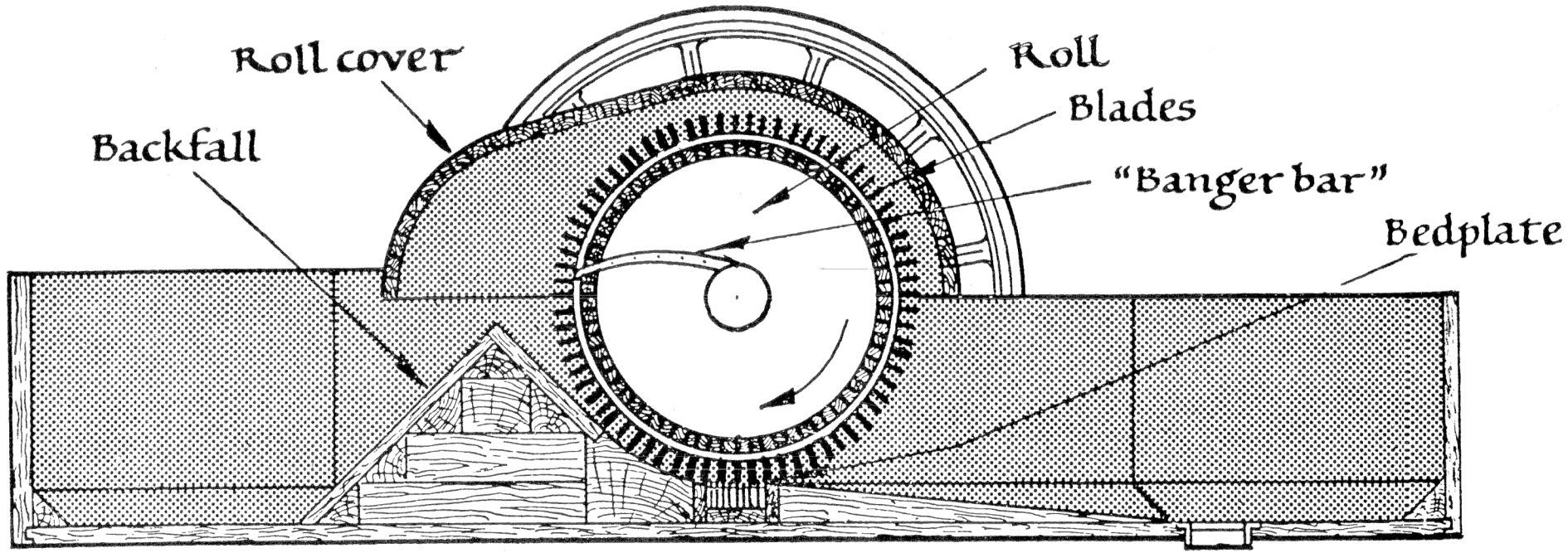
Beater Builders of North America

A catalog of handbuilt beaters
1946-1989



The Friends of the Dard Hunter Paper Museum

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This being a registry of the 1988 beater exhibition held by
the Friends of the Dard Hunter Paper Museum in Bloomington, Indiana
with additional handbuilt beaters by members of the Friends

Edited by Lee S. McDonald

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FOREWORD

The machines in this catalog reveal the remarkable dedication of their builders, which springs from their love of (or is it addiction to?) making paper. These papermakers needed a beater and so overcame obstacles such as lack of information and money for parts—problems that would stop most people. Their ingenuity shows what the talented and/or foolish can achieve once they set their hearts on it. Just about every way you could possibly build a beater is represented here. These handbuilt and homebuilt machines range in levels of technogical sophistication, from the simplest of construction to machines that are works of art in themselves. Many of the beaters are by people who had little experience with machines. Some built machines so that they could have exactly what they wanted, others because nothing else was affordable, and a few because they actually like the challenge of building something. All received an education of sorts.

This catalog was created to have permanent documentation of a show that was held at the 1988 annual meeting of the Friends of the Dard Hunter Museum in Bloomington, Indiana. While every effort was made to contact all known papermakers who had built beaters, there was little time from the inception of the idea to the show itself. Not all beater builders were known, for there isn't a registry for beaters like the one for automobiles. When a second call went out for beater builders, the number to come out of the woodwork pointed out that many more people had built beaters than had previously been thought possible. Aside from its historical interest, this catalog will be an inspiration to any papermaker out there who wants to attempt to make their own. As you can see, it has been done before.

Lee S. McDonald
September 1990

ACKNOWLEDGMENTS

I want to thank all beater builders who supplied pictures and text for inclusion in this catalog. Special thanks go to Lyda Kuth as copyeditor, Kathy Herman as designer, Peter Vandermark as photographic advisor. Kent Christman and Ichabod for their late night efforts. Also to my staff here at Lee S. McDonald, particularly Roz Kramer, for their help and for putting up with the duration of this project. I could not have done it without them. Also thanks to Howard Clark and Tim Barrett for organizing the original show and others such as Peter Thomas and Doug Stone for their continuing enthusiasm.
Lee S. McDonald
September 1990

All pictures unless otherwise noted are photographed or supplied by the current owner of the machine.
Photographs marked (ck) are by Carle Kissel
Photographs marked (lsm) are by Lee S. McDonald

All text is by the makers of the machines unless otherwise credited.

Cover art by Howard Clark

Text set in 11/13 Goudy Old style, specifications in 10/13 Avienir.

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BEATERS

THE BEATERS

This table of contents also serves as a chronological index and record of participation in the beater show. Where possible or known the beaters in this catalog are arranged in chronological order. If the builder has made more than one beater then the earliest machine places the order.

FRIENDS OF THE DARD HUNTER PAPER MUSEUM
1988 BEATER EXHIBITION

This exhibition has been organized by Howard Clark and Timothy Barrett in an effort to bring together some of the more notable homebuilt beaters, especially, where possible, the originals in any subsequent series. We have also invited those currently in production of beaters designed for hand papermakers to exhibit.

Building a beater is no easy feat. Such an accomplishment requires a general knowledge of beating and papermaking, a feel for basic engineering, good hand and tool skills, a knowledge of materials, inventiveness, gumption, and blind faith. When the finished machine actually functions, and particularly when it produces a range of pulps through decades of constant use, the accomplishment is major and significant.

This exhibition, while representing only a portion of the machines that have been built, testifies to the intensity and duration of the hand papermaking revival in North America, and to the creativity and energy of many in the craft.

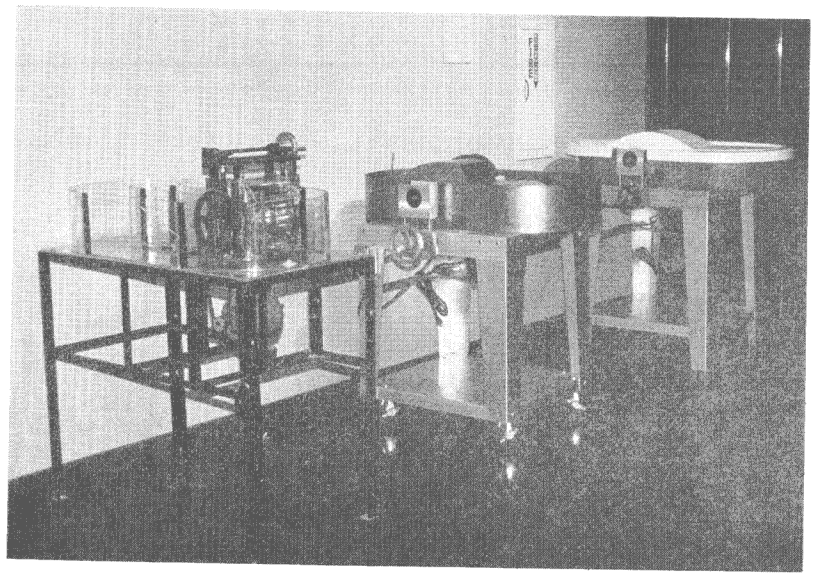
We hope the exhibition educates, enlightens, and inspires. At some point in the future we hope to have a similar, perhaps more comical, exhibition of "first moulds" by members of the Friends. In the meantime, we welcome comments and suggestions.

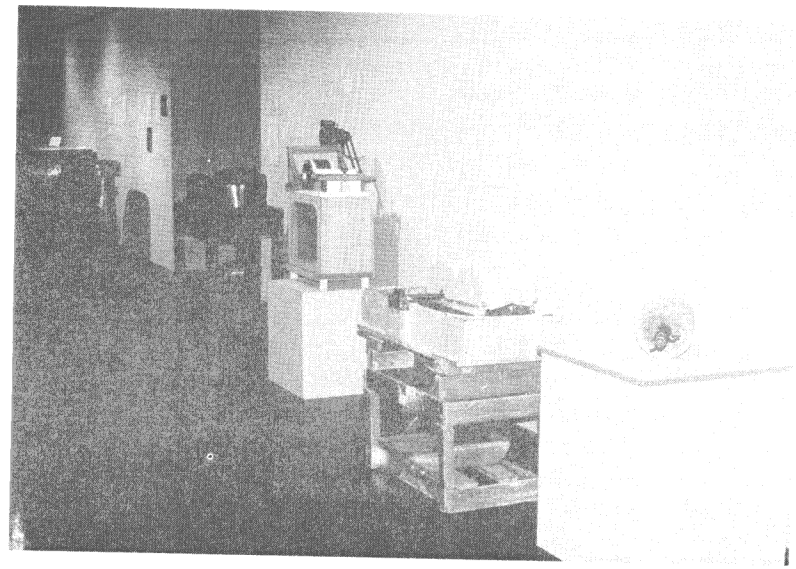
Our apologies to anyone who was not invited to this exhibition who should have been. We have made every effort to contact those in the field we are aware of whose machines would be appropriate to this show.

Our thanks to Kathryn Clark who helped with important organizational efforts, and Jim Canary who provided crucial tactical support as site liaison person.

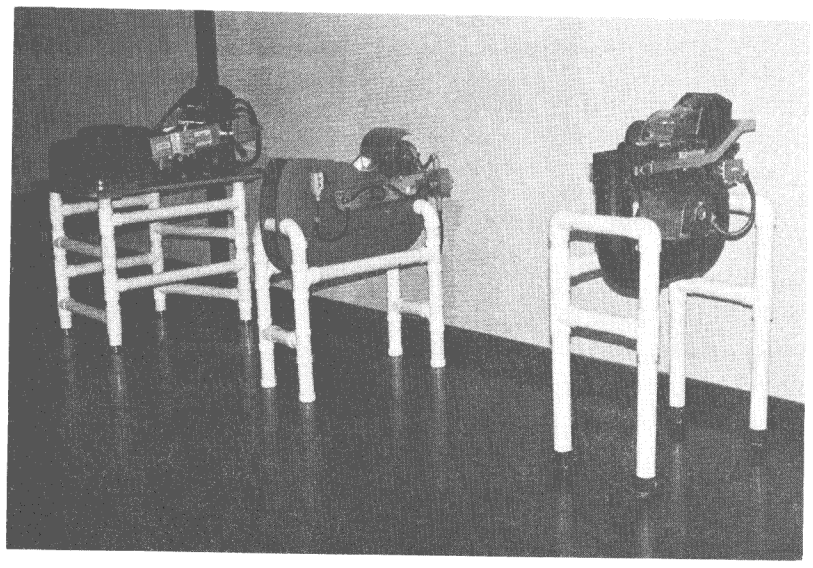
Our thanks especially to the William Hammond Mathers Museum of Anthropology, History and Folklore, to its staff, and in particular to Ms. Elaine Gaul, all of whom have hosted the show and struggled with moving, installing, and return shipping some very odd machines.

Timothy Barrett and Howard Clark
1988





Laws beater, Irving E. Lee Jr., Weygand Tightwad beater, Jim Dandy beater (remaining parts)
(ck)



David Reina's #1, Standard and Aluminum roll beaters
(ck)

Lee McDonald's Hydra Hollander, Oak Park beater, Jim Yarnell's Sewer Pipe beater
(ck)

BEATER TYPES

The beaters in this exhibit have two types of tub arrangements: horizontal, and over-under; and two types of roll/bedplate combinations: moving roll/fixed bedplate, and fixed roll/moving bedplate.

I. TUB DESIGNS

A. HORIZONTAL TUB: Most of the beaters in this exhibit have an oval tub with a midfeather that divides the straight, central portion to create a "racetrack" in which the pulp can go round and round. The roll is situated in the center of one of the straight runs. The pulp travels down the first straight section, where it goes between the roll and bedplate, then up and over the backfall, around the back turn, up the "backstretch," around the front turn, and so on.

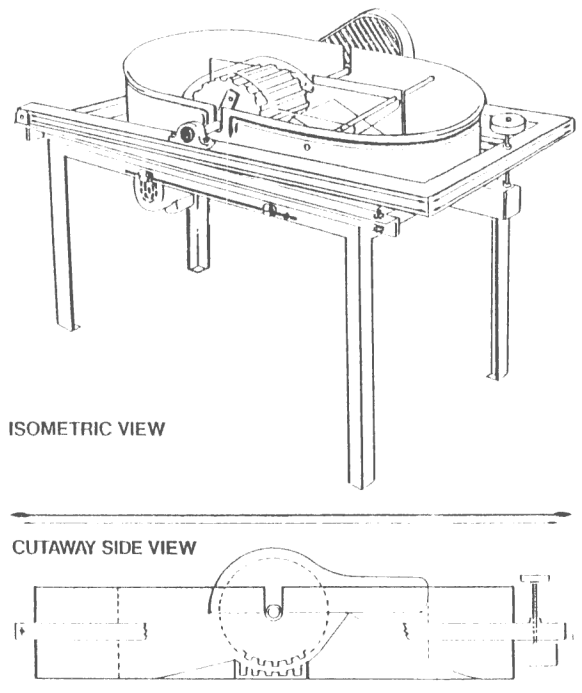
B. OVER-UNDER TUB: Jim Yarnell's second beater and, subsequently, Lee McDonald's first production beaters, were of the over-under type. The pulp travels between the roll and bedplate, then up and over the backfall, then sinks down the back turn, through the return run which is directly under the roll and bedplate, then up the front turn, and so on.

II. ROLL/BEDPLATE DESIGNS

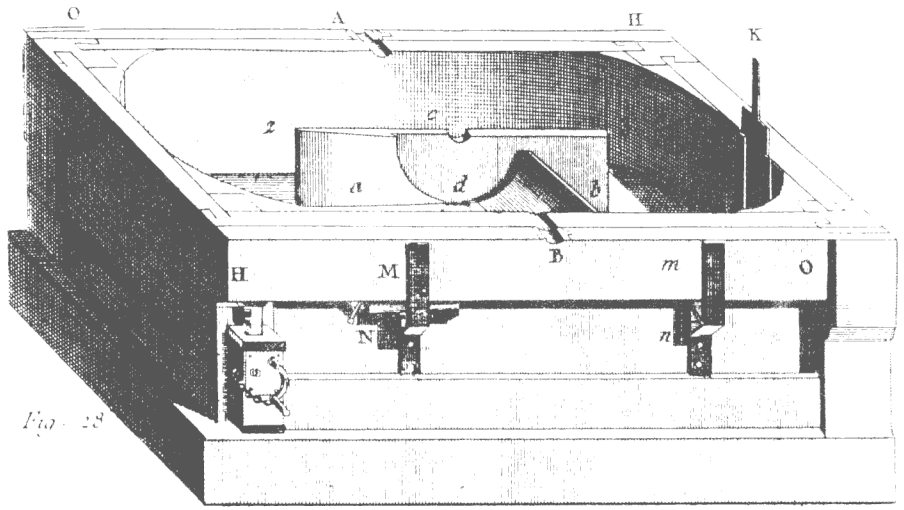
A. MOVING ROLL/FIXED BEDPLATE: Historically most common, this design has the roll supported at each end by bearings attached to moving arms. The arms have pivots at one end and an adjusting mechanism on the other. This mechanism is used to raise and lower the roll in relationship to the bedplate, which is fixed in the tub floor directly beneath the roll. Beating pressure is determined by the weight of the roll.

B. FIXED ROLL/MOVING BEDPLATE: Historically uncommon, the roll bearings are fixed in relationship to the tub and the bedplate is in a vertical slot in the tub floor. The bedplate can move up and down in this slot, and there is a flexible gasket to keep the water and pulp from leaking out. A pivoted lever arm is located under the beater, one inch pushes up on the bedplate, the other end is pulled down by weights that, in turn, provide the beating pressure. This design was used by the Valley Iron Works (now Voith Inc.) in Appleton, Wisconsin, for their ubiquitous laboratory beater, and I know of no other use of this design in the industry.

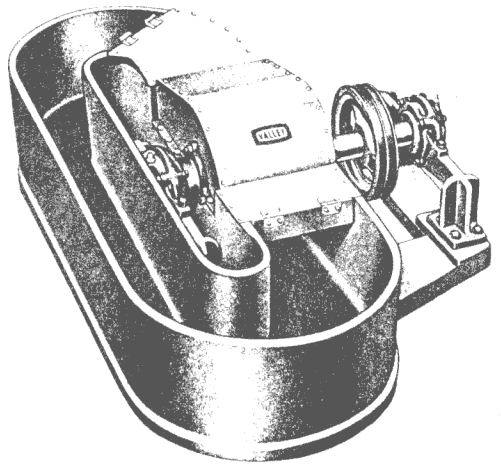
The design has been used by many home-builders, myself included, due to the simplicity of the lever arm arrangement. Its drawbacks are the difficulty in cleaning pulp from the bedplate slot, and a related tendency for the bedplate to stick.
Howard Clark

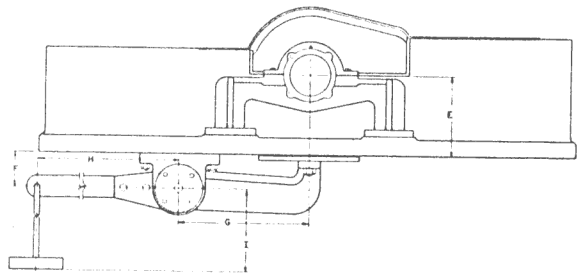


Moving roll / fixed bedplate
Example Davis Hodges beater

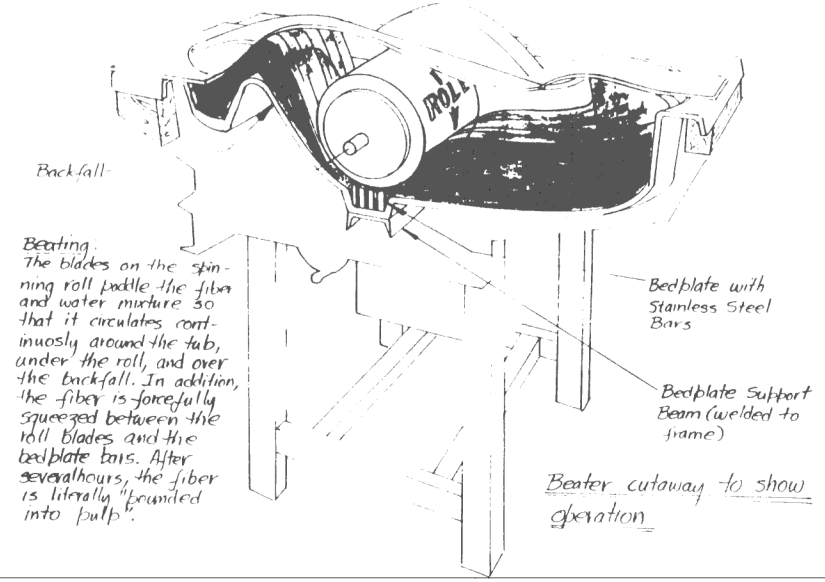


Horizontal tub

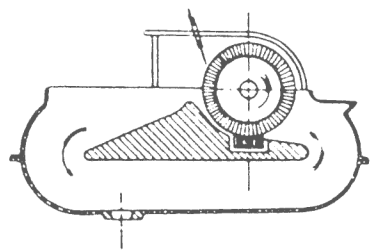




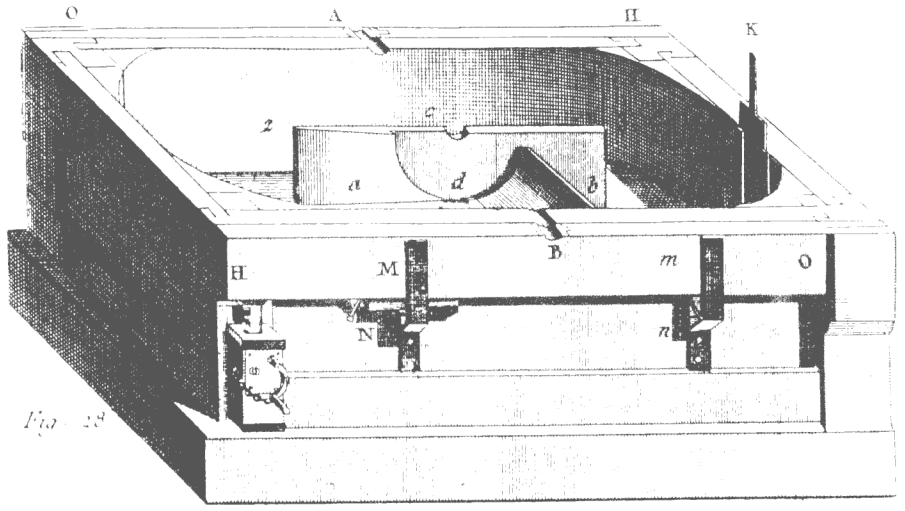
Moving bedplate / fixed roll
Example Valley Beater built by Voith Inc.



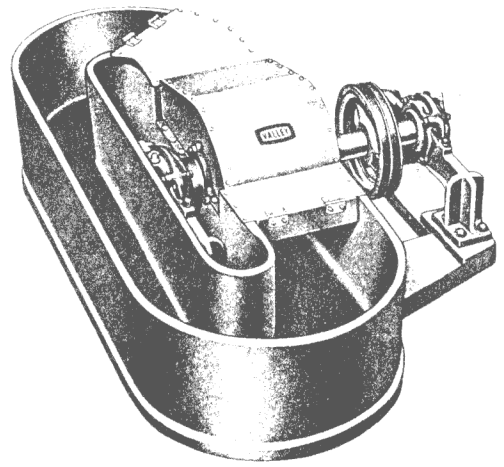
How a hollander works
(Howard Clark)

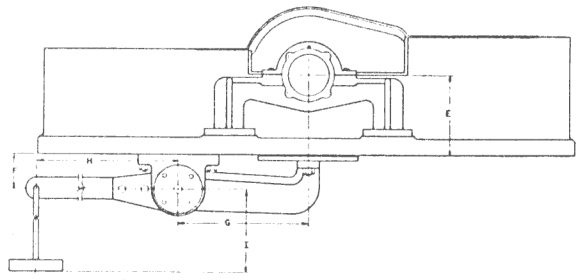


Over-under tub

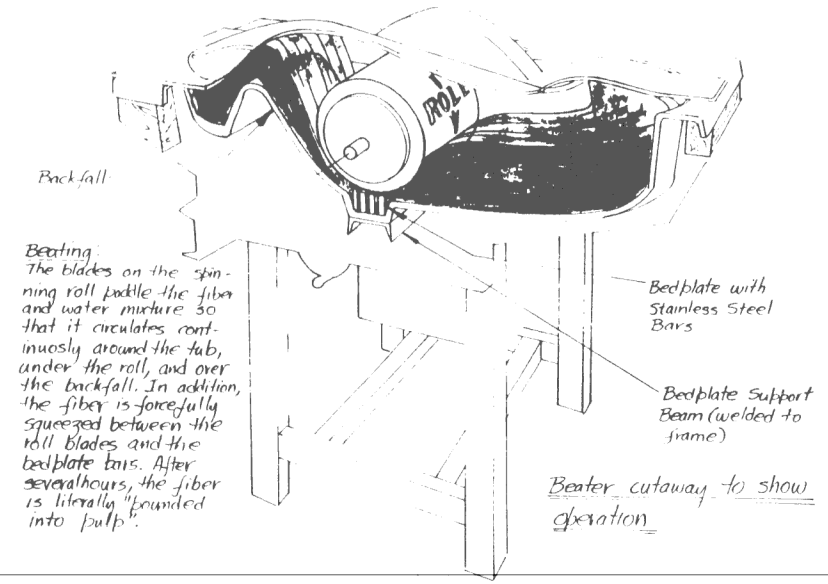


Horizontal tub

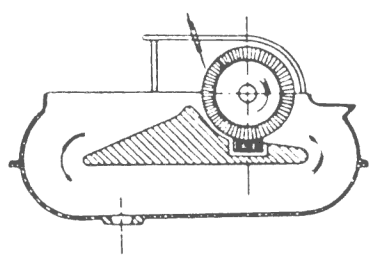




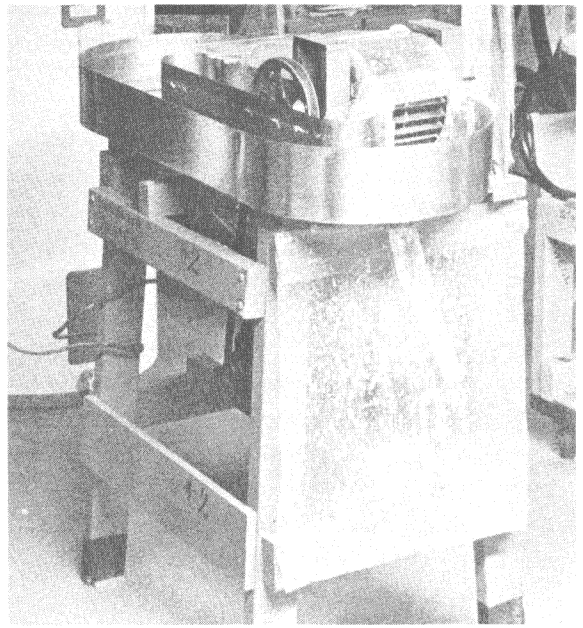
Moving bedplate / fixed roll
Example Valley Beater built by Voith Inc.



How a hollander works
(Howard Clark)

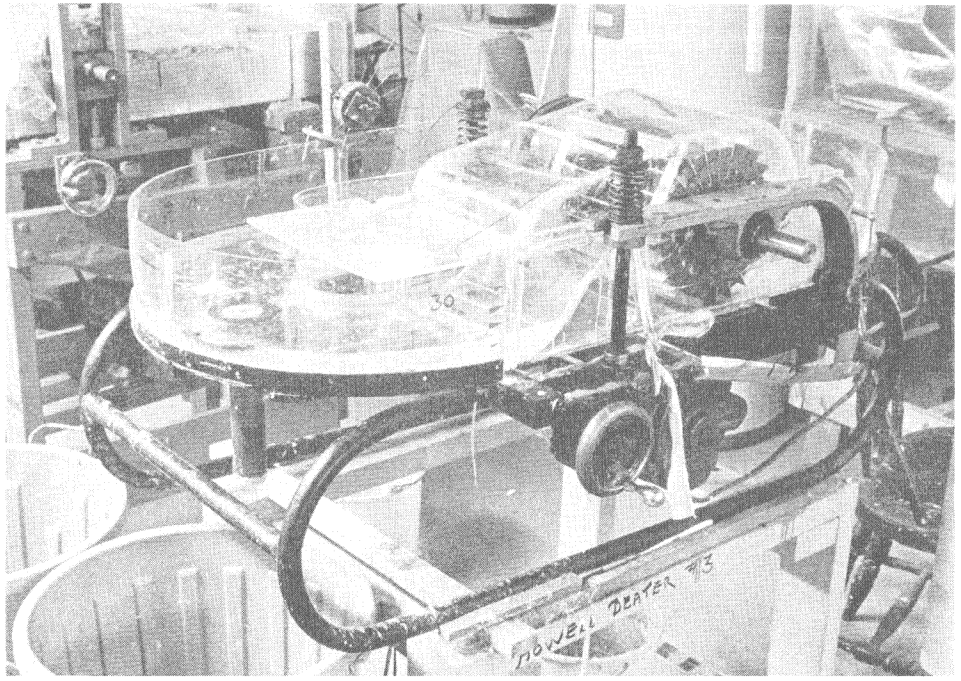


Over-under tub



BEATER #2

Built and designed by Douglass Howell in 1949
Period in use: 39 years; daily use until 1961, average once a week since 1961
BEATER LOAD WEIGHT: 1 lb. (454 gm.) dry fiber to 30 ltrs. water
MATERIALS: Stainless steel tub, bedplate and flybars, bronze roll and shaft
Remarks: Originally the roll shaft was set onto blocks which raised and lowered the roll. There were no ball bearings. In 1988 the roll height lifter blocks were replaced with ball bearings. The bedplate is stationary.
PRESENT OWNER:
Eugenie Barron, Richmond Hill, NY



BEATER #3

Built and designed by Douglass Howell in 1961
Period in use: daily through 1982

MOTOR: 1/2 hp industrial
BEATER LOAD WEIGHT: 1 lb. (454 gm.) dry fiber to 30 ltrs. water
MATERIALS: Plexiglass tub, stainless steel flybars and bedplate

REMARKS: The modifications which Howell made for this research beater relative to his previous design were these:

1) The bedplate bars were lowered to be flush with the tub.

2) Howell changed from shaft lifter blocks to a ball bearing arm for adjusting the roll height.

3) The flybars in #3 are thicker than those in his previous beaters, and made from a higher grade steel.

PRESENT OWNER: Douglass Howell, Hackettstown, NJ

THE LAWS BEATER

Henry Morris published Arthur Laws's account of building a beater in Omnibus where many of the current hand papermakers read it, even if it was a third hand, xerox copy. It, and an account of Henry's experiences in the same book, were the only nonindustrial beater information that many of us had access to.

The Laws beater is of the fixed roll/moving bedplate variety and is obviously a home-made version of the Valley laboratory beater. There were some very ingenious adaptations, however, including the wooden roll with blades screwed on and the copper tub that any sheet metalshop could make. Laws was an experienced wood-worker, by his own account, and was obviously good with sheet metal as well. Mr. Laws was retired when he built his beater, in 1959. He made the paper for a sample book before leaving for a trip to Europe in February 1960, but died from a heart attack while in Italy. Mrs. Laws, with no experience at all in bookbinding, completed the eight copies of his book.

Arthur Laws didn't make a lot of paper with this beater, but it surely did work. The paper Mr. Laws made with pulp prepared in this beater was just fine.

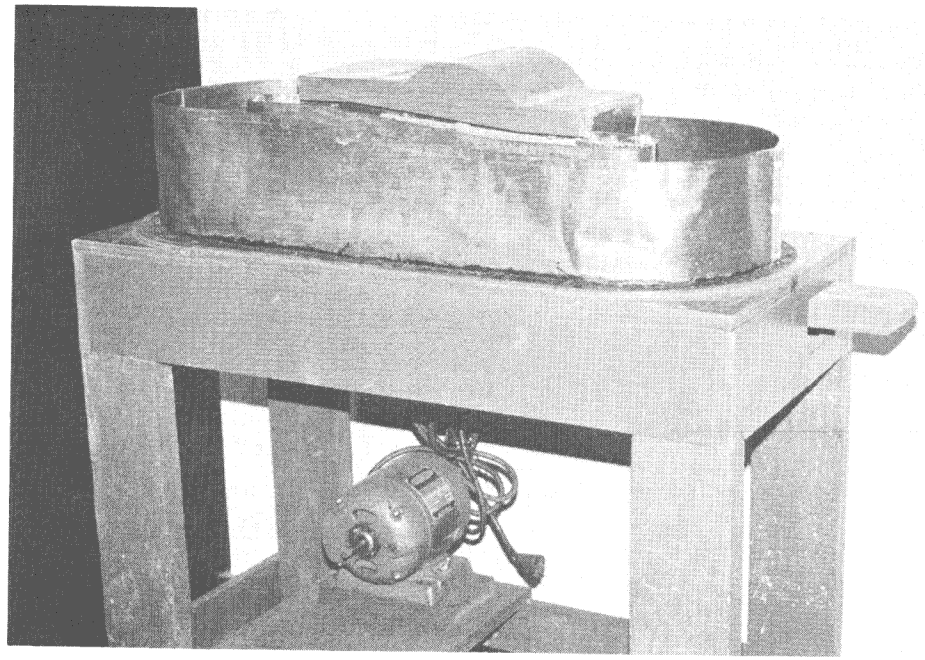
If you prefer the scientific approach, where an experiment isn't valid until another worker reproduces it, consider the Hoffman/ Urabec beater in Los Angeles. It is an exact clone of the Laws beater, built from the article in Omnibus, and has made pulp almost every Friday afternoon for more than twenty years. It looks only slightly more worn than the original Laws machine, which speaks well for the copper construction. There are, incidently, pictures of Hoffman and Urabec and their beater in Vance Studley's book, even though he didn't see fit to identify his photographic subjects.

The beater was located by Peter Thomas, with the help of Sara Gilfert, and was subsequently donated to the Friends of the Dard Hunter Paper Museum. We are very proud to have this important relic of the revival of hand papermaking in America. If you are interested in Mr. Laws and the early days of papermaking revival, contact Peter Thomas, printer and historian, who has the most complete collection and information about Mr. Laws and others.

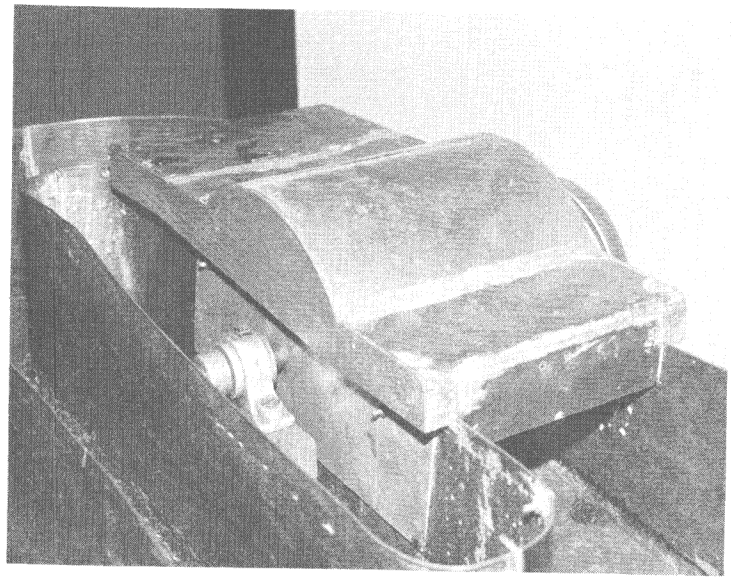
Howard Clark

Note:
By the way, Mr. Laws was very proud of the fact that his beater only cost $55.81 to build. He had hoped that by building an inexpensive beater he could encourage more people to take up the craft. I think I spent more than that on the brass I poured into my roll.

Peter Thomas

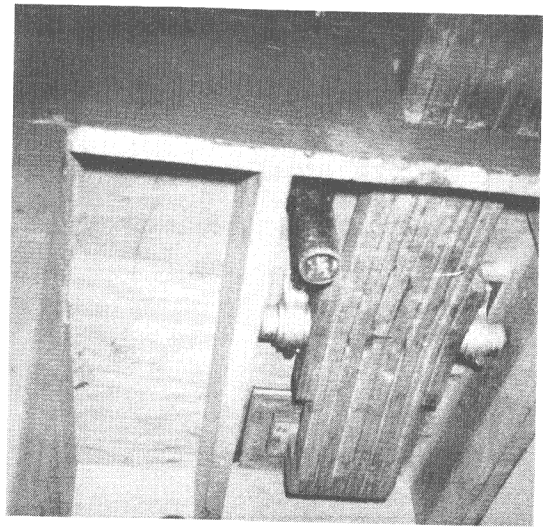


Laws beater side view
(ck)



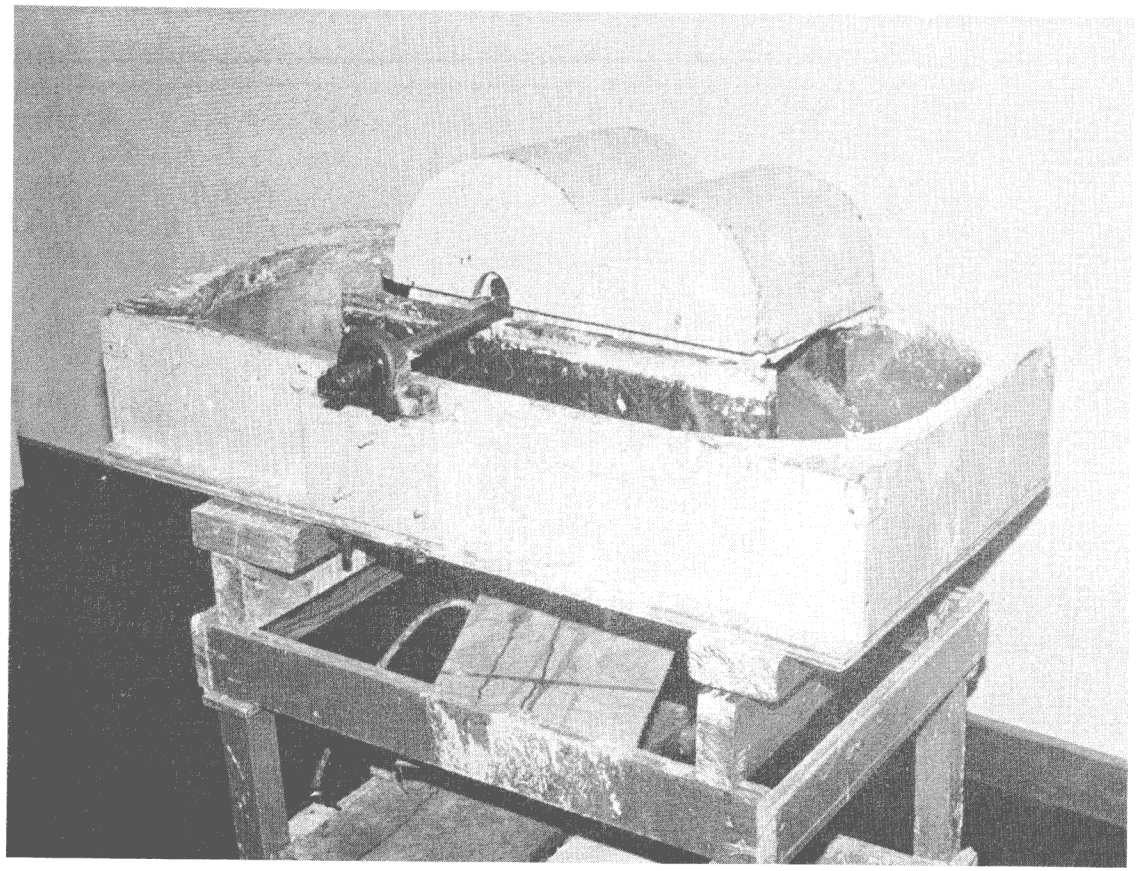
Detail lid
(ck)

THE LAWS BEATER
Designed and built by Arthur Laws 1959
ROLL:
Diameter: 7 1/2 inches
Width: 6 inches
Shaft diameter: 3/4 inch
Bars: 32 brass bars, 1/4-inch square attached with 1-inch brass wood screws
Construction: three, 2-inch-thick disks of cypress wood, painted, and then sheathed in copper
BEDPLATE: Pecan wood with four , 1/4-inch brass bars mortised in. The bars are ~~chevron shaped.~~
LEVER ARM: Laminated plywood that exerts pressure on the bedplate through a rubber gasket
TUB: 14 1/2 x 36 x 6 inches, sheet copper throughout
CAPACITY: 1 1/2 lbs. of dry fiber, 5 to 6 gals.
MOTOR AND DRIVE: 3/4 hp, 1760 rpm electric motor with a 1 1/2-inch pulley driving a 6-inch roll pulley with a v-belt. The roll speed is approximately 440 rpm.
COST: $55.81, less motor (1959)



Underside showing pivot arm
(lsm)

THE WEYGAND TIGHTWAD BEATER



Weygand Tightwad beater
(ck)

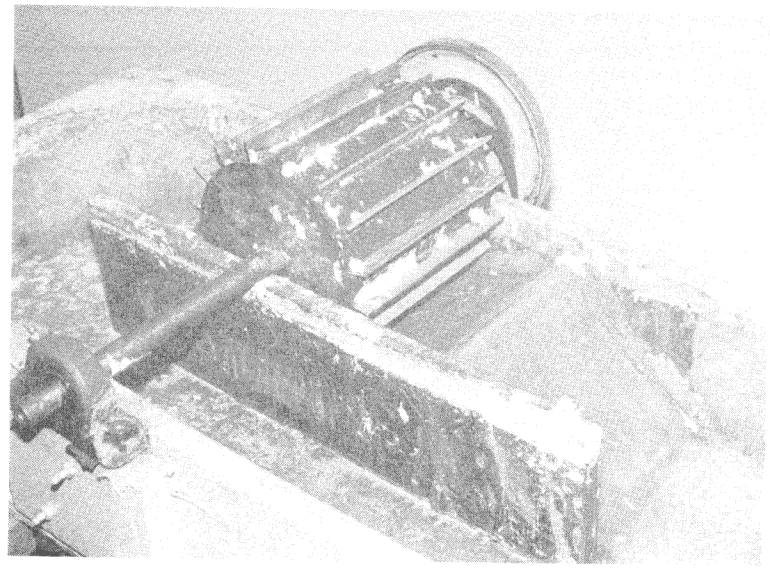
James Lamar Weygand, of Nappanee, Indiana, has operated Private Press of the Indiana Kid since the forties. He is one of the pioneers of the American revival of hand papermaking, making his first attempt in 1945, which you can read about in his "Adventure with Paper; Encounter with a Meat Grinder," the first miniature book ever printed on paper handmade by the author.

Weygand's enthusiasm for papermaking was dampened by the fact that he is a "confirmed tightwad," and commercial laboratory beaters were simply too expensive. He claims to have no mechanical ability, but that is refuted by the machine you see before you. He overcame his lack of experience in machinery construction by thorough research and careful design and construction.

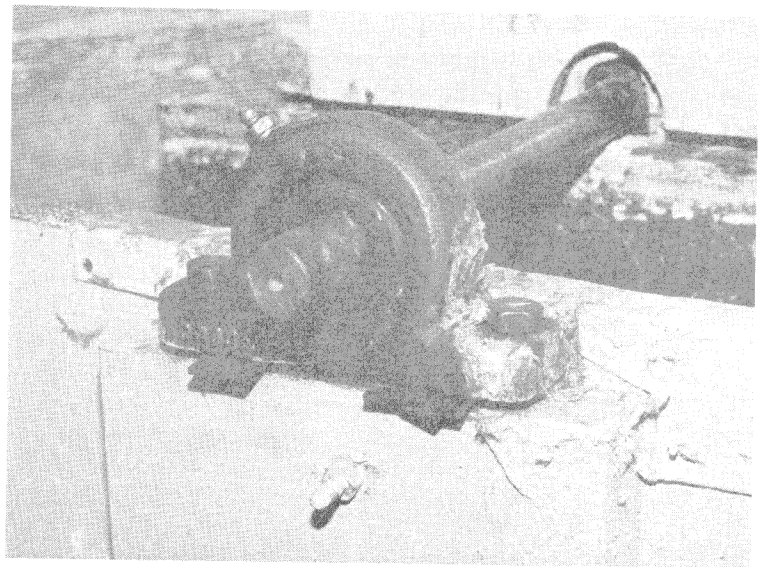
The beater was constructed in 1967 and is still in occasional use today. The construction details are recounted in "The Weygand Tightwad Beater," one hundred copies of which were printed by the author on his own Antique Laid IK paper in 1970.

Weygand's enthusiasm and knowledge have added immensely to the revival of hand papermaking. He was of immeasurable help to Twinrocker in the early days. I called him from San Francisco once, when I was having trouble making decent pulp, and we had a long discussion of what a wooden beater sounds like when it's working properly; the noise is frightening to someone who has just spent months building the machine.

Howard Clark



Roll and tub without lid
(ck)



Bearing block showing wedges used to adjust roll height
(ck)

THE WEYGAND TIGHTWAD BEATER

ROLL: Diameter: 8 1/2 inches
Width: 8 inches
Bars: 16 bars made of 1/8 x 1-inch tool steel, set in 1/4-inch grooves in roll and welded
Construction: Made from 7-inch O.D. heavy wall pipe, ends welded up and attached to the shaft
Shaft diameter: 7/8 inch

ROLL ADJUSTMENT: The roll height is adjusted by means of shims under pillow blocks. The pillow block bolts are loosened and a combination of 6 and 2 point printer's shims, along with brasses and coppers, are inserted, depending on the roll height desired, and the bolts retightened. A somewhat cumbersome method, but simple, accurate, and effective.

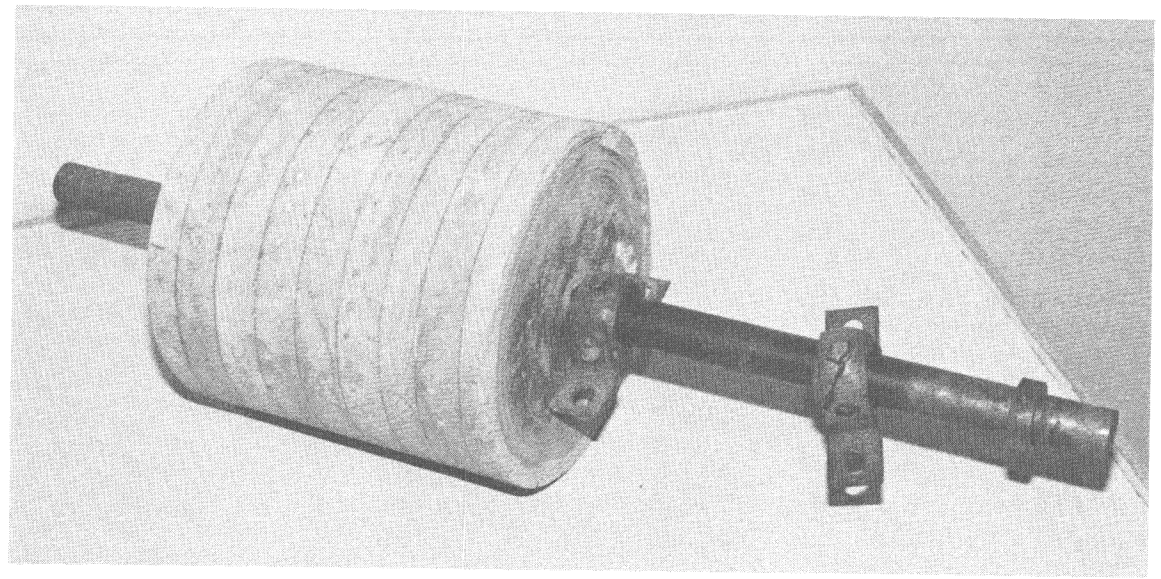
BEDPLATE: 9 tool steel blades bolted together, set in tub floor
TUB: 20 x 38 x 6 inches, marine plywood and galvanized sheet metal, fiberglassed
CAPACITY: 1 1/4 lbs. dry fiber
MOTOR AND DRIVE: 1/2 hp, 1700 rpm, from a 20-year-old furnace. A 3-inch motor pulley drives a 7-inch roll pulley with a v-belt, roll speed is approximately 700 rpm

JIM DANDY BEATER

James Lamar Weygand's brother, Charles F. Weygand, was fascinated by his brother's papermaking activities and decided to build a beater for himself. The construction and use of his machine is detailed in the hilarious book, "Charlies Place: Papermaking in a Mobile Home," printed by James Lamar Weygand at the Press of the Indiana Kid in 1972 on paper made entirely by Charles Weygand at his Jim Dandy Mill.

Charlie lived in Arizona, in the infamous mobile home, and so had to work out different construction methods than his brother used. Charlie's roll is made of wood, sheathed in galvanized steel. The tub was made from galvanized steel at a sheet metal shop. Charlie wanted an easier method of adjusting the roll height than the one his brother had used, so he came up with an ingenious and simple device using eighteen-inch wooden arms with long vertical bolts at each end, with turning nuts on the bolts that raised, lowered, and locked the roll position. Unfortunately, we are unable to examine the entire beater as Charlie got tired of papermaking (and annoying his neighbors) and junked the machine, although his brother managed to rescue the roll that you see here.

Howard Clark



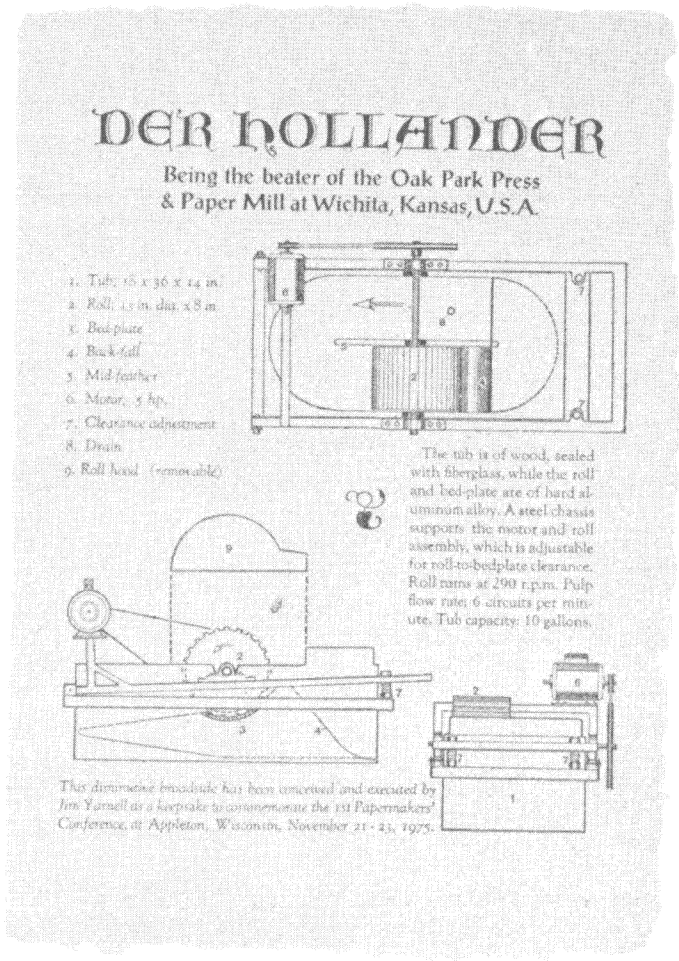
Remaining roll core and shaft from the Jim Dandy beater
(ck)

THE JIM DANDY BEATER

ROLL:
Diameter: 8 1/2 inches
Width: 8 inches
Bars: 36 bars made of 3/8-inch square brass, attached to the shaft and 1-inch brass screws
Construction: Made from layers of wood, attached to the shaft and turned, sheathed in galvanized steel
Shaft diameter: 1 inch, from a junked evaporative cooler (plentiful in Arizona)

ROLL ADJUSTMENT: The roll was adjusted by means of bolts at either end of the wooden arms that supported the pillow blocks. The bolts went through the arms and down to the base board, with nuts above and below the base board. The nut above the board determined the height of the roll, the one under it was tightened to lock the adjustment.
BEDPLATE: 7 3/8-inch square brass, set in the tub floor
TUB: 18 x 36 x 6 inches, galvanized sheet metal over a wooden floor, seams smoothed with fiberglass and resin
MOTOR AND DRIVE: "GE 2-speed" from another old evaporative cooler, probably 3/4 hp, 1800 rpm. A 2-inch motor pulley drove a 6-inch roll pulley with a v-belt

JIM YARNELL BEATERS


DER HOLLANDER

Being the beater of the Oak Park Press
& Paper Mill at Wichita, Kansas, U.S.A.

1. Tub; 16 x 36 x 14 in.
2. Roll; 15 in. dia. x 8 in.
3. Bed-plate
4. Back-fall
5. Mid-feather
6. Motor, 5 hp.
7. Clearance adjustment
8. Drain
9. Roll hood (removable)

The tub is of wood, sealed with fiberglass, while the roll and bed-plate are of hard aluminum alloy. A steel chassis supports the motor and roll assembly, which is adjustable for roll-to-bedplate clearance. Roll runs at 290 r.p.m. Pulp flow rate; 6 circuits per minute. Tub capacity: 10 gallons.

This diminutive broadside has been conceived and executed by Jim Yarnell as a keepsake to commemorate the 131 Papermakers' Conference, at Appleton, Wisconsin, November 21 - 23, 1975.

This broadside was the inspiration for Peter Thomas's beater along with many others by struggling papermakers

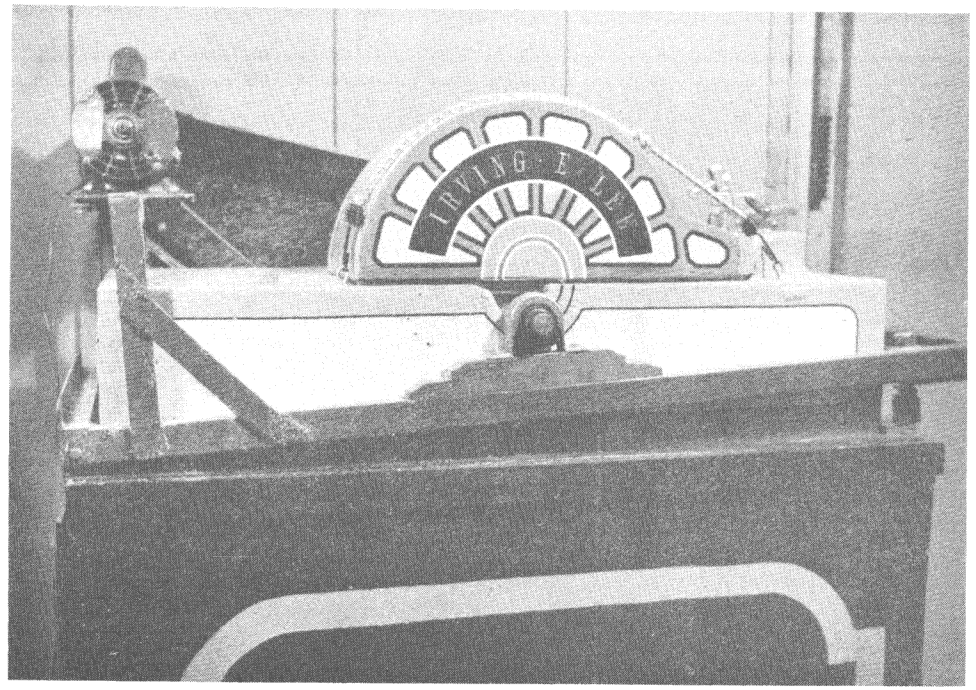
Jim Yarnell has been an inspiration to more beater builders than any other single source. His involvement with paper has brought a sense of humor to what once tried to be a serious group of aspiring papermakers. Besides that, Jim is always ready with solid advice to anyone who approaches him, including myself. He's built at least six different designs at the last count, and there may be one or two more I don't know about. These machines range from 2 quart miniatures to 1 1/2 pound hollanders. His enthusiasm and practical advice have always been a winning combination.

I asked Jim why he started building beaters, and his reply was:

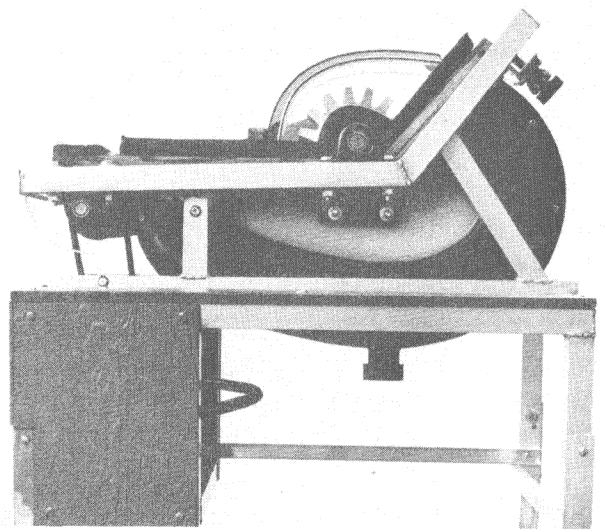
"I really thought everyone made it too complicated, too mysterious. I thought there was a need for small beaters rather than gigantics, and I still believe that. I really thought there was too much hocus-pocus around papermaking . . . people talking about the ideal length of the paper fiber being 2.97 mm and not 3 mm. Most of them wouldn't know a mm if it kicked them.... What people really wanted was a way to make paper whether the water was good or not.

I built my big beater first. It made a lot of pulp, but I couldn't keep up with it. I thought, now here I am a one man conglomerate. I would rather have three little ones than one big one. Building the big one was kind of like climbing a mountain; I was determined to build it. Even Dard Hunter had said anyone not making paper on a big scale is doomed to failure. I don't know what he called his operation. The reason I built the first beater the size I did was by default. I was looking for anything to make a roll out of. I looked at tractor parts, pulleys, even iron things that would rust. Finally in my own aircraft company I found a solution. The company was making rocket powered targets for pilots to shoot at. They were using a 12-inch aluminum tube for the body. They bought these things from the mill, and I noticed they had scrap of 8 or 9 inches left over after cutting. I availed myself of this through the salvage yard where all the damaged and left over parts ended up. I had them put ends on it and welded bars onto them. If they had been making little rocket ships 8 inches around instead of 12 inches the roll would have been that size. It was hardly by design. It is still working fine. Lucy is using it in Utah. I like my smaller ones now."

Lee McDonald



The Irving E. Lee Jim's original beater
See Jules Heller's Papermaking for detailed pictures of the Irving E. Lee.



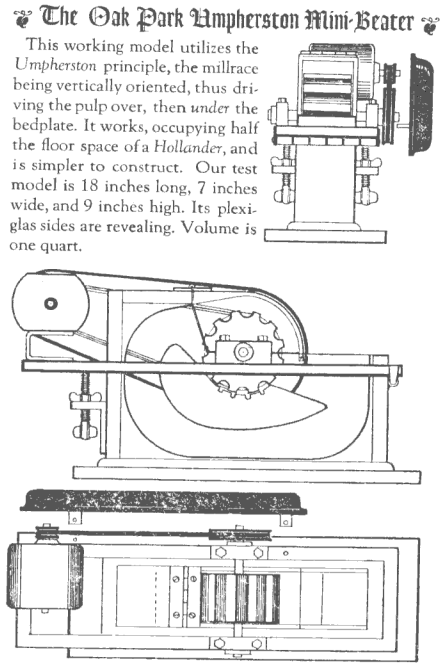
Ferrari/Umpherston

IRVING E. LEE

The first beater of the Oak Park Press and Papermill. Late 1960s, 12 gallons fluid capacity, aluminum roll and bedplate. Tub made of 3/4-inch plywood sealed in fiberglass. Ultra simple in design. Roll to bedplate clearance adjustable by machine screws on a hinged chassis. The chronic sloshing, splashing sounds along with the riverboat appearance of the machine inspired its daddy to christen it the Irving E. Lee. It is now based in Moab, Utah, Cap'n Lucy Wallingford commanding.

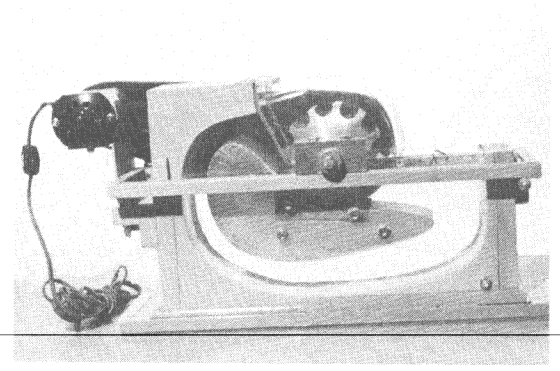
FERRARI/UMPHERSTON BEATER

This small beater is based on the Umpherston principle with Ferrari overtones. The tub is of vacuum formed ABS thermoplastic. The 4 x 6 roll and bedplate are of heat treated aluminum. Capacity is 2 gallons liquid plus 7 to 8 ounces of dry fiber.



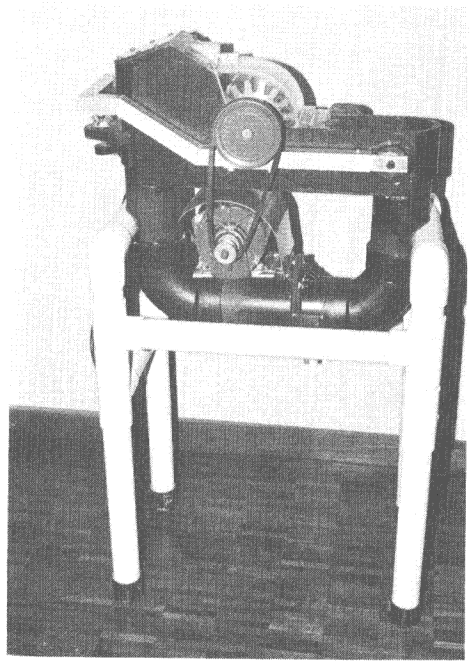
Broadside of the Oak Park Umpherston Mini beater

The Oak Park Umpherston Mini beater



THE OAK PARK UMPHERSTON MINI BEATER

This very small beater operates on the umpherston principle. With a fluid capacity of one quart, it is easily portable and useful as a demonstration device. With sides of transparent Plexiglas the beating process can be easily and graphically observed.



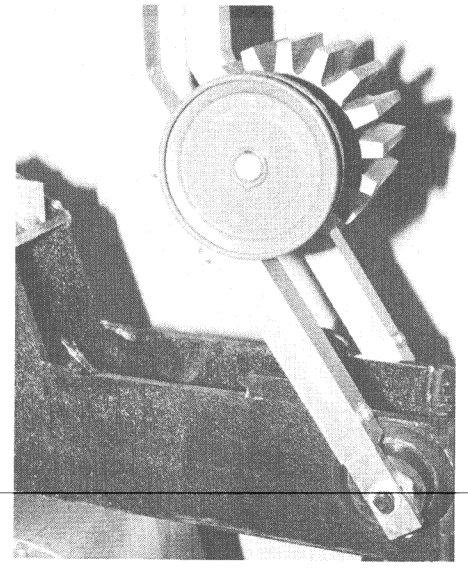
Sewer Pipe beater (ck)

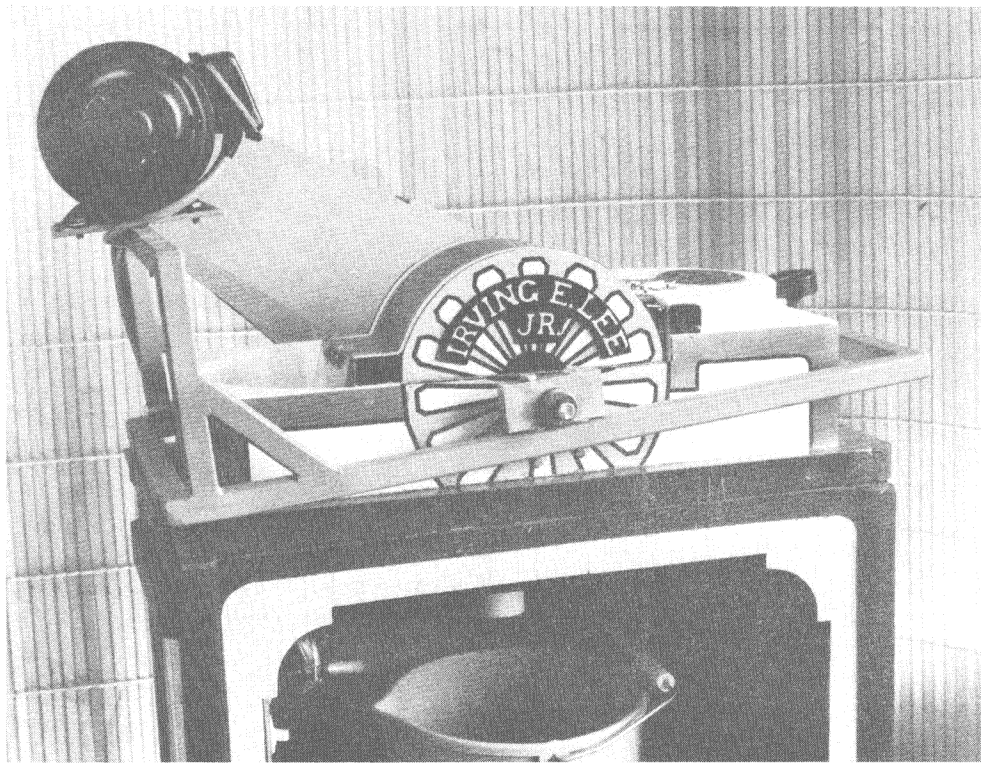
Roll and swing arms on the Sewer Pipe beater (ck)

JIM YARNELL SEWER PIPE BEATER

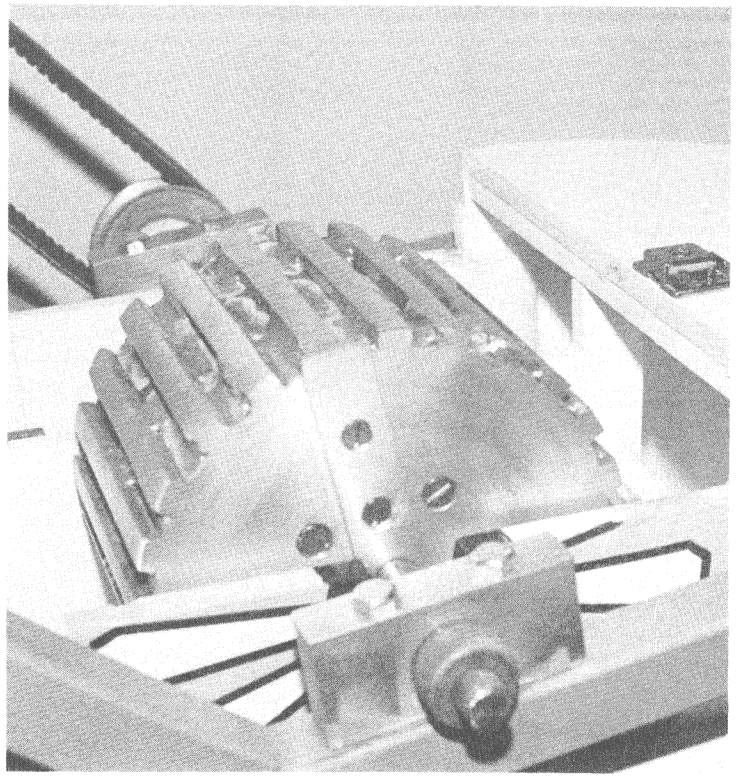
Designed and built by Jim Yarnell of the Oak Park Press and Papermill of Wichita, Kansas, about 1983.
Built of PVC pipe and aluminum with cast aluminum roll; 3/4 lb. capacity, 1/4 hp motor. This is an Umperston design with a over-under flow. It was the inspiration for the Oak Park beaters. A very simple design using a lot of readily available materials.

Owner: Lucy Wallingford, Moab, Utah





The Irving E. Lee



Roll exposed on the Irving E. Lee

IRVING E. LEE JR.

The Irving E Lee Jr. is a working one-half size model of the original hollander of the Oak Park Press and Papermill. Both were designed and built by James Yarnell 20 years apart. The junior has a fluid capacity of 6 quarts.
Now residing at the Oakpark Press and Papermill, Wichita, Kansas.

THE FIRST HOWARD CLARK BEATER

Howard Clark's Version

This beater, around which Twinrocker was established, was built in the late winter and spring of 1971 in San Francisco. The beater project began as a kind of therapy after an intense two years helping a friend begin a high-tech, computer-based company. The West Coast Aerospace Recession wiped out my job, and prospects for another one, so I applied for unemployment and went down in our rented basement to build a beater.

A good friend, the poet and printer Clifford Burke, had encouraged all this by lending me his copy of Hunter's Papermaking, Art and Technology, and by finagling a copy of Henry Morris's Omnibus from a collector. With the Laws article, and Henry's hilarious account of building his own first beater, I set off to design mine. Before I was finished, I had read all of the dozen or so technical books on papermaking in the San Francisco Public Library.

The design is basically of the fixed roll/moving bedplate type, modified by the tools and materials I could afford. My mechanical engineering background helped, but I was hindered by my lack of tools and finances. My power tools consisted of a portable table saw, and an electric drill that could be mounted in a cast-aluminum drill press gizmo.

The beater tub and stand are made of wood. The bearing support area is of interlocking pieces of marine plywood, glued and screwed together. The tub ends are made from redwood, barrel fashion, with brass bands. I used resorcinol waterproof glue throughout.

The roll is made from the center portion of a belt conveyor roller that I found in a machinery junkyard. The only work done outside my basement was to have the crown turned off the roll and the blades cut to length. The blades are of mild steel, all that I could afford. Two blades were bolted to every other oak spacer, and these units were in turn bolted to the roll; then the other spacers were bolted in between to tighten up the whole assembly.

The bedplate was initially a block of wood in which mild steel blades were mounted. I replaced this with one made entirely from steel, after a couple of years, as the wooden one would swell and stick in the slot.

The lever arm was laminated wood and the pivot was a shaft and bearings from a junkyard. Initially, bedplate height was adjusted by a screw jack under the lever arm. I soon found out that an important concept in beater designs is the idea that the roll and bedplate be able to move away from each other if a knot or lump comes through. With my screw jack design, this couldn't happen, and the beater would often stall, blowing a fuse in the process.

I found the Valley beater idea of hanging weights to be cumbersome, so I tried a lot of different arrangements to apply weight onto the bedplate. The one on the beater was made from a junkyard steering gear from a Ford truck. It was just another trial gizmo, but it worked, and worked well. We hung various amounts of weight on it, depending on the fiber and the pulp desired. The steering gear allowed us to apply more or less of the weight as desired and we didn't have to remove the weights at the end of beating. I always intended to rebuild the mechanism into something more aesthetically pleasing, but never got around to it.

When I first finished the beater, I was pleased that it worked at all. My experience in machine design told me not to expect much from a prototype machine, particularly one made of wood. I expected it to either fail or not perform correctly, and that it would have to be greatly modified or replaced, and soon. I certainly didn't think it would make all of Twinrocker's pulp for eight years and remain in service for eleven. As you can see, it is just as it was the day we retired it.

Howard Clark

Kathyrn Clark's Version
In the beginning, Howard and I were just curious to know if we could actually make handmade paper. And we wouldn't have started if we hadn't happened to rent one of the 1930s stucco houses where the Avenues meet Golden Gate Park in San Francisco (Turk and Arguello streets). This one had the usual ground-level garage under the house itself, but was unusual in that it had a work bench in the garage and a cement floor (which unfortunately sloped not toward the sidewalk and the street, but to the back of the house, forcing us to later bail water). Then one day, we happened to drive by the last gasp of a Sears tent sale—everything must go—so we impulsively bought a portable table saw. Perhaps Howard was half looking for a reason to use his new postage stamp table saw, aluminum drill press, and old work bench. And we wondered, "Why in the world wasn't there a hand mill in America anyway?" Henry Morris had warned the reader in Omnibus not to try it—but curiosity killed the cat.

Howard got laid off from his engineering position (due to the aerospace recession in 1970) April 1 (Fool's Day) 1971 and started building the hollander you see here in the beater exhibition. He made it all with those three pieces of equipment, drilling three holes in each bar with the little hand drill set into the Sears aluminum drill press. The core of the roll, the shaft, and the bearings came from a junkyard.

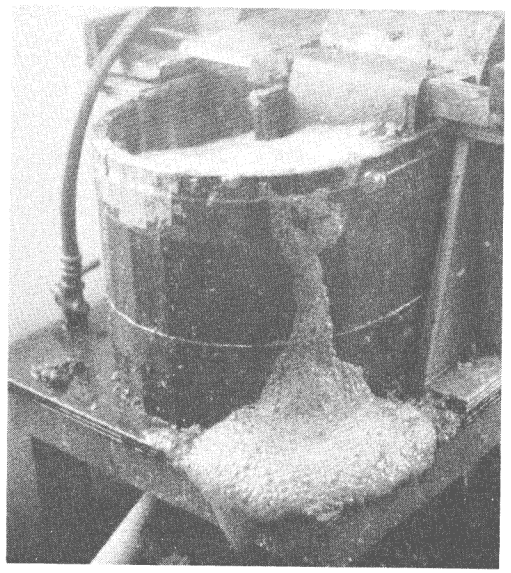
My twin sister, Margaret Prentice, and her husband Kit Kuehnle joined us as the beater was being completed. Howard hoped it would hold water and maybe run for three weeks, but we used it, running it about ten hours a day for the last five years of its life. It continued to produce the great pulp it had learned to make until we finally got one of Howard's fiberglass hollanders. By that time, he had already made several of them for universities and private individuals.

For many young people today, its hard to imagine there NOT being handmade paper and paper pulp as an art material.

Kathryn Clark

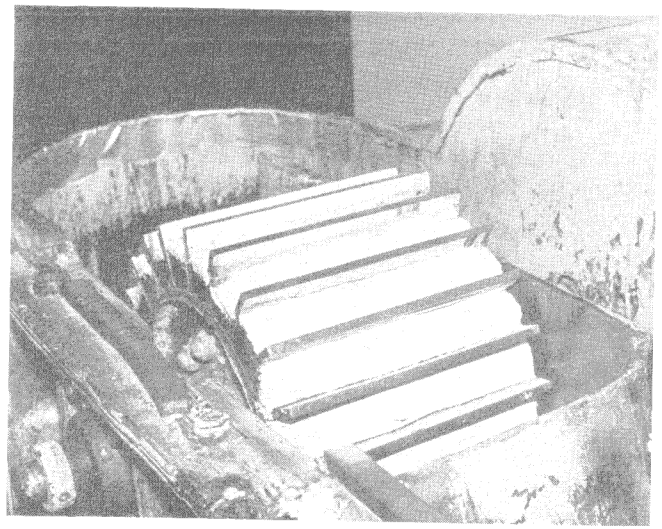
THE FIRST HOWARD CLARK BEATER

ROLL:
Diameter: 12 inches
Width: 8 inches
Shaft Diameter: 1 1/16-inch
Bars: 24 mild steel bars, 3/8 x 2 inches attached to oak spacers with wood screws
Construction: Steel cylinder from a conveyor with webs and hubs keyed to the shaft, oak spacers and blades bolted to the cylinder
BEDPLATE: Mild steel block with 6 3/8 x 2-inch blades welded to the top
LEVER ARM: Laminated wood that exerts pressure on the bedplate through a rubber gasket
TUB: 18 x 36 x 8 inches, redwood and marine plywood, fiberglassed
CAPACITY: 3 lbs. of dry fiber, 10 to 12 gals.
MOTOR AND DRIVE: 1 hp, 1760 rpm electric motor with v-belt drive

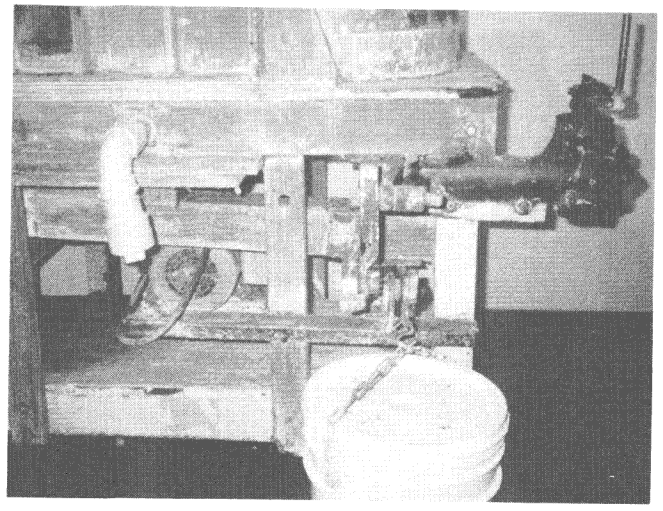


Howard Clark #1 in action
(Ism)

Howard Clark #1
(ck)



Roll detail
(ck)

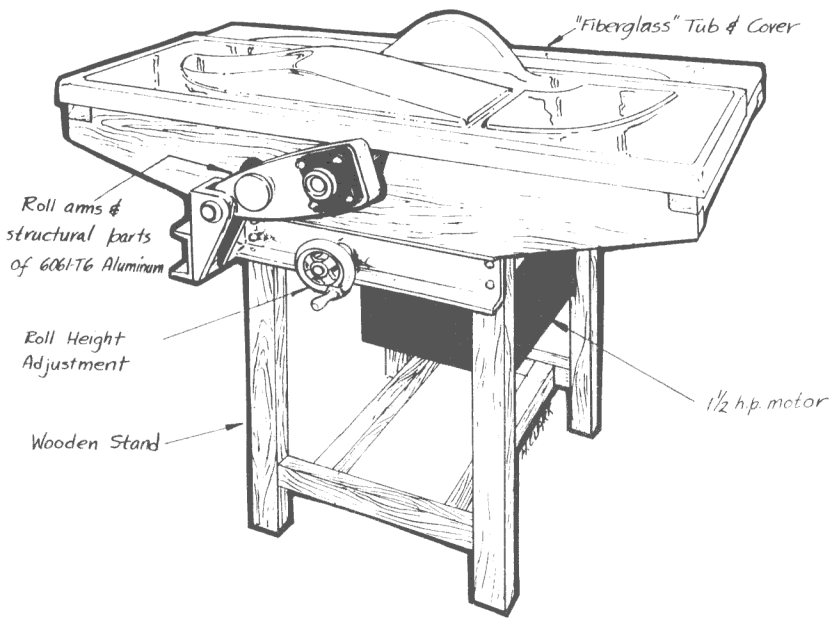


Adjusting mechanism
(lsm)

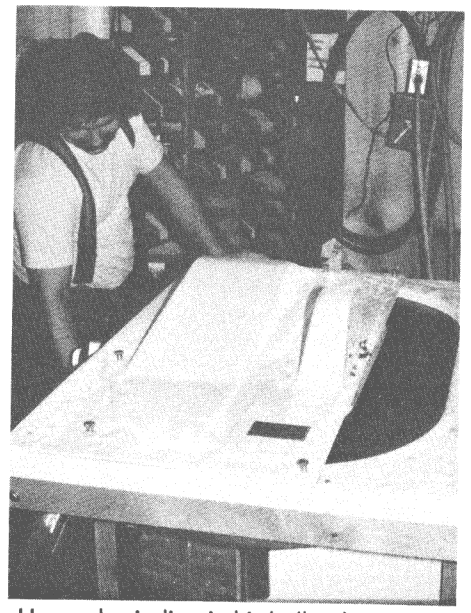
After seven years, Howard started building a hollander especially for the fine art papermaker working in schools and private studios. He saw that there was not much available at that time, not to mention that Twinrocker's beater seemed to be on its last legs and it wasn't known how much longer it would last.

THE HOWARD CLARK HOLLANDER BEATER

FIRST BUILT: 1978
CAPACITY: 2 1/2 lbs cotton fiber in 12 galllons water
TUB: Tub, roll cover and guards are fiberglass 3 ft. by 4 ft.
ROLL: Stainless steel flybars nest in milled slots in the heavy steel roll. Oak spacers separate each bar of blades, Flybars are retained by clamp rings on the ends.
BEDPLATE: Stainless steel bedknives are mounted to the support structure
SUPPORT STRUTUR:E: Structural aluminum
ROLL ADJUSTMENT: Roll is raised and lowered by a a self- locking worm gear actuator on aluminum pivot arms
MOTOR: 1 1/2 hp TEFC motor with v-belt drive.

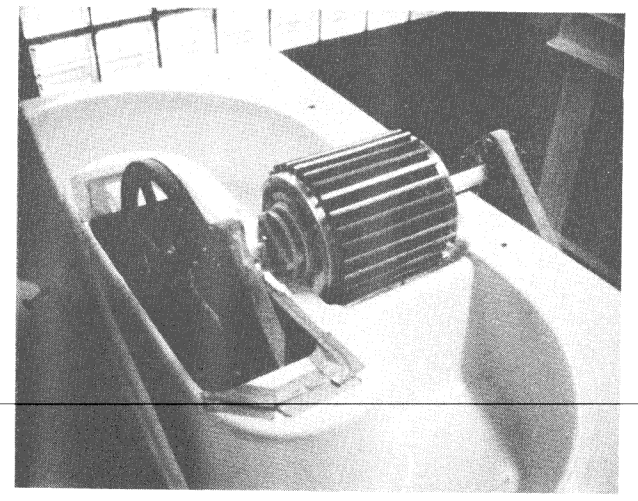


Drawing of hollander



Howard grinding in his hollander (lsm)

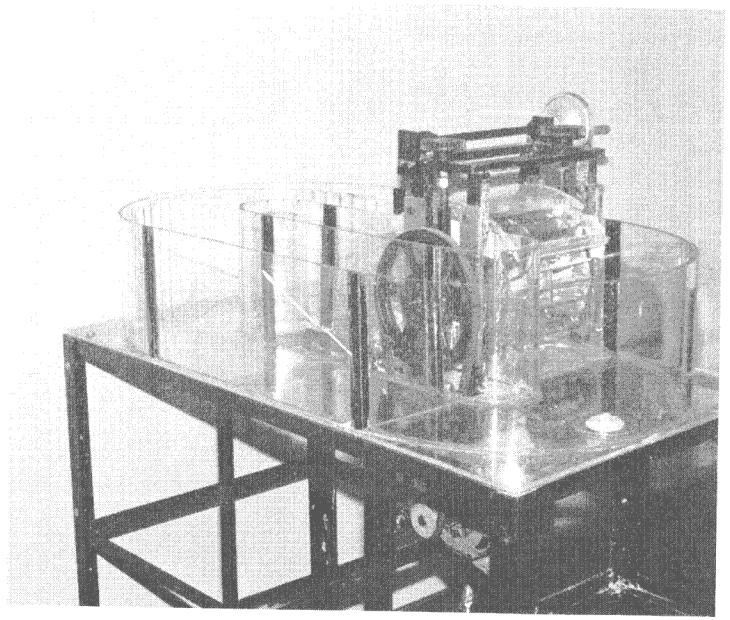
Hollander with roll raised (lsm)



DAVID REINA #1

I made this Beater just after College in 1972. It was made for Anton Krajnc. He was sharing a carriage house with Douglas Howell and learning papermaking from him. He had come over from Austria and was chiefly a lithographer interested in experimental paper to use for his prints. The lessons he was taking from Douglas Howell were frustrating, as he wanted to go faster and Douglas was having him spend a lot of time with the table saw making moulds. I had met Anton in Italy during college and we had become friends. He said he would like to have a paper beater and I said that I would build him one. We took all the books we could find on the subject out and especially helpful was Dard Hunters book.. We got Douglas to sit with us and give us tips. We budgeted $700.00 for the beater and I thought that would be enough, But we ended up spending all that on materials and machining and we learned how difficult it was to machine stainless steel. Basically it worked and Douglas even complimented us on the way we suspended the bearings. At the time we still had to prefect the seals in the tub and it had a lot of leaks. The roll was adjusted with two independent screws like an etching press He used used it for a year and started having students. People like Coco Gordon started beating paper in his workshop.
It was revamped in 1980 with new seals and a gearing system to raise and lower the roll. The beater is still operation. We were amazed because we glued the tub together out of Plexi-k which needed a special glue.and it still is holding together. The roll construction was originally going to be made with retaining rings but the stainless was so hard and taps kept breaking we had the bars welded to the 3 supporting discs.. It had an open hub which beat well but proved to be a pain to clean. I continued to build beaters when someone put my name into a book as a supplier.

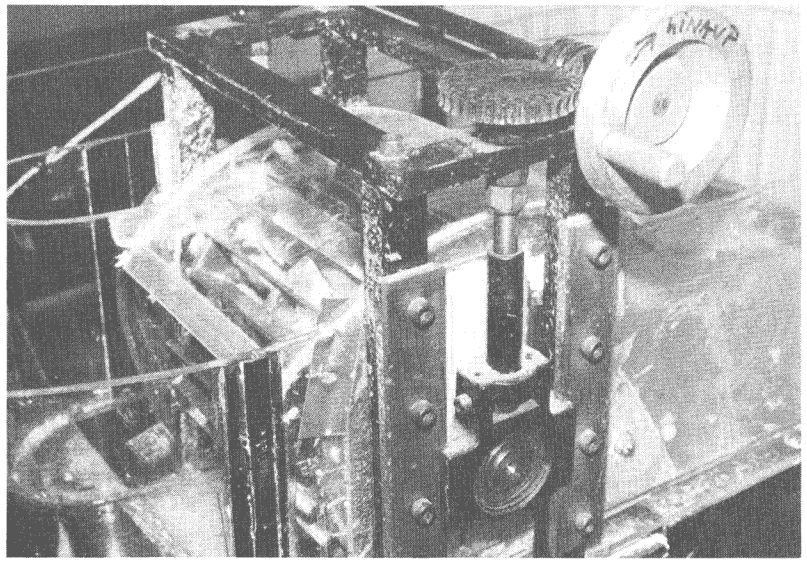
Note
(David has just finished designing a 5 lb. model).



David Reina #1

DAVID REINA #1

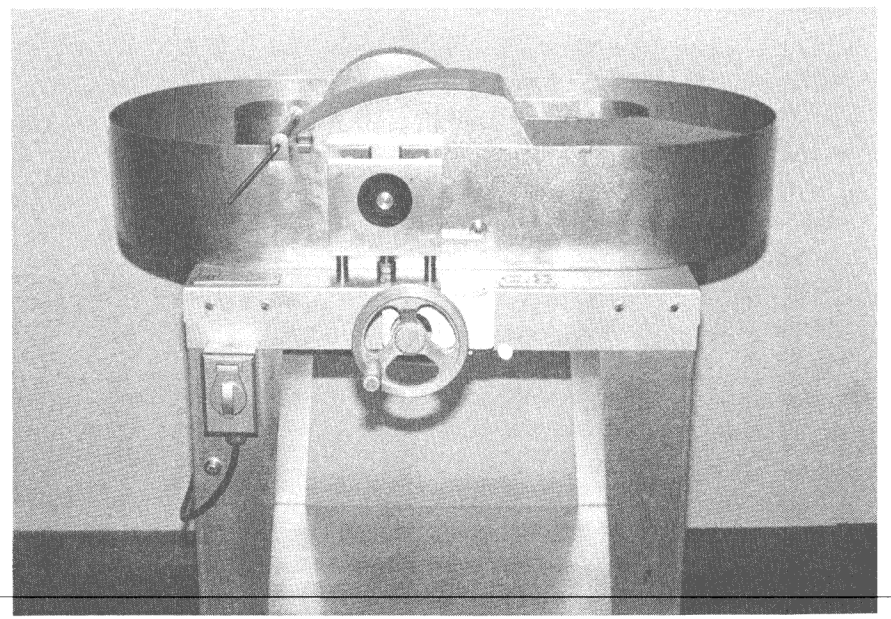
Designed and built by David Reina 1972
CAPACITY: 12 gals water, 1 1/2 lbs. dry fiber
MOTOR: 1/2 hp
TUB: Plexiglas-K glued with 2 part epoxy
ROLL: Welded stainless steel construction of 3 discs with an open hub.
Still in use
Owned by Anton Krajnc



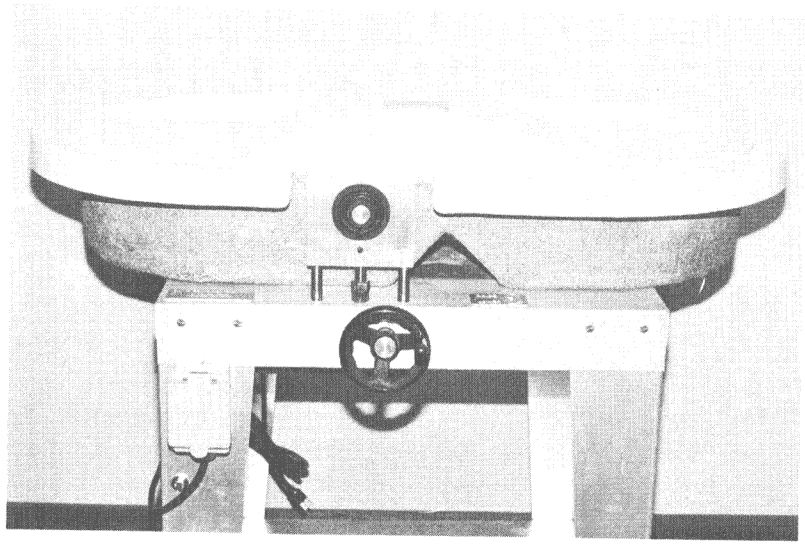
Roll adjustment mechanism

DAVID REINA STANDARD MODEL

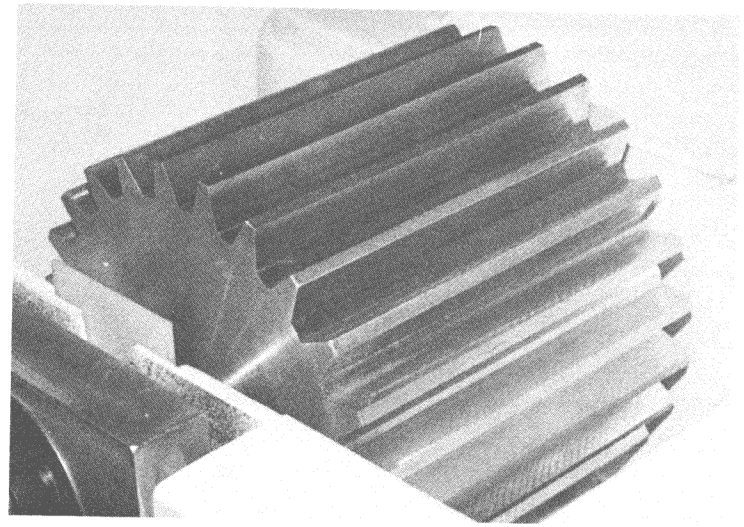
CAPACITY: 2 lbs. 14 gallons water
ROLL CONSTRUCTION: Removeable stainless steel blades which are held in a bronze spool on a stainless steel shaft.
ROLL ADJUSTMENT : The roll running height is adjusted by a single handwheel which drives a precision gear system.
BEDPLATE: Stainless steel
TUB AND COVERS: Stainless steel with a hinged removeable cover. Sliding plastic seals close openings around shaft.
MOTOR: 3/4 hp TEFC
SIZE: 41 1/2 in x 33 in x 43 in high



David Reina Standard Model



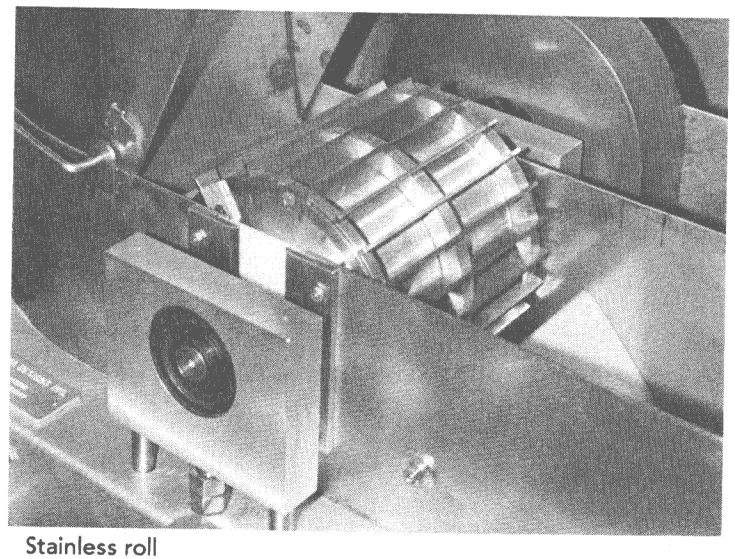
David Reina Aluminum Roll Model



Aluminum roll

DAVID REINA ALUMINUM ROLL MODEL

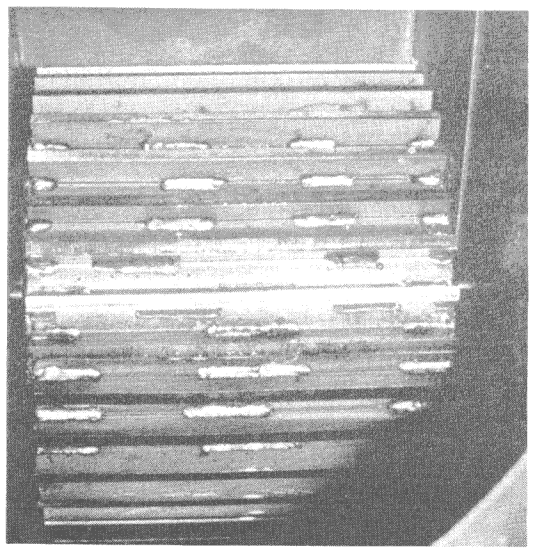
CAPACITY: 2 lbs. 14 gallons water
ROLL CONSTRUCTION: The roll has blades machined from a solid block of high strength aluminum on a stainless steel shaft
ROLL ADJUSTMENT: The roll running height is adjusted by a single handwheel which drives a precision gear system
BEDPLATE: Aluminum
TUB AND COVERS: Fiberglass with removeable lexan cover. Sliding plastic seals close openings around shaft.
MOTOR: 1/2 hp TEFC
SIZE: 44 in x 36 in x 43 high



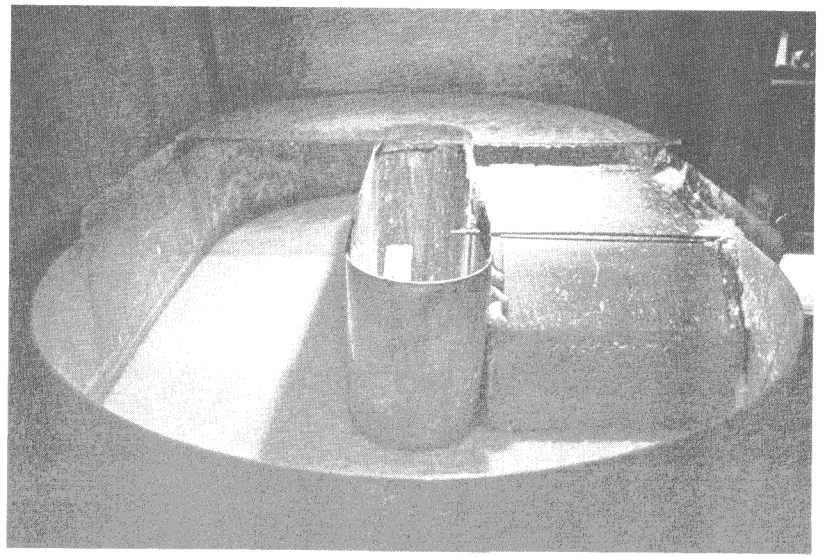
Stainless roll

DIEU DONNE HOLLANDER BEATER

Designed and built by Arthur Schade in 1977, New York
CAPACITY: 10 lbs. for rag, 15 lbs. for linters
MOTOR: 7 1/2 hp
ROLL DIAMETER: 16 inches
TUB SIZE: 60 inches long x 38 inches wide
CONSTRUCTION: Bronze cast bedplate with stainless steel knives, stainless steel roll and flybars.
In operation since summer 1977
Owned by Dieu Donne Papermill in NewYork City

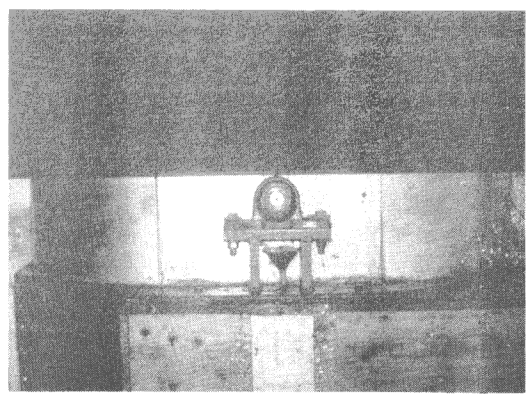


Welded roll construction (lsm)



Beater in operation

The Dieu Donne Beater was first of three built by Art Schade. It is one of the largest found in hand mills in the U.S. The machine incorporates a moveable bedplate. The bars are welded to the roll. Two improved beaters were built: for Richard Royce and Austin Productions in the 1980s. These featured stainless steel tub construction and a 20-pound capacity.



Side view of beater (lsm)

I began it some time in 1978 (I think) but definitely had it finished by 1979, as some of the first paper made from it was used in a book printed in 1979. I cast the roll in bronze, having built the model from wax by hand. I used Jim Yarnell's instructions as found on page 61 of Jules. Heller's book Papermaking (though this book was not printed yet when I was building my beater). The box was built from 3/4-inch plywood. The bedplate and backfall were all 1 curved piece of 1/4-inch brass with six brass 1/4-inch bars heliarced straight across the bedplate. The roll was supported by an angle iron frame hinged (with door hinges at the back end of the beater. Two 1/2-inch bolts screw through the frame on the front end which were screwed up or down to adjust the roll (then locked in place by a second nut). It was all very primitive. The 1/3-horsepower motor had a very small pulley and the shaft with the roll had a 12-inch (or so) pulley so the beater turned at about 600 rpm. It held about 1 1/2 pounds of half stuff or linter with 7 or 8 gallons of water. It had two major flaws.

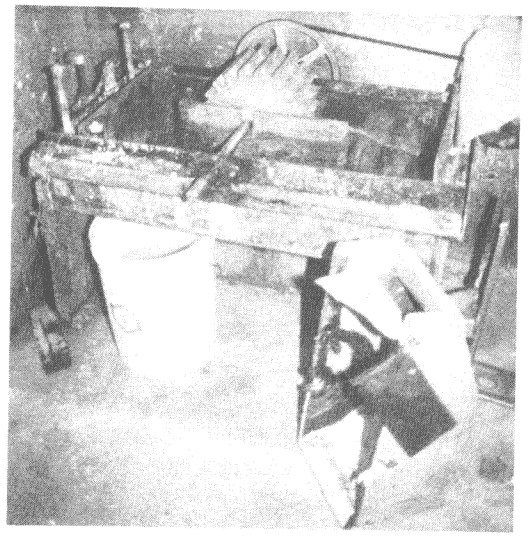
#1. The roll was badly cast and so was off balance. Though this bouncing allowed no real accurate beating, it did create a pulp that made good paper, perhaps by making longer and shorter fibers all in one beating.

#2. I covered all the wood with resin, which cracked and broke off during prolonged hard beatings—so often my paper would have rock-hard bits in it.

In 1986 or 1987 I completely rebuilt it (using marine plywood and mahogany for the box—balancing the roll by adding metal and drilling away), increasing the capacity to 3 1/2 pounds rag and 16-17 gallons of water
Peter Thomas

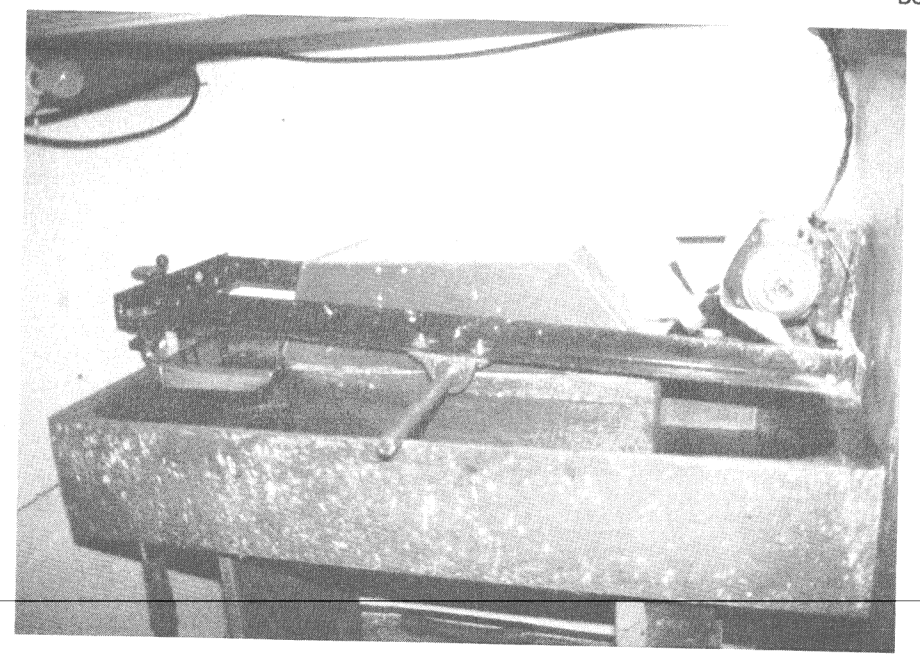
PETER THOMAS BEATER #2

CAPACITY: 3 1/2 lbs. 16 gallons water
TUB: marine plywood and mahognay
ROLL: cast bronze



Beater #1 with cast roll

Beater #2

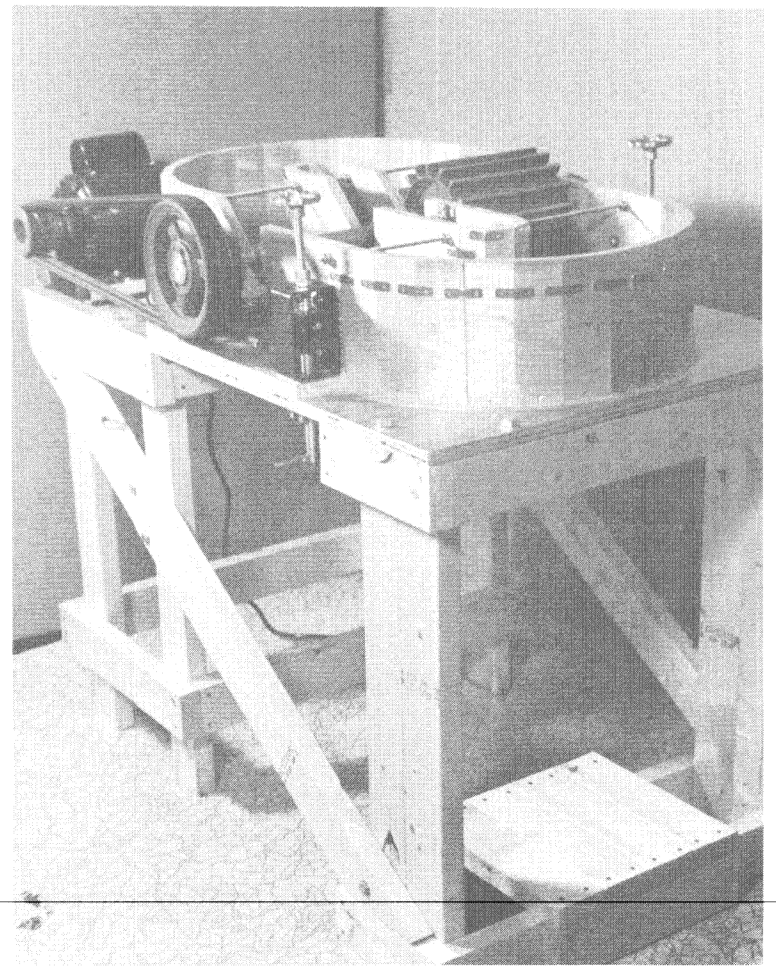


The construction of the beater we are currently using for studio production began in 1977 in Indiana. Every conceivable material one should avoid when building a hollander was used in this first phase and most of the parts have since rotted or rusted away. The original tub was made from non-exterior birch plywood, coated with flakey polyurethane and chinked with silicone caulk. The roll was moveable, had welded steel blades and was connected to an unstable armature. The roll core was a crown pulley which I found in a junkyard and the hollow was filled with buckshot for weight. The entire machine was at the edge of existence, although building it was a blast. The first trial run was in the backyard with the neighborhood kids kept at a safe distance.

After moving to Maine from Indiana in 1982, the beater was enlarged and reinforced. The roll and bedplate were raised with the roll fixed and the bedplate moveable. The original plywood sides were heightened and the entire tub was fiberglassed using local lobster boat building practices. The entire tub was glassed again in 1984. At this time it was discovered that the original plywood tub was gone, or rather, it resembled prune compote.

The tub is now all fiberglass, the capacity has grown to three pounds cotton rag (Cheney damp), the bedplate is a flat stainless steel bar ground to the diameter of the roll and is moved by a screw mechanism at the rear of the beater. The machine beats all pulps well, with an unmistakable smooth roar that I associate with beaters in action. Aside from occasional upkeep and scrubbing, I don't think about it much. It does what it has to.

Bernie Vinzani
July 1989



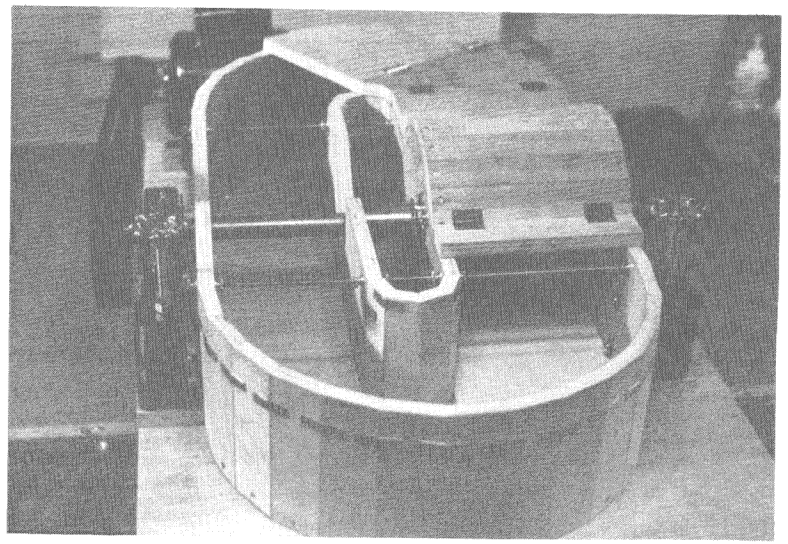
Vinzani orginal version

ORIGINAL VERSION

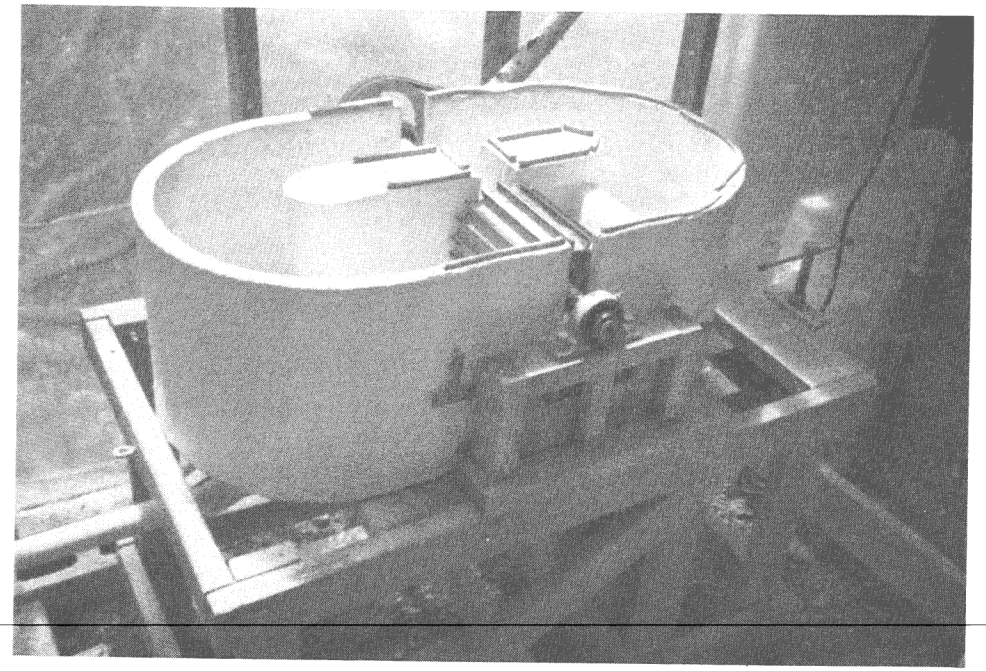
Designed and built by Bernie Vinzani in 1978
CAPACITY: 1 lb.
MOTOR: 1 hp
CONSTRUCTION: Coated birch plywood, welded steel roll, moveable roll

EVOLVED VERSION 1982

CAPACITY: 3 lbs.
CONSTRUCTION: Moveable bedplate design, fiberglass tub



Top view, original version



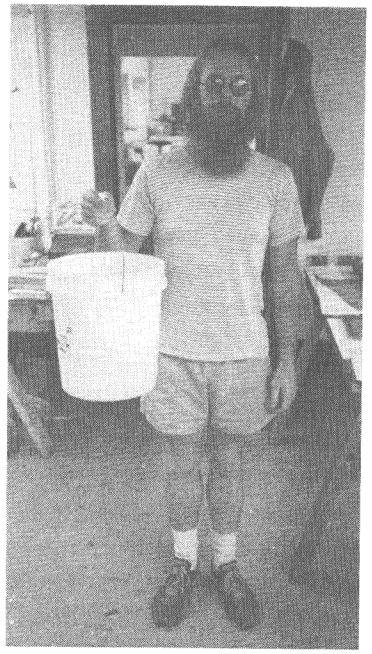
Rebuilt version

THE ROSE

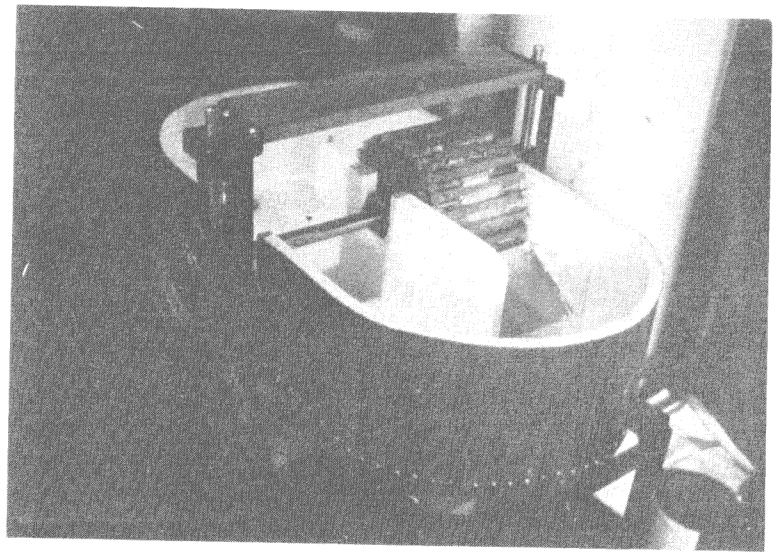
Encouraged by some photocopied diagrams of hollander beaters which I got from Joe Wilfer, I began building the first of 2 1/2 beaters in 1978. I theorized that the flow of pulp through the tub would be hastened by a multilevel "waterfall" type base. Tracing an oval from a wash tub I cut and laminated the base from plywood. The roll I made from 1/2-inch thick, 8-inch diameter aluminum pipe reinforced across its length with 4 circular aluminum plates spaced inside the roll and keyed to a stainless steel shaft. The roll blades I cut from 1/2-inch square high strength aluminum bar stock and welded them to the roll. The roll completely constructed and turned by a machinist friend, I began to model a bedplate. From years of teaching printmaking and having an inventory of beginning student mistakes, I devised a plan. Students occasionally get mixed up and put etching plates between the blankets on the press. The result is a smoothly bent and round plate. With extra blankets and three attempts, I matched the curve of the roll to a 1/8-inch aluminum plate. I mounted the 1/8-inch plate on a shaped wooden form to use as a model for casting. The bedplate was sand cast, at the now defunct Usonia Foundry in St. Louis, of solid aluminum—10 pounds. I coopered the tub from mahogany, soon discovering that the concept outstepped my skill. Although it was aesthetically pleasing, it leaked and required a fiberglass lining. The roll was originally mounted on take-up bearings to allow adjustment. The power was supplied by a 1/3 hp washing machine type motor. I recall the surprise and satisfaction that came when I stepped back and cautiously flipped the switch and it actually worked, pumped and rolled. I used it personally and with students at Webster University for three years. I replaced the take-up bearings with a hinged "Yarnell" type adjustment system made from hard maple. An eccentric wooden shaft with a gear shift lever adjusts the roll height. The beater is still used for plant fibers and kozo and the like because of its gentle beating action. The beater was named "The Rose" because of the ordinary hardware store drain used in the tub. Recalling Gertrude Stein's, "A rose by any other drain..."

I built the second beater in one week at a workshop I gave at Arrowmont School in Tennessee. I had all the parts and we put it together. It worked and to my knowledge is still usable. The half beater refers to parts I made and sold to the University of Kentucky in Lexington.

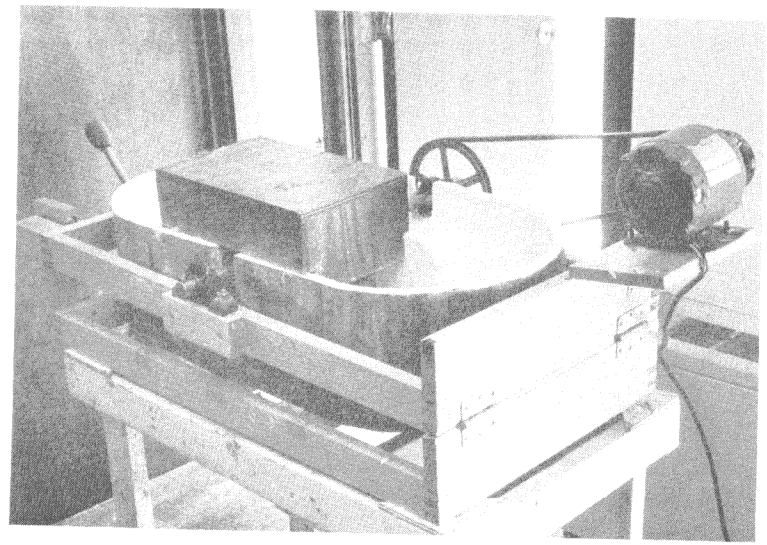
Tom Lang



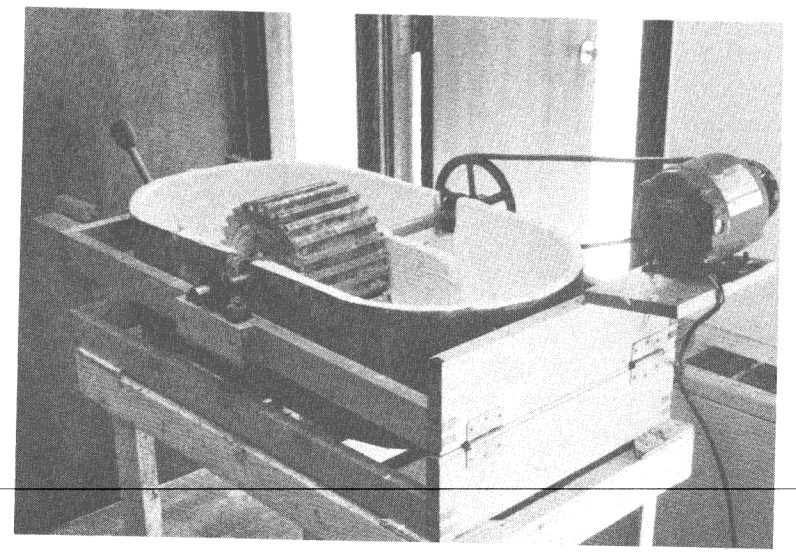
Tom Lang, the typical beater builder



The rose, original version



The rose rebuilt



The rose with lid off

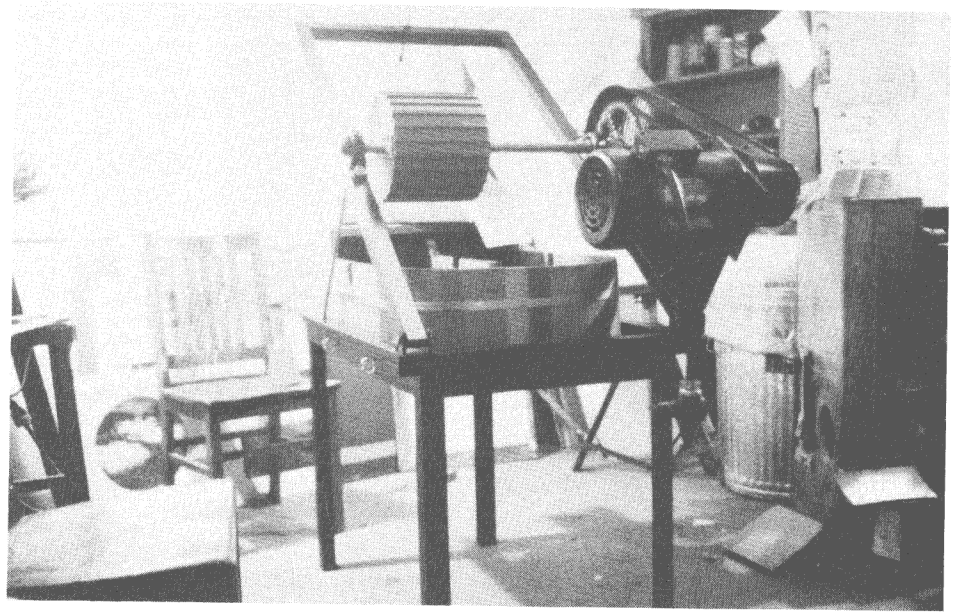
THE ROSE

Designed and built by Tom Lang
1978; used through to the present
ROLL DIAMETER: 8 inches
TUB SIZE: 18 x 36 x 12 inches
CAPACITY: 2 1/2 lbs dry

DAVIS HODGES BEATER

It was the fall of 1978 I was just starting my second year of graduate school at the University of Colorado. Peggy Prentice was just beginning her first year of graduate school. Art Hardware, the local art store, informed us that Dick Hodges had come in and mentioned that he was interested in making a machine to form sheets of paper. Peggy and I decided to investigate this further. We found out that Dick owned Hodges Engineering, which designed prototypes for N.A.S.A,. and was an inventor. Peggy and I met with Dick and convinced him that what one needed before making a paper sheet former was a hollander beater. He agreed with our evaluation and then asked if we were interested in having him produce one for each of us. He would research for the next week and then submit a bid based on producing two beaters. The bid came back at $1275 plus the cost of the motor and a three-week completion date. In 1978 this was the cheapest beater available.

At the end of three weeks I received a phone call from Dick stating that it would take him a little longer as this 17th-century machine was harder to design than gluing ceramic nose cones to missiles. In the following three weeks he figured the flow patterns on the computers at Bell Labs in Boulder. The beater was designed with the roll made from the hardest aluminum alloy with a hard anodized surface with the shaft inserted into it and glued. The tub was of pressed

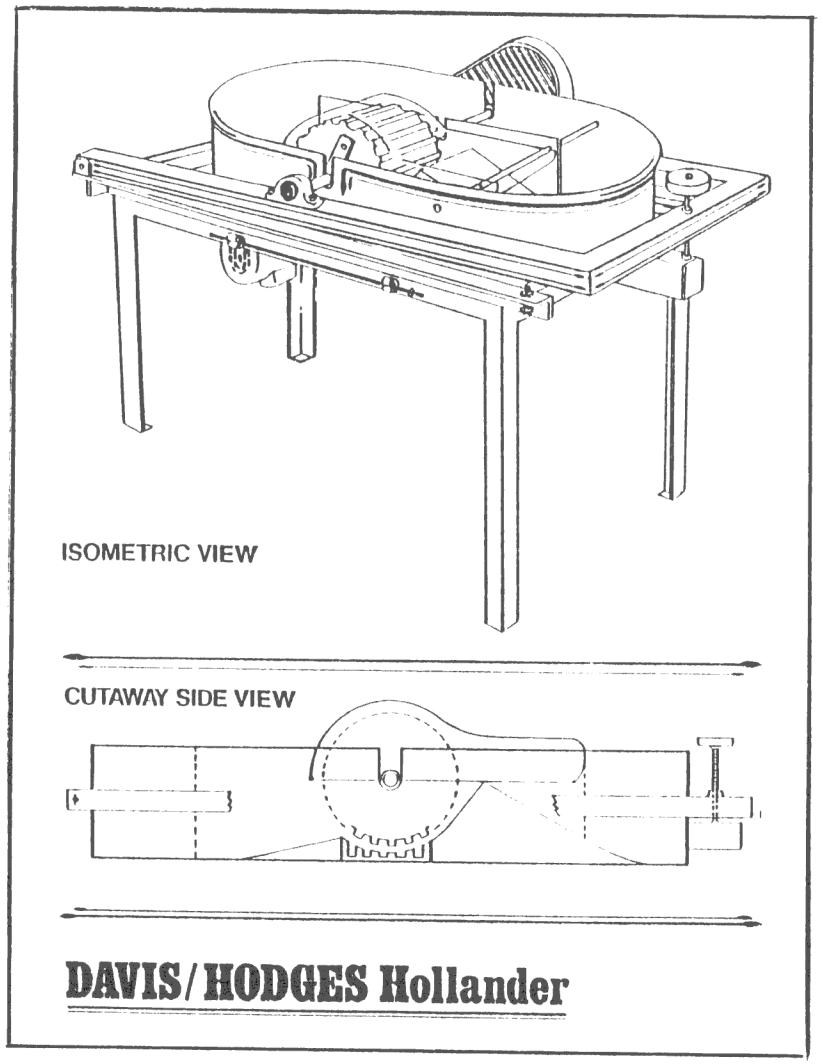


The original Davis Hodges

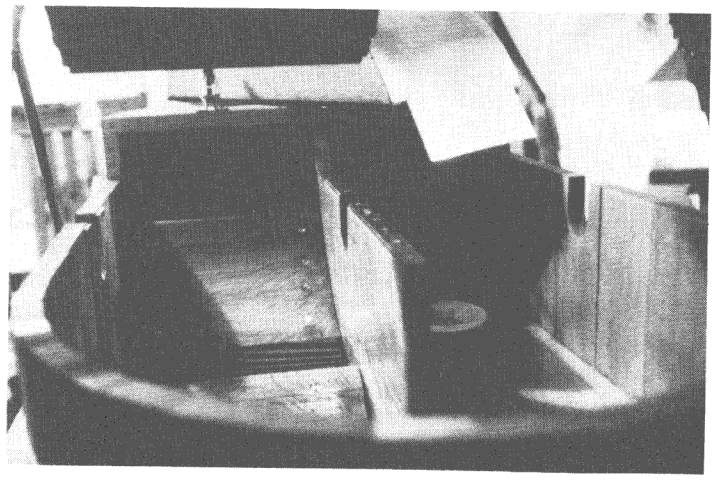
wood with seven coats of applied resin and the frame was steel. The tub was held to the frame by the screws through the frame into the bedplate (hard anodized aluminum). All the welding was done by Mike Davis of Colorado Instruments. The two original beaters were reported to have cost approximately $2800 each to produce. Dick said that he would sell them to us at the original quote. The first tub lasted less than a week and wa replaced by the second tub, which is shown in the photographs (based on a cedar hot tub). This was the last wooden tub tried. Due to the problems with my tub and an offer from Howard Clark, Peggy's brother-in-law, Peggy returned her beater to Dick. It sat in storage for years and was cannibalized and finally sold to Tom Leech in Colorado Springs.

After the first two beaters were produced, Dick Hodges stepped out of the picture and Mike Davis took over the selling of the beaters as well as the production of them. He usually produced four at a time. Each generation seemed to have some advancement from the previous beater. Currently I'm using a later generation Davis Hodges beater and a Valley beater. The original Hodges beater is sitting in my shop awaiting a metal tub and a new motor (it has out lasted two motors).

Ray Tomaso



Drawing of the Davis Hodges production beater

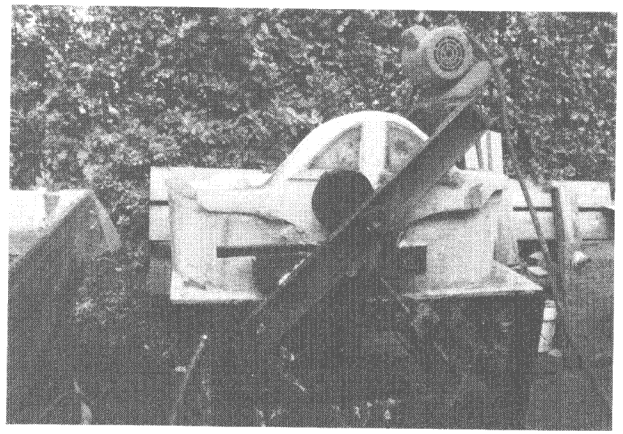


Inside tub of orginal Davis Hodges

DAVIS HODGES HOLLANDER
DIMENSIONS: 50 inches long, 37 inches high, 22 inches wide
CAPACITY: 2 lbs. dry weight
ROLL: 9 inches diameter, 8-inch face, aluminum alloy, 431 rpm
MOTOR: 1/2 hp, later 3/4 hp

BETTY KJELSON

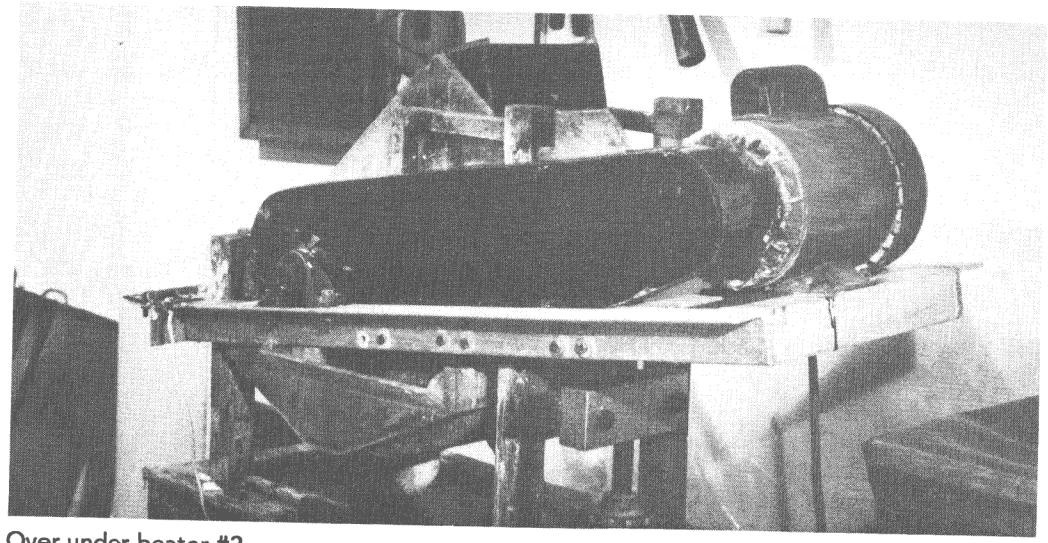
You will see photographs of three different beaters: the one I built ten years ago, the small over-under that my son, Jay Kjelson, designed and built for me about eight years ago, and the one that I had built starting in January of this year (1989) and just had delivered today with all of the kinks out of it.
I started building my hollander just after the San Francisco conference. I wanted to process the many long-fibered plants that we have in Southern Florida that are suitable for making paper. It didn't seem to me that a blender would do it, and I felt I could not afford the cost of any hollander on the market.
As you know, I spent a lot more money building mine but I also got the equivalent of a masters degree just doing the research and designing and then building my own.
The original beater was made of these materials: oak for the base; fiberglass over masonite for the tub; fiberglass hood; stainless steel roller and bedplate; steel I-beam for the arm; 1/2-hp motor. It would hold just over 5 gallons of water and took about 1 1/2 to 2 linters. I very seldom used linters as I was interested in long-fibered papers made either from rag or more often from rag and subtropical plants mixed. I also make paper like I cook, by feel, so all of my measurements are ball park.
The small over-under beater was designed and built by my son, Jay Kjelson. He built it for me to teach workshops and I now use it in my studio at the Bakehouse Art Complex, Inc., while keeping the new beater in my studio at the house. The over-under beater holds approximately 2 1/2 gallons of water and perhaps 1/2 linter. It is constructed out of plexi and oak and the roller is heat-cast aluminum cogs running against aluminum bars in the bedplate. Naturally, it does not have the weight that the big hollander has so that it beats the material in a completely different way—or I should say the finished pulp is quite different than that from the bigger hollander.
The machine that I have designed and had built for me by Doudney Sheet Metal retains the heavy stainless steel roller and has a bedplate of stainless steel bars. You will notice that the bars on the roller are placed much wider apart and are much deeper than the manufactured machines. In the first ma-



Hollander #1 "in my studio" outdoors all year round

BETTY KJELSON BEATER #1

Designed and built by Betty Kjelson
1978-79
CAPACITY: Two linters 5 gal. water
MOTOR: 1/2 hp
CONSTRUCTION: Fiberglass over masonite with stainless steel roll
Retired 1989



Over under beater #2

BETTY KJELSON BEATER #2

Over-under beater designed and built by Jay Kjelson 1980
CAPACITY: 1/2 linter, 2 1/2 gal.
CONSTRUCTION: Plexiglas and oak with cast aluminum roll
Still in use

bar but found they served no function and that it actually beat better with the spreaders out. I like the weight of the roller so I retained it for the new beater. The bedplate bars are much closer together, as you can see from the pictures. This seems to make the beating much more efficient.

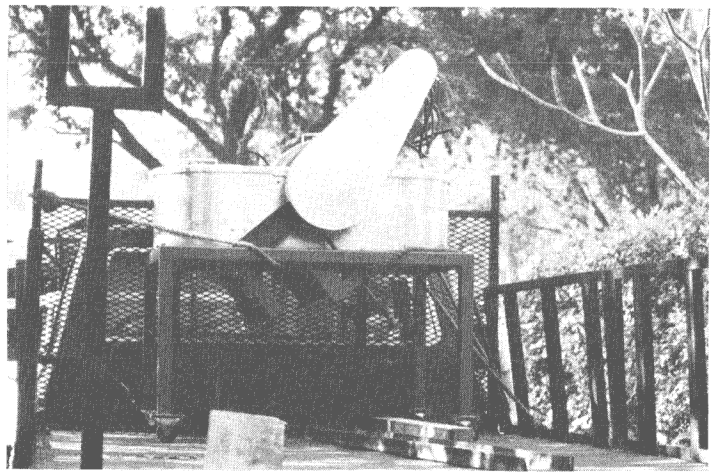
The measurements of the Hollander II: base table is 28 inches high, tub is 12 inches high, 19 inches wide, 45 inches long. The roller channel is 9 inches wide, and the back channel is 8 inches wide. The depth at the drain end is 12 inches and the depth at the backfall end is 5 inches. It holds about 15 gallons of water and approximately 3 pounds of fiber. Of course, as it beats the pulp increases in bulk so I start taking out some as we go along.

The pulley wheel and belt are on the outside of the tub, rather than in the center opening as on the first hollander. This facilitates changing and greasing the bearings. As you can see by the pictures, the one problem was the conformation of the hood. I allowed too much room over the roller and as a result the pulp flew all the way around and therefore reversed the flow of the water. Pulped well, but in the wrong direction. I solved that by placing baffles within the hood, but then the pulp "roped" itself at the backfall. I slowed down the motor, this helped, and finally at the suggestion of a hydraulic engineer neighbor, experimented with baffles at both ends of the tub. Today the hollander came back and this seems to be the solution—hooray!!!! We did not go back and rebuild the hood. It probably would have saved a month of frustration but I do learn the hard way and now seem to have solved the problem.

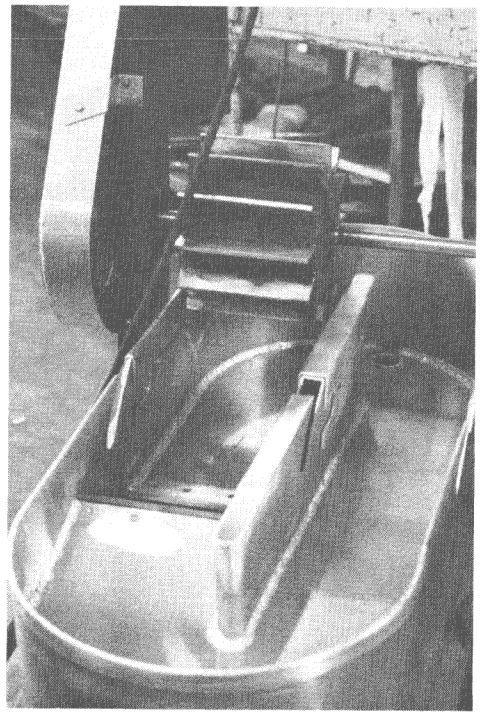
As I said in the beginning; it is important to me to be able to experiment with the long-fibered plants we have in subtropical Florida and also be able to use rags, not linters, so this heavy machine is my solution and I'm pleased with it.

Marylin Sward was here the day the Hollander II was delivered and we had an exciting, puzzling, and finally successful day in trying to solve the problems and went on to make some good paper out of cotton and sisal.

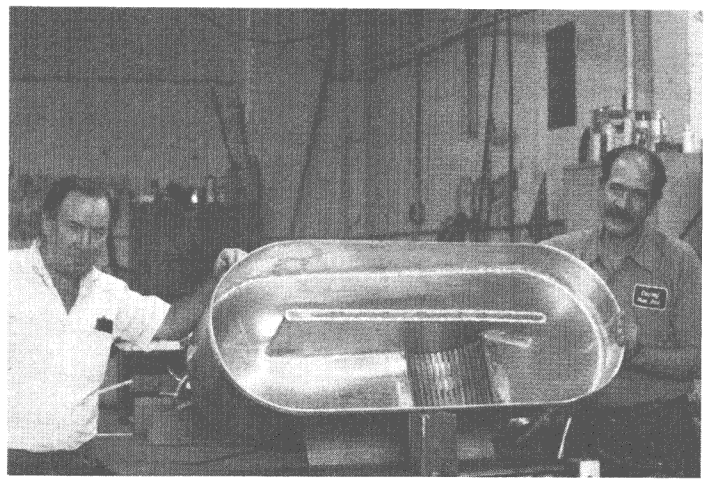
Betty Kjelson



Beater #2 being delivered



Hollander beater #2 with roller bar raised



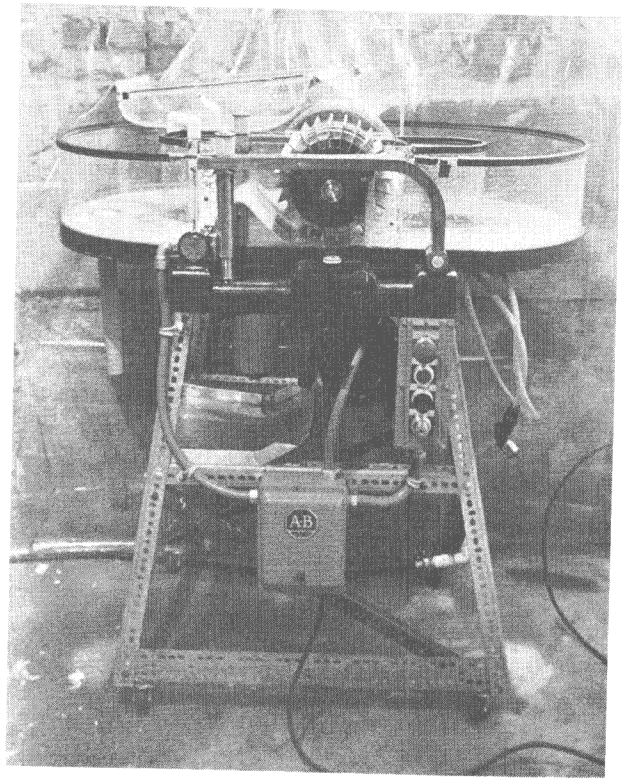
Johnny (foreman) and Al (builder) showing shape of tub and bedplate

HOLLANDER #2

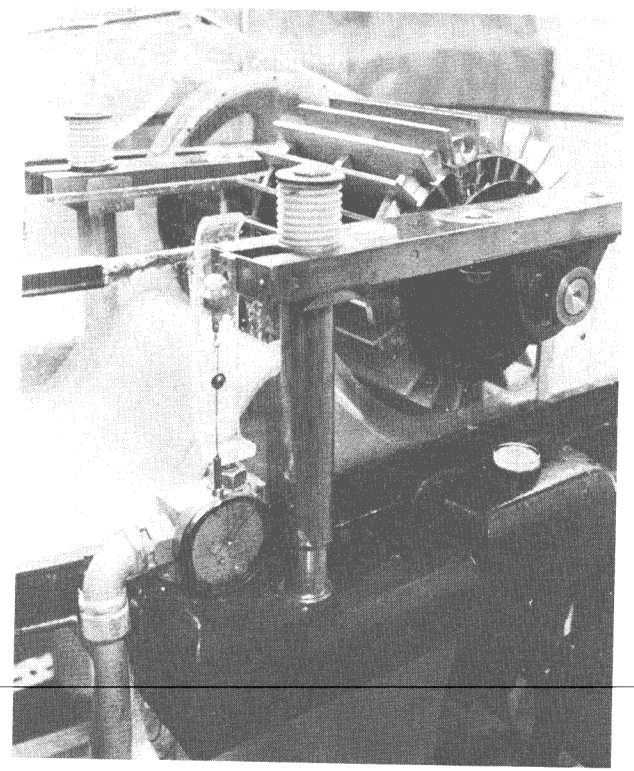
Designed by Betty Klelson
Built by Al Pardon of Doudney Metal Works in 1989
CAPACITY: 3 lb fiber, 15 gallon
CONSTRUCTION: Stainless steel

THE GREEN MACHINE

Built by Michael Paulin in 1980, based on design of Howell beater #3
MOTOR: 3/4 hp. industrial motor
CAPACITY: 1 lb. dry fiber to 30 liters water
MATERIALS: Wooden chassis Tub bottom is wood coated with fiberglass. Plexiglass sides
ROLL: Stainless steel flybars, brass core, aluminum plates for retaining flybars
Bedplate is stainless steel
IN USE: Four years bi-weekly, then four years once a week.



The green machine



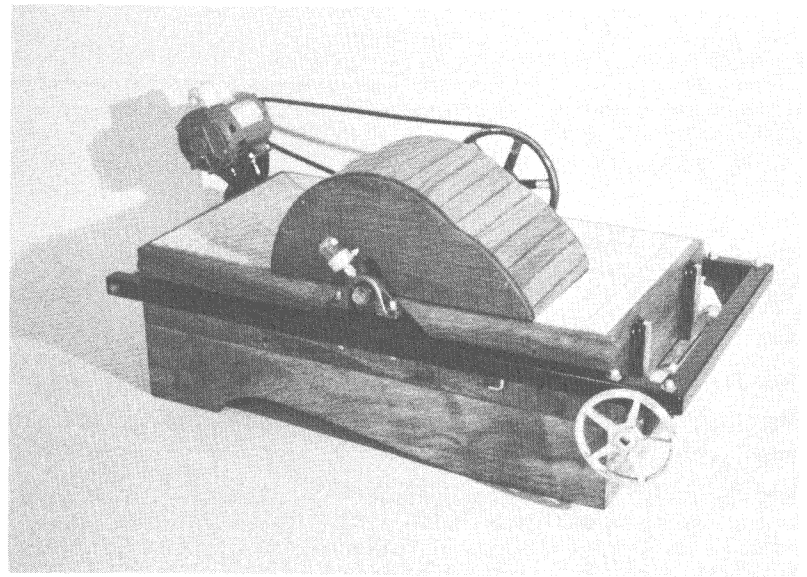
Detail, the green machine

REMARKS: This beater was built on a limited budget, with basic hand tools. Unlike the Howell beater, the roll height transport is chain driven, designed by Paulin. Paulin also added a hanging water filtration system to the inside of the tub, and a spray hose for cleaning.

PRESENT OWNER: Eugenie Barron
Richmond Hill, NY

I began designing and constructing my beater in 1980, and it took about three years to complete. In 1983 it was accepted for a juried show by the San Diego Fine Woodworking Association. The 10-gallon tub is 39 x 21 x 13 inch book-matched koa with ebony and purpleheart details and lined with copper. A 1/2-hp motor drives the roll, which I put together with individual staves of Philippine mahogany dadoed for the hard aluminum bars. The roll to bedplate adjustment is by spring-tension rack and gear. The roll hood is teak. I have always felt that if I work with fine tools, I have a better chance of producing fine work—the work itself the joy.

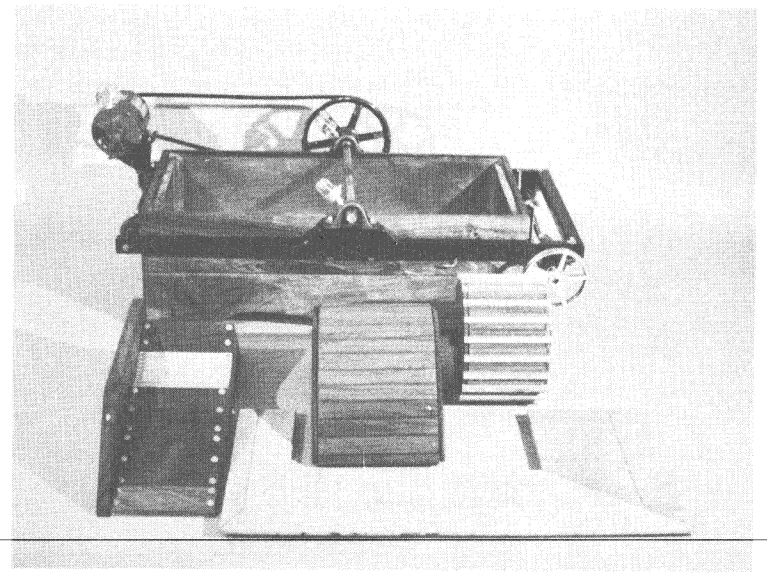
Michael West



Michael West hollander with rack and gear roll adjustment

MICHAEL WEST HOLLANDER BEATER

Designed and built by Michael West
1980-83
17th-century design with contemporary technology, koa, teak, white ash, purpleheart, cocobolo, Philippine mahogany, and ebony
DIMENSIONS: 56 x 26 x 46 inches

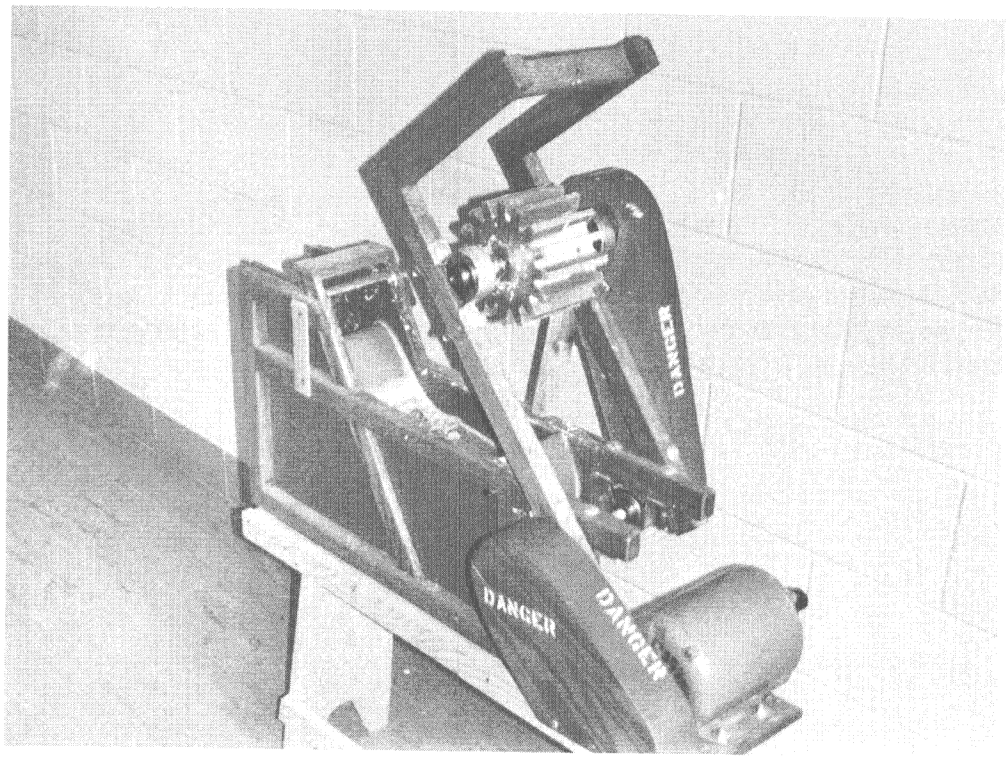


Hollander unassembled

HOWARD HAMANN
OVER-UNDER STYLE BEATER

I built this beater because I wanted a challenge and I wanted to make paper. I saw Jim Yarnell's design in Bernard Toale's book "The Art of Papermaking". I went to Wichita and purchased two rolls and bedplates from him. It was designed as a table-top unit. That's the reason for the bench it's standing on. The removable cover has clear plastic sides to view action. With the over-under design everything has to be covered or you get paper pulp on the ceiling and everywhere else.

I've been trying to make something affordable so that more people can have a beater. I'm in the process of building a more conventional hollander-style beater with the same capacity. While this model it does a good job would be too labor intensive to duplicate.



Hamann #1 based on Yarnell design

HAMANN OVER UNDER

Designed by Jim Yarnell
Built by Howard Hamann, 1983
CAPACITY: Approx: 1/2 lb stock 4 1/2 gals water
BEDPLATE AND ROLL: Cast aluminum
CONSTRUCTION: 1/4-inch PVC sheet sides, oak structural frame
MOTOR: 1/2 hp

LEE MCDONALD BEATERS

In late 1984 I decided I wanted to offer some kind a beater. I figured that a low-cost machine would fill a niche between what David Reina was making at the time and the Valley beaters. Howard Clark had stopped production of his machines so that there was not much available on the market. Because I was going for the lower end, I looked around and I saw what had been done by Jim Yarnell. On a trip across the country I stopped in to visit him in Wichita, and he gave me advice and patterns for the cast aluminum rolls he had made. I also hauled his sewer-pipe beater back to Boston to study. It was a remarkable machine, made out of ordinary sewer pipe, but for a manufacturer it was a liability nightmare. One drawback was that pulp was fed into the machine two inches in front of the roll. Anyone who has spent time around a beater has been tempted to stick their hand in there to help that pulp along when it gets stuck. Not a good idea. A second was that to raise the roll for cleaning the belt had to be removed from the pulley, and I worried that eventually any kind of guard would be left off.

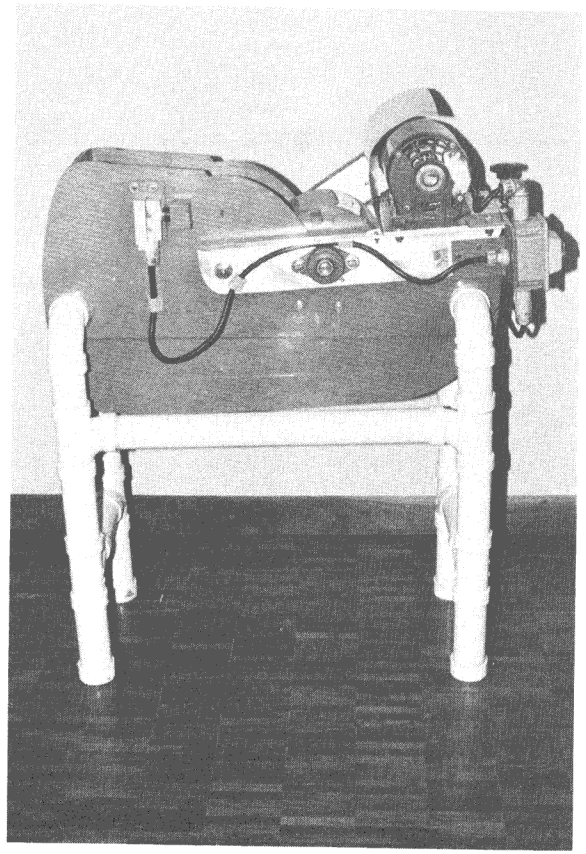
So I used elements of his design and added features that made safety foremost. I chose to use PVC plastic because it could be heated and bent, then welded with a hot-air welder. Jim's cast rolls gave a low-cost solution for roll construction and offered satisfactory beating characteristics.

The first machine I built was for Jennifer Morrow, now in Lawrence, Kansas. At the time she was living in Rhode Island and so was close by for consultation. Needless to say the first one did not come off as smoothly as hoped and took a bit longer to deliver than anticipated. It was a 3/4-pound capacity machine which looked real cute on its PVC pipe stand.

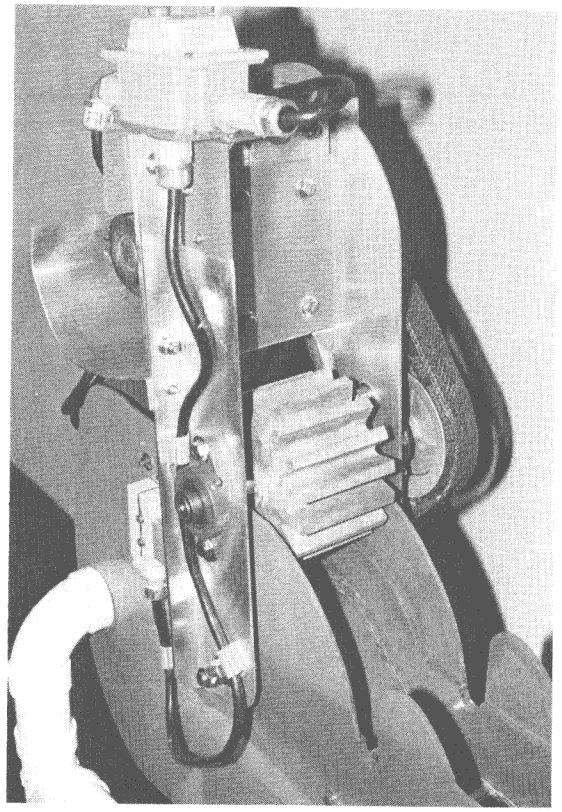
I offered the Oak Park Beater as a kit. The name is in honor of Jim Yarnell's Oak Park Press and Paper Mill. (Thanks for your help, Jim). I thought that by offering a kit, the beaters would be more affordable for people. As usual it was more complicated than expected and we decided very quickly to make only complete machines.

In 1987 we started making our Hydra Hollanders. We used the same swing arm construction, as it allows for easy cleaning and controls the beating in a way I like.

Over the years the basic design has stayed the same. Small changes such as mounting of the bearings on the underside of the arms have made maintenance easier.



Oak park beater #3

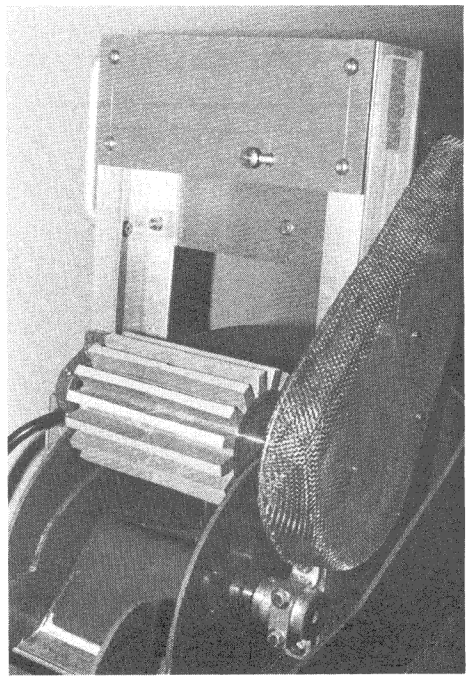


Oak park with swing arms raised

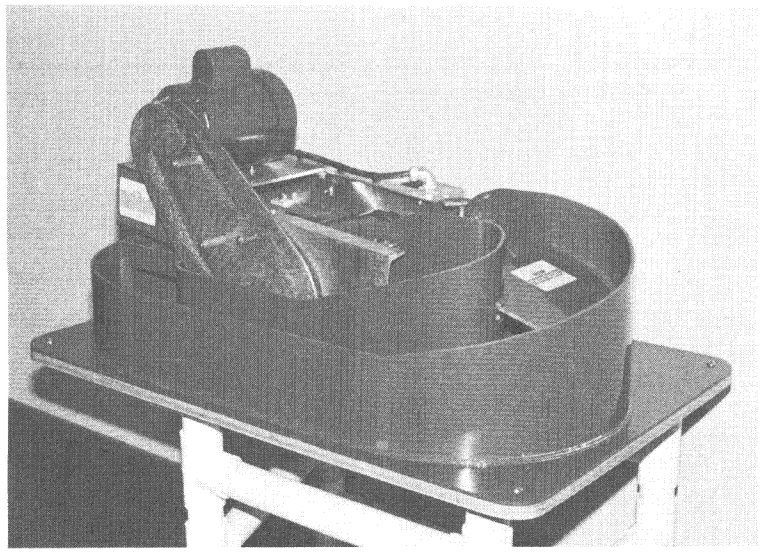
OAK PARK BEATER #3

Designed and built by Lee McDonald, 1984
CAPACITY: 3/4 lb. dry weight, 4 gal. water
ROLL: 4 x 6 inch cast aluminum
MOTOR: 1/3 hp
CONSTRUCTION: PVC plastic and aluminum All stainless fasteners.
Design based on the Sewer Pipe Beater by Jim Yarnell. Uses same roll
Still in use

Owned by Nina Gilbert
Somerville. MA



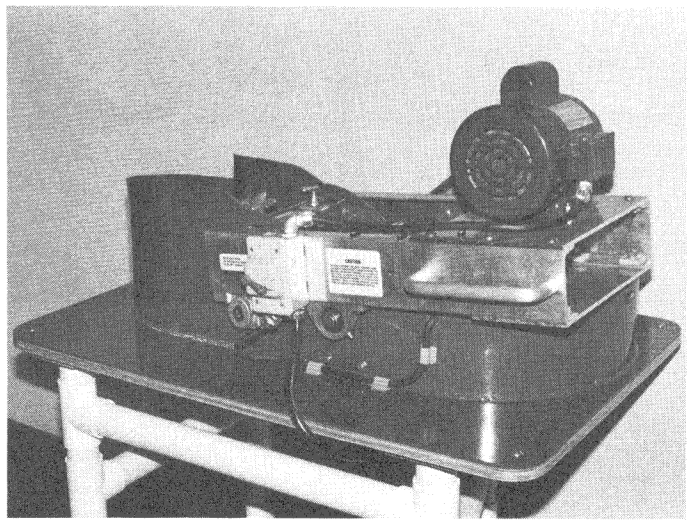
Hydra hollander with roll raised for cleaning



Hydra hollander

HYDRA HOLLANDER

Designed and built by Lee S. McDonald
First built 1987
CAPACITY: 1 1/2 lb. dry fiber, 8 gal. water
MOTOR: 3/4 hp. motor TEFC
ROLL: 8 x 6 inch cast aluminum roll
CONSTRUCTION: PVC plastic and aluminum



Swing arms in beating position

HELMUT BECKER #1 AND MISSISSAUGA BEATERS

HELMUT BECKER #1

This is an early model of Douglass Morse Howell's hollander paper beater. This is the model I personally have in my studio. This first one was built by Technical Services, Faculty of Engineering Sciences at the University of Western Ontario, in London, Canada. This model is a close replica of Douglass Howell's hollander beater with several collaborative changes which I and the University in the Engineering Faculty redesigned into Howell's original.

Howell had never kept drawings, sketches or really even a file of notes on the design and construction of this beater. With the help of one of my students we took exacting measurements of Howell's beater, and after many letters back and forth between Douglas Howell and myself I carefully drew the plans out on a 1 to 1 scale. Later at some expense I had a professional engineer draft out the 24 engineering drawings, developed directly from the by then constructed beater.

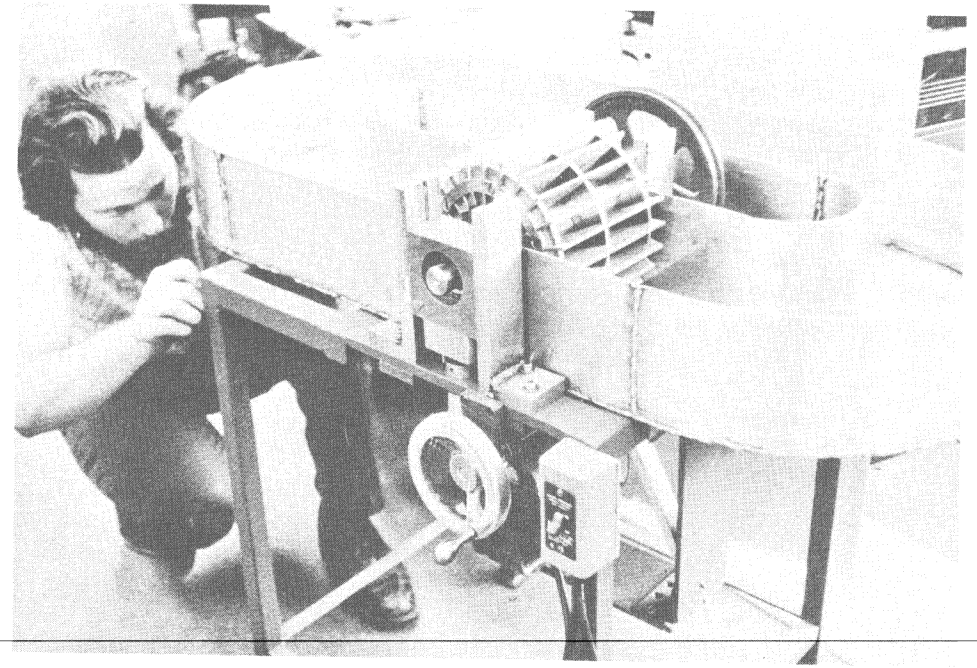
This beater would give you a bit of history. The roll is constructed out of stainless steel -- that is the shaft and the beater blades while the side disc, slingers and the centre solid drum are out of bronze. The shear weight of this gives the beater roll considerable momentum. In Howell's original the bedplate bars are wedged fit together. It is a unique design and construction. As stated this would only be available by special or custom order. We did build one like this at the factory in Missisassauga for a Community College in Edmonton, Alberta.

MISSISSAUGA BEATERS

The Mississauga beaters are the production version of the Helmut Becker #1. In the 70's I designed and built, through a local machine shop, a more simplified one-pound version of the first beater. In the early 80's I collaborated with an engineering team at College Tool and Die, Ltd., where precision parts for Pratt & Whitney are machined and tested.

A number of papermakers encouraged me to scale up the one-pound Mississauga beater. In deciding what would be ideal for most professional artists/papermakers or college/university departments, I talked with Winifred Lutz, Alexandra Soteriou, Coco Gordon, Helen Frederick, and others. Anything larger than a five-pound beater would not give any creative artist/papermaker the versatility and ease to experiment with a wide range of different fibers and qualities.

Mississauga beaters are again in the process of being redesigned. The factory where they are made has converted to computerized milling machines and it may be possible to get the rolls machined with a gradual spiral so that the bedplate can be set at right angles to the roll instead of slightly offset at 3 degrees.



Helmut Becker's first hollander

MISSISSUAGA 1 LB. HOLLANDER BEATER

Designed by Helmut Becker
Built by College Tool and Die
CAPACITY: 1 lb. fiber, 6 to 8 gallons water
TUB: Stainless steel 46 x 27 x 5 1/4 inches
ROLL: Stainless steel weldment , 24 fly-bars, 8 inch dia. x 6 1/2 inch face, 600 rpm
MOTOR: 1/2 hp.

MISSISSUAGA 5 LB. HOLLANDER BEATER

Designed by Helmut Becker
Built by College Tool and Die
CAPACITY: 5 lb. fiber, 30 gallons water
TUB: Stainless steel 64 x 35 1/2 x 9 3/4 inches
ROLL: Stainless steel weldment , 36 fly-bars, 14 inch dia. x 11 1/2 inch face, 400 rpm
MOTOR: 1 1/2 - 3 hp

The 5 and 1 lb Mississauga hollander beaters designed by Hemut Becker and built by College Tool and Die Ltd. Featuring all stainless construction and variable speed