



THE NOBLE & WOOD CYCLE BEATER ITS PURPOSE AND CHARACTERISTICS



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October 2017



THE NOBLE & WOOD CYCLE BEATER ITS PURPOSE AND CHARACTERISTICS

This Beater has been developed to meet the following requirements:

1st - A Beater for pulp testing purposes with a large roll, and tackle sufficiently near to commercial size, so that a reproducible cycle can be run in a short time on high density pulp, the type of treatment given to the stock will be comparable to that of commercial equipment, and the power that will be required by the pulp to obtain desired paper characteristics may be predicted.

2nd - A testing Beater wherein the clearance between roll and plate bars in relationship to the roll load and power may be studied as a variable on different types of pulps.

3rd - A testing Beater which will properly circulate a wide range of consistencies and with adequate control of the tackle relationship so that, by experiment, a cycle can be determined upon, which will administer the same type and quality of treatment as is found to exist in any given mill system.

4th - A general purpose experimental Beater in which raw materials of all kinds may be broken, beaten, and chemically treated.

It is a matter of common knowledge that experimental Beaters heretofore used, of less than 25 pound size, give a decidedly different type of treatment from that given in commercial equipment. It is also well known that different types of commercial equipment give different types of treatment, especially with widely varying operating conditions.

The principal use of a pulp testing Beater is to try out a small batch of pulp which is proposed to be used commercially and, by means of a suitable standardized sheet making device, to determine in advance what properties may be expected to appear in the sheet due to the use of the proposed pulp. Obviously such a procedure is of little or no advantage unless the type of treatment given the fibre in the testing Beater is similar to that given in the commercial size equipment of the particular paper machine on which the pulp is to be used.

A pulp testing Beater, to be of general use, must, therefore, be able to run off a reproducible cycle of any quality of treatment desired, from extremely sharp cutting action to almost pure wetting action. In the following discussion, the term "low quality" and "high quality" will be used to designate the extreme of cutting and wetting predominance in fibre treatment.

The Experimental Beater, no matter how small the roll or how sharp the tackle, can be made to produce either a high or low quality of treatment by proper adjustment of the roll-plate relationship. However, the low quality of treatment is most easily obtained and the ordinary small Experimental Beater requires many hours to run off a cycle of high quality treatment. Furthermore, with light parts the vibration induced by bar contact becomes so large a factor in determining the quality of treatment that a high quality becomes impossible except with both roll and plate rigidly fixed at a definite clearance. Rigid holding of roll and bedplate at fixed clearances has been investigated in many tests incident to the development of the CYCLE BEATER. Reproducible cycles can be run on a particular pulp but it was found that this method was entirely unsatisfactory in comparing different pulps due to the widely differing characteristics of various fibre in their clearance requirements for proper engagement.

Apparently the only satisfactory way to obtain a reproducible cycle is with actual load regulation between roll and plate. If high quality treatment is to be obtained, it is necessary that the plate be solidly set and the roll adjustable. Otherwise, vibration of the plate will impair both quality and reproducibility.

It has been found that, in order to obtain a short cycle of high quality treatment, a large amount of tackle must be used on a small amount of high density stock. In order to circulate high density stock in a small tub a very considerable pitch is necessary in the channels. It is difficult, if not impossible, to run reproducible cycles on high density stock unless there is adequate control of the level of stock approaching the roll.

These considerations have determined the design of the Noble & Wood CYCLE BEATER. Following are the general features:

A 15" dia. x 13" face roll with 5/16" Stainless fly bars weighing 400# with its attached yoke. The roll is held by ball bearings in a substantial yoke which is pivoted at a point level with the roll axis. All the weight of the roll and yoke bears on the plate except that which is counterbalanced by a simple pair of knife edged beams. The leverage system is arranged so the roll may easily be balanced at any time and the weight beam is calibrated in pounds load between roll and plate. A dashpot is provided which prevents bunting or pounding. The roll is free to "jump" if mistreated without upsetting the balance system.

A dial calibrated in thousandths of an inch indicates at all times the clearance between roll and plate. The roll runs at 490 RPM giving a peripheral speed of 1,920 ft. per minute (Commercial Speed). The supporting point for the roll yoke is located so as to balance the weight of the roll, shaft, yoke, and pulley at the proper point. The drive is furnished with the Beater and is of the V-ball type with the driving belt pulling horizontal to roll axis. This reduces the effect of the power pull upon the roll-plate relationship to a negligible factor.

The propeller with a variable speed drive is provided to lift the stock from the return channel to the proper level approaching the roll. The speed may be varied at will while running so the level at the roll may be kept constant at a predetermined point regardless of consistency.

The recommended batch size for pulp testing purposes is 8# bone dry fibre at 4.7%. The tub is calibrated in pounds of water to facilitate loading (*Figure 1*, page 8). The Beater will handle properly up to 10# fibre at 5%, and, for mixing purposes, as little as 2# at 2.5% or 1# at 1%.

Any type or quality of treatment desired may be obtained in this Beater by manipulation of the consistency and the roll load. A 10# furnish at 5% with 100# roll load will give a quality of treatment comparable to that of a good commercial Beater carefully operated to make strong papers. Under these conditions approximately 40 minutes is required on a Swedish Kraft pulp to bring the stock well down below commercial papermaking freenesses.

Some attention has been paid in the past to the location of the “peak” in the Mullen curve, with reference to the time of beating, as an indicator of the power that will be required commercially by that pulp. It is noticeable in testing pulps with this Beater the Mullen curve rarely has a distinct “peak” with high quality treatment. Incidentally, chemical pulps in a good commercial Beater will not show a “peak” in the Mullen curve, no matter how long the paper is beaten within papermaking limits of freeness.

Time alone, or revolutions of the roll, are not sufficient to indicate the relative power consuming properties of different pulps. Different pulps require different amounts of power even with the tackle, the roll speed, the batch size, the consistency and the roll load kept constant. It is entirely possible that further study will show a definite relationship between the power required or the bar clearance for a given load under definite conditions, and the paper making or strength factors of a pulp.

The proper instrument for measuring the proportional power requirement of different pulp is an integrating wattmeter on the driving motor which can be read periodically when samples are taken. The relationship between the time and the power required to develop a given sheet strength, furnishes a reliable means for determining the rate at which power may be expended in commercial Beaters and Jordans without injury to the stock.

The CYCLE BEATER normally requires about 5 HP on the regular pulp testing furnish but can consume more with heavy roll adjustments. The 5 HP motor is recommended as it is adequate for any practical treatment of paper pulp.

SPECIFICATIONS OF NOBLE AND WOOD CYCLE BEATER

WEIGHT - Approximately 1600# complete with drive but without motor.

CAPACITY - Possible batch sizes range from 2# to 10#, depending upon the consistency. The following table gives the maximum consistency for adequate and uniform circulation for different batch sizes (bone dry) for untreated sulphite or kraft fibre.

POUNDS OF BONE DRY FIBRE	PERCENT CONSISTENCY, BONE DRY
2	2.5
3	3.3
4	3.8
5	4.1
6	4.4
7	4.6
8	4.7
9	4.9
10	5.0

The batch size recommended for pulp testing work is 8# at 4.7% or 4# at 3.8%.

ROLL SUSPENSION - The roll is held in a substantial yoke of welded steel construction, which is pivoted on free turning, snug bronze journals. The weight of the roll and its assembled parts bearing upon the bed plate is approximately 400#. The front end of the roll yoke is supported by a combination of levers with hardened knife-edged journals, which are properly counter-balanced and fitted with a dash pot so that the roll may be accurately adjusted either with reference to the clearance between roll and bedplate bars or with reference to the effective weight of the roll on the bed plate. Adequate provision is made for possible “jumping” of the roll without damage to or misadjustment of the balancing equipment. The balance beam, provided with a latch, is used as a quick-lift lever without disarranging the previously adjusted micrometer setting of the roll.

ROLL MICROMETER ADJUSTMENT - The roll may be adjusted to a definite clearance between bars of roll and plate by locking the balance beam in the horizontal position with the pin provided. The hand wheel on the vertical shaft has a threaded connection to the supporting leverage system. A dial is calibrated in 0.001” vertical movement between roll and plate (*Figure 2*, page 9). The zero position of this roll adjustment is obtained with the balance being locked by turning the hand wheel until the roll bars touch the bedplate bars with the Beater empty. The dial is then set to zero and fastened to the vertical shaft with the thumb screw. The roll may then be adjusted to any clearance from the plate by direct reading on the dial.

ROLL WEIGHT ADJUSTMENT - The main balance weight on the balance beam is exactly 10#; the counter-balance weight is adjusted with the roll running and the beater empty so that the roll is exactly balanced with the main weight on the zero point of the balance beam. The balance beam is then lowered to the “quick lift position” for furnishing the batch. When furnishing is completed any desired load up to 350# may be placed on the stock between roll and bedplate by moving the main weight on the balance beam and adjusting the hand wheel so that the beam is horizontal. If the dial on the vertical shaft has been previously set to the zero position of the roll, the clearance between roll and bedplate will be indicated on the dial.

PROPELLER - The beater has been developed to circulate a small quantity of stock at high density and a Propeller is used on a vertical axis to lift the stock to the proper level in front of the roll in order to compensate for the extreme pitch necessary in the back channel. This propeller has been developed so that it will not plug with unbroken pieces of stock and will not air-bind. The Propeller assists in breaking the batch and in mixing it thoroughly at every revolution to prevent channeling in the tub. The furnish, if in the form of pulp sheets, may be torn to pieces about 3” square and furnished either above the propeller or below it.

STOCK FLOW ADJUSTMENT - The upper end of the Propeller shaft is driven by a variable speed drive, which is adjustable while the Propeller is running. By this means the speed of the Propeller is adjusted to maintain throughout the cycle the level of the stock approaching the Beater roll at the desired point.

TACKLE INSPECTION - Roll and bed plate of this Beater may be critically examined to observe or correct their condition in a few minutes without loss of the relative adjustment between them. The curb, which is fastened to the tub, may be quickly removed and after removal of the Propeller driving belt the yoke carrying the roll is pushed upwards on its pivots until it leans backwards from a vertical position where a stop is provided for holding it. In this position the roll may be rotated by hand and carefully examined. Also, the bedplate is completely exposed for the same purpose. When the roll is lowered again it goes exactly to its former position without fear of misalignment. It is not necessary to move this motor or main drive or use any tools other than a wrench to make this inspection.

DRIVE - The roll is driven at 490 RPM by a standard over-capacity V-belt drive furnished with the Beater. The driven sheave is of such a diameter and the driving sheave so arranged that the effect of the drive, as to its influence on the pressure of the roll and plate, is negligible.

WATER GAUGE - The inside of the Beater tub is fitted with a gauge calibrated in pounds of water so that the exact amount of water desired may be provided before the batch is furnished and thusly the proper consistency obtained.

ROLL - The roll is 15" O.D. x 13" face and rotates at 490 RPM. It carries 36 fly bars of 5/16" stainless steel. The woods are oak and are locked in with stainless steel screws so that no damage may result from the beater standing idle and dry. An extra set of sealing woods are used under the bars to prevent stock from entering into the center of the roll. The roll heads are cast iron fitted with banger irons and carefully balanced. The bars are fastened to the roll heads by the conventional banded construction.

BED PLATE - The bed plate is a stoutly riveted unit consisting of sixteen 5/32" stainless steel bars with fifteen 3/32" Oak Woods. It is of a single angle or herringbone construction and is mounted in a plate box holder which is fastened to the underside of the Tub. This allows for easy change, or for alternate tackle to be used.

TUB - Cast iron construction with properly rounded fillets and curves at all points to prevent stagnation of stock and promote free circulation.

MAIN BEARINGS - Norma-Hoffman, self-aligning Ball Bearings.

STOCK SEALS - The tub, the curbsides and the shaft are fitted with special packing frames which adequately prevent leakage or throwing of the stock at the shaft level.

CURB - The curb is one piece, cast iron, solid construction, and carries substantial packings for sealing against stock leakage.

PROPELLER ASSEMBLY - The Propeller shaft is #316 Stainless Steel carried on specially sealed ball bearings, which do not require lubrication for several years. The variable speed drive is controlled by a handwheel in convenient position. The entire Propeller unit, including the shaft, Propeller and Variable Speed Drive may be removed by loosening of a single nut and readily replaced to its exact former position.

PROPELLER DRIVE - The Propeller is driven by a Velos belt from the Beater Roll Shaft. This belt is carried over ball bearing idler pulleys which are carried on a self-adjusting support.

DROP VALVE - The drop valve is a ball type with a 2" passage for dropping the batch or sampling.

SPATTER CURTAIN - A spatter curtain is provided in front of the roll, and although ordinarily not necessary, it effectually prevents splashing of water and stock, so that it is unnecessary to take special precautions regarding splash in the installation of this Beater.



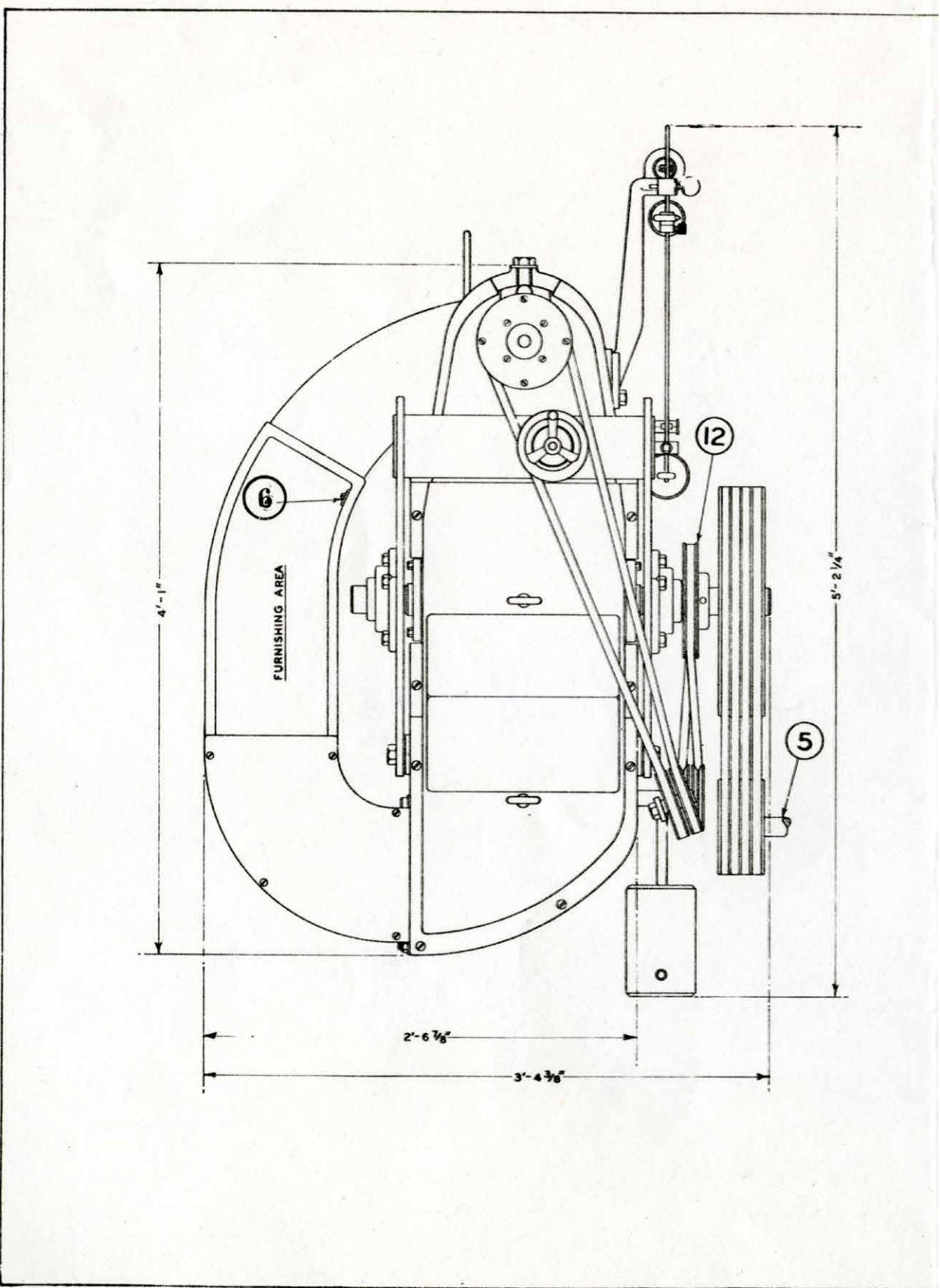
Figure 1:
The tub is calibrated in pounds of water to facilitate loading.



Figure 2:
The hand wheel on the vertical shaft has a threaded connection to the supporting leverage system. A dial is calibrated in 0.001" vertical movement between roll and plate.

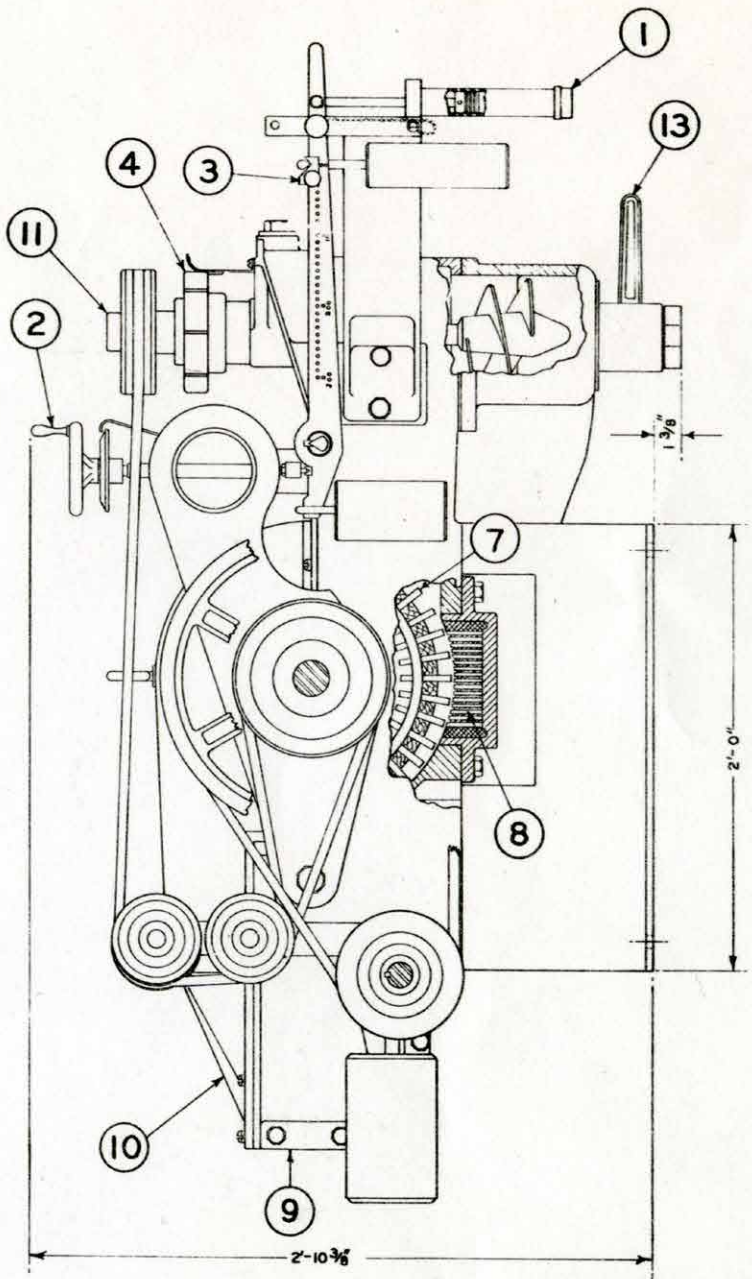
1100 RPM AT LEAST SHP
 400 RPM ROLL SPEED
 316 S-STEEL BED+ROLL BARS
 WOODS OAK WHITE PINE OR MAPLE

BED: OAK, MAPLE, MASSENHUBA, PURI
 $\frac{5}{32}$



PURPLE HEART

2 LBS 2 1/2%
10 LBS - 5%



13	SAMPLING VALVE
12	PROPELLER DRIVE
11	PROPELLER ASSEMBLY
10	CURB - ONE PIECE, CAST IRON
9	TUB - CAST IRON CONSTRUCTION
8	BED PLATE
7	ROLL - WEIGHT APPROX. 400 LBS.
6	WATER GAUGE
5	DRIVE
4	STOCK FLOW ADJUSTMENT
3	ROLL WEIGHT ADJUSTMENT
2	ROLL MICROMETER ADJUSTMENT
1	DASH POT
-	CYCLE BEATER WEIGHT 1350 LBS.

THE NOBLE & WOOD MACHINE COMPANY
ROCHESTER FALLS, NEW YORK

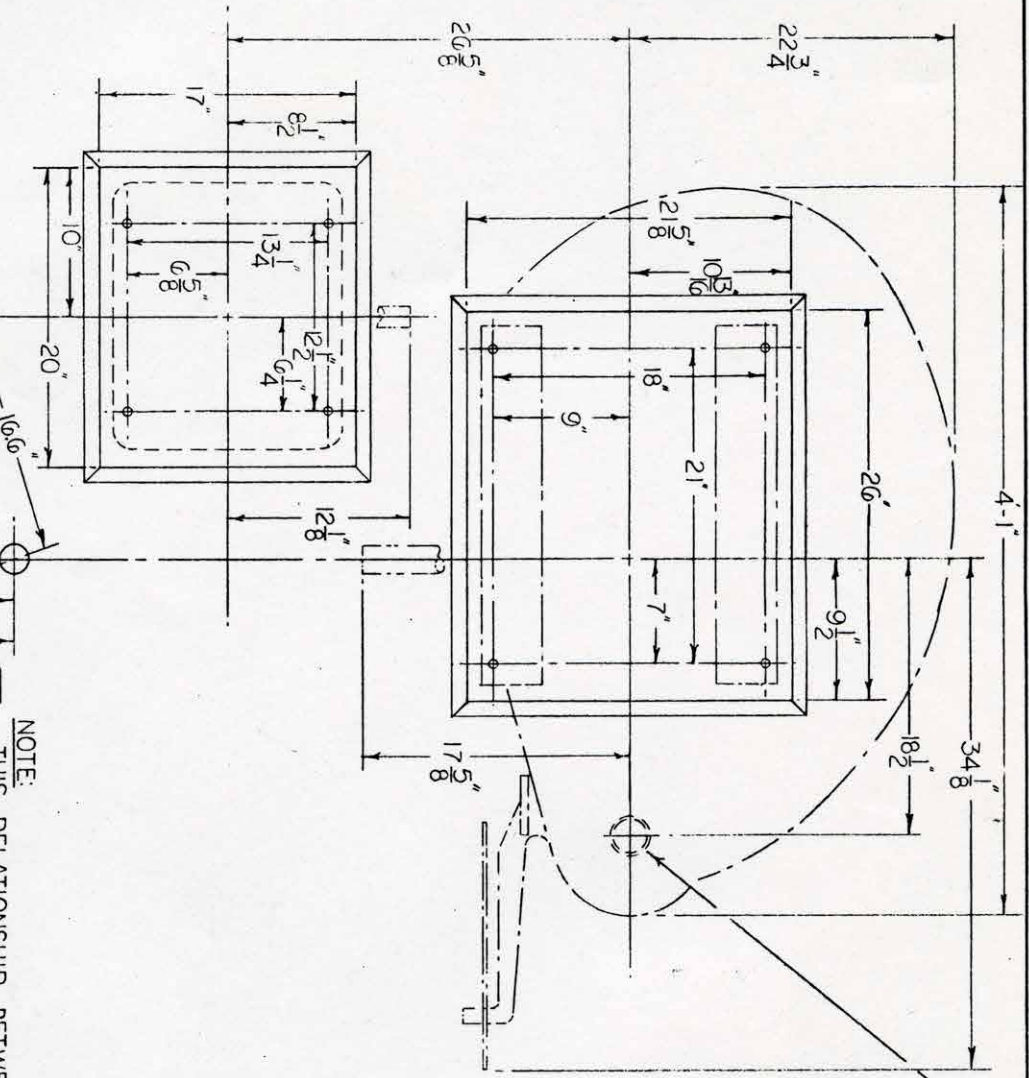
CYCLE BEATER
GENERAL ASSEMBLY - SERIES 110

DATE	2-18-34	SCALE	3" = 1'-0"
DESIGNED BY	W. J. WOOD	CHECKED	W. J. WOOD
APPROVED BY	W. J. WOOD	DATE	2-18-34

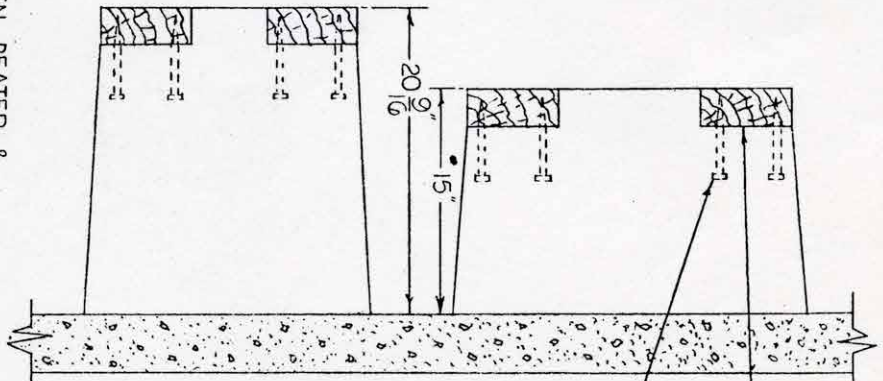
C-858

CYCLE BEATER

1325 LBS NET



BEATER DRAIN CONNECTION FOR 2" PIPE CONSISTS OF BALL VALVE FACING DOWNWARD 11" ABOVE FLOOR.



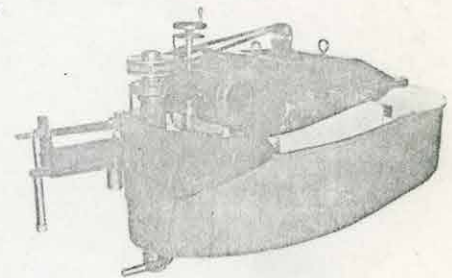
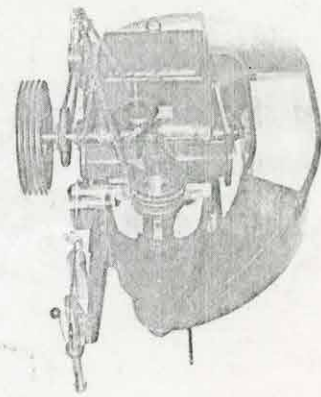
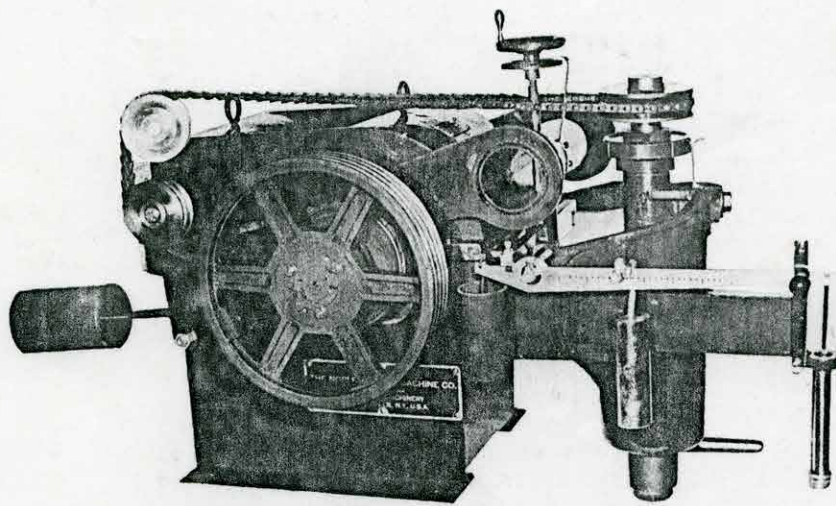
2 1/2" x 6" OAK PLANKS TO WHICH BEATER & MOTOR BASES ARE LAGGED.
4-1/2" x 6" LAG SCREWS IN EACH PLANK FOR ANCHORS.

NOTE: THIS RELATIONSHIP BETWEEN BEATER & MOTOR SHAFTS MUST BE KEPT IN ORDER THAT DRIVING SIDE OF BELTS MAY BE HORIZONTAL.

NOTES: MOTOR SLIDING BASE DIMENSIONS SHOWN ARE THOSE FOR G.E., 5 HP, 1200 RPM, 3-P, 60 CY, 254 U FRAME INDUCTION MOTOR MOUNTED ON A SLIDING BASE. STANDARD V-BELT DRIVE NO. 4-8 68-64-160, FURNISHED BY N. & W., HAS 1 1/8" BORE FOR MOTOR-1 1/16" BORE FOR BEATER SHAFTS. CUSTOMER TO BUILD MOTOR & BEATER FOUNDATIONS TO SUIT INDIVIDUAL INSTALLATION.

THE NOBLE & WOOD MACHINE COMPANY HOOSICK FALLS, NEW YORK			
INSTALLATION PLANS FOR CYCLE BEATER (SERIES 100-60 CY)			
DATE	CHECKED	DATE	SCALE
12/27/63	1/25	1/27/64	1/8" = 1'-0"
APPROVED BY	DATE	DATE	
			E-1225

FIRST MADE FOR S. O. No.



The Cycle Beater

The principal use of a pulp-testing beater is to try out a small batch of pulp prior to its commercial use and, by means of a suitable standardized sheet-making device (such as the Noble & Wood Laboratory Sheet Machine), to determine in advance what properties may be expected in the sheet due to the use of the proposed pulp. Obviously such a procedure is of little or no advantage unless the type of treatment given the fibre in the testing beater is closely identical with that given in the commercial equipment of the particular paper machine on which the pulp is to be used.

Here's a pulp-testing beater that actually duplicates the operating conditions of any commercial beater. The Noble & Wood Cycle Beater is a small, commercial-type beater in performance and construction — not a miniature — and is the most complete laboratory beater ever offered to paper mills.

It will give you a complete test of stock in 20 to 30 minutes; batch size from 2 lbs. at 2.5% to 10 lbs. at 5%. Consistency and level of stock approaching the roll can be controlled and weight of roll and consistency can be adjusted for any type of treatment from sharp cutting action to almost pure wetting.

You can duplicate the performance of any beater, Jordan or combination of commercial units, quickly and easily. With such a reproducible cycle established, the power required by any pulp to obtain desired paper characteristics can be predicted. Clearance between roll and plate bars in relationship to roll load and power can be studied as a variable and important factor in pulp treatment. New pulp, fibre, waste material of most all kinds can be broken, beaten and chemically treated.

The roll is 15" in diameter with a 13" face and 5/16" stainless fly bars. It weighs 400 lbs. with its attached yoke and is held by ball bearings. Load on bedplate can be regulated between 0 and 350 lbs. Bedplate is 5 1/2" by 13", with 5/32" stainless bars; solidly supported in main tub casting. Exact clearance between roll and plate bar tips is registered at all times on a dial calibrated in thousandths of an inch. Conditions of roll and plate can be inspected by removing curb and throwing back roll on pivots, without disturbing alignment.

Standard equipment includes all attachments illustrated, and V-Belt Drive between motor and beater, but does not include the 5 HP, 1160 RPM motor recommended for optimum performance. We can also supply the Cycle Beater with roll and bedplate of Basalt Lava in place of the conventional bar-and-wood filling.

NOBLE & WOOD PRODUCTS OF QUALITY. Write for complete information on any of these Noble & Wood Products: Agitators • Beaters • Beater Rolls • Beater Fillings • Bedplates • Cylinder Washers • Jordans Jordan Fillings • Jordan Plugs • Laboratory Equipment • Manganese Steel Fillings • Metering Pumps Noblewood Mill Refiners • Pulpers • Riggers • Stock Thickeners • Sheet Machines • Wet Board Machines

N W

THE AGITATOR

NOBLE & WOOD BULLETIN No. 1

THE NOBLE & WOOD MACHINE CO
 Paper Mill Machinery
 Hoosick Falls, New York, U. S. A.
 Mid-West: Ronningen-Petfer Company,
 Vicksburg, Michigan
 West Coast: Monarch Supply Company,
 Portland 10, Oregon
 South: Noble & Wood Southern, Inc.,
 Atlanta 5, Georgia

LED BY A VIGOROUS NEW MANAGEMENT TEAM, NOBLE & WOOD MANUFACTURES PRODUCTS OF QUALITY—BACKED BY 67 YEARS OF EXPERIENCE

“WOULD LIKE TO COMPLIMENT YOUR COMPANY,” SAYS CYCLE BEATER USER

Fiber Products Research Center, Inc.

SMITH-LEECO, INC.
 ONEIDA, N. Y.
 MILWAUKEE DIVISION
 MILWAUKEE, WIS.
 PLAINFIELD DIVISION

BEAVER FALLS, NEW YORK
 TELEPHONE CHESHAM 2301

THE J. P. LEWIS COMPANY
 BEAVER FALLS, N. Y.
 BROWNVILLE BOARD DIVISION
 BROWNVILLE, N. Y.
 LATEX FIBER INDUSTRIES, INC.
 BEAVER FALLS, N. Y.
 PAYNE-JONES, INC.
 LOUNSVILLE, N. Y.

Noble & Wood Machine Company
 Beaver Falls, New York

Dear Mr. Areson:

We have had your laboratory cycle beater in constant use now for over two months, and I would like to compliment your company on producing such excellent equipment. We have two floating bed plate beaters, a two-pound and a five-pound capacity. This type of beater is best for accurate laboratory refining duplication, but is almost worthless for hard cutting and defibration of materials such as rag. For this, we would have required two more beaters of the fixed bed plate type or a total investment of approximately \$12,000.

Your one cycle beater handles two to ten pounds of material with no circulation problems even at high consistencies. It can be changed from a floating bed plate type of refining to a fixed bed plate type in a matter of minutes. Reproducibility of results with either type we have found to exceed our previous equipment, and now we can beat rag and other tough fibers which we were unable to handle with our floating bed plate beaters. My only regret is that I did not have an opportunity to use the cycle beater before this, because we certainly would have made it our first choice in refining equipment when we set up these laboratories.

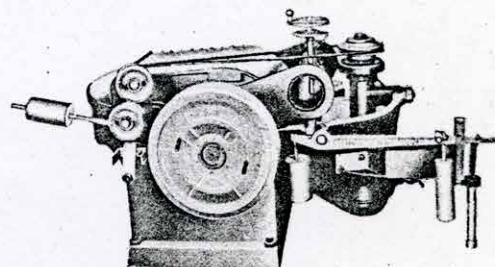
Very sincerely yours

Clark E. Thorp
 Clark E. Thorp
 President

This unsolicited comment speaks for itself. We are happy to say it is typical of reports from Cycle Beater users in all the papermaking states and over a dozen foreign countries.

The N/W Cycle Beater roll is 15" in diameter with a 13" face and 5/16" stainless fly bars. It weighs 400 lbs. with its attached yoke and rotates on ball bearings. Load on bedplate can be regulated between 0 and 350 lbs. Bedplate is 5 1/2" by 13", with 5/32" stainless bars, solidly supported in main tub casting. Exact clearance

between roll and bedplate is registered at all times on a dial calibrated in thousandths of an inch. The roll runs at 490 rpm, giving a peripheral speed of 1920 fpm (commercial speed). Roll and plate can be inspected by removing curb and lifting roll back on pivots without disturbing alignment.



THE NOBLE & WOOD CYCLE BEATER

The Noble & Wood Cycle Beater is the most complete laboratory beater obtainable. It duplicates the operating conditions of any commercial beater. It is a small commercial-type beater in performance and construction — not a miniature.

The N/W Cycle Beater will give you a complete test of stock in 20 to 30 minutes, batch size from 2 to 10 lbs., consistencies 2.5% to 5%. Consistency, and level of stock approaching the roll, can be controlled. Weight and clearance of roll can be adjusted for any type of treatment from sharp cutting action to almost pure wetting.

New pulp, fiber, waste materials of all kinds can be broken, beaten, and chemically treated. You can duplicate the performance of any beater, Jordan, or combination of units, quickly and easily . . . and thus predict the power required by any pulp to obtain desired paper characteristics.

Ask your N/W representative or write for full information on performance, specifications, price and delivery.



JORDANS



CYLINDER BOARD MACHINES



LABORATORY SHEET MACHINES



BEATERS



AGITATORS



“EXTRACTA” PULPERS

Factory on First Street

From Potato Digger to Paper Machinery to Copper Foil

Since 1891, a large factory has been located at 80 First Street. It started on March 18, 1891 when the Pruyn Manufacturing Company was established to manufacture potato diggers invented by Henry S. Pruyn. The company built a plant at this site and was producing and selling potato diggers all over the country. In the Hoosick Falls Directory of 1893 the last sentence about the company said, "There is no doubt in a reasonable time the Pruyn potato digger will be as well and favorably known over the world as the harvest machine manufactured in Hoosick Falls." In 1894, the company went bankrupt.

James A. Noble from Lawrence, Massachusetts moved to this area in 1894 to manufacture paper making machinery. A.L. Johnston, a successful store keeper on Church Street, purchased the foundry of the bankrupt Pruyn Company. After a few years Mr. Johnston teamed up with James Noble and the Noble and Johnston Machine Shop was incorporated. The excellent paper machinery produced at this factory was soon known throughout the paper industry. The plant grew into a machine shop, wood-working shop, and a first class blacksmith and steel shop. By 1899, it was employing over 40 people. All was going very well. However, on March 14, 1902 the plant was destroyed by a major fire.



A. L. Johnston declined to invest in the rebuilding of the business and factory.

Walter A Wood, Jr. became interested, and the Noble and Wood Machine Company was organized in 1902. A new modern well-equipped plant was established. In several years, over 150 men were working in this thriving enterprise. James Noble was the President of Noble and Wood and Hugh Blackinton, brother-in-law of Walter A. Wood, Jr. became Treasurer. Noble and Wood became a leader in paper making machinery. As a side line, they began manufacturing piano parts. These piano parts were cast, machined, plated and polished in the plant and shipped out ready to be assembled. Fifteen to twenty five men worked all year round on this process.

Noble and Wood flourished and during World War II, the company employed over 250 individuals. During this time about 100 woman were employed making artillery shell boosters. Business slowly declined in the 60s until only 50 people were employed. In 1969 Simmons Machine and Tool Corporation of Menands purchased 53% of the company's stock. The Simmons company went bankrupt in 1973, and the Noble and Wood Machine Company closed in January 1974.

The factory was purchased by Oak Industries. In August of 1977, the manufacturing of copper foil started at this factory through a joint venture between Oak and Mitsui Mining. The business flourished, and in 1988 plans were drawn for a new plant on Route 22 opposite True Value. In 1990 plans were cancelled, and the plant was built in South Carolina. In 1999, the company talked about expanding the workforce. The electronic industry became weak and in July 2001, 100 employees were temporarily laid off. In November 2001 the lay off became permanent. Research and development are being done at present with a faint hope that manufacturing at this site will be brought back to Hoosick Falls.

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Timothy Barrett

both roll and ~~be~~ plate rigidly fixed at a definite clearance.

The Experimental Beater, no matter how small the roll or how sharp the tackle, can be made to produce either a high or low quality of treatment by proper adjustment of the roll-plate relationship. However, the low quality of treatment is most easily obtained and the ordinary small Experimental Beater requires many hours to run off a cycle of high quality treatment. Furthermore, with light parts the vibration induced by bar contact becomes so large a factor in determining the quality of treatment that a high quality becomes impossible except with rigid holding of roll and bedplate at fixed clearances has been investigated in many tests incident to the development of the CYCLE BEATER. Reproducible cycles can be run on a particular pulp but it was found that this method was entirely unsatisfactory in comparing different pulps due to the widely differing characteristics of various fibres in their clearance requirements for proper engagement.

Apparently the only satisfactory way to obtain a reproducible cycle is with actual load regulation between roll and plate. If high quality treatment is to be obtained, it is necessary that the plate be solidly set and the roll adjustable. Otherwise, vibration of the plate will impair both quality and reproducibility.

It has been found that, in order to obtain a short cycle of high quality treatment, a large amount of tackle must be used on a small amount of high density stock. In order to circulate high density stock in a small tub a very considerable pitch is necessary in the channels. It is difficult, if not impossible, to run reproducible cycles on high density stock unless there is adequate control of the level of stock approaching the roll.

These considerations have determined the design of the Noble & Wood CYCLE BEATER. Following are the general features: -

A 15" dia. x 13" face roll with 5 16" Stainless fly bars weighing 400# with its attached yoke. The roll is held by ball bearings in a substantial yoke which is pivoted at a point level with the roll axis. All the weight of the roll and yoke bears on the plate except that which is counterbalanced by a simple pair of knife edged beams. The leverage system is arranged so the roll may easily be balanced at any time and the weight beam is calibrated in pounds load between roll and plate. A dashpot is provided which prevents hunting or pounding. The roll is free to "jump" if mistreated without upsetting the balance system.

A dial calibrated in thousandths of an inch indicates at all times the clearance between roll and plate. The roll runs at 490 RPM giving a peripheral speed of 1920' per minute (Commercial Speed). The supporting point for the roll yoke is located so as to balance the weight of the roll, shaft, yoke and pulley at the proper point. The drive is furnished with the Beater and is of the V-belt type with the driving belt pulley horizontal to roll axis. This reduces the effect of the power pull upon the roll-plate relationship to a negligible factor.

The propeller with a variable speed drive is provided to lift the stock from the return channel to the proper level approaching the roll. The speed may be varied at will while running so the level at the roll may be kept constant at a predetermined point regardless of consistency.

The recommended batch size for pulp testing purposes is 8# bone dry fibre at 4.7%. The tub is calibrated in pounds of water to facilitate loading. The Beater will handle properly up to 10# fibre at 5%, and, for mixing purposes, as little as 2# at 2.5% or 1# at 1%.

Any type or quality of treatment desired may be obtained in this Beater by manipulation of the consistency and the roll load. A 10# furnish at 5% with 100# roll load will give a quality of treatment comparable to that of a good commercial Beater carefully operated to make strong papers. Under these conditions approximately 40 minutes is required on a Swedish Kraft pulp to bring the stock well down below commercial papermaking Freeesses.

Some attention has been paid in the past to the location of the "peak" in the Mullen curve, with reference to the time of beating, as an indicator of the power that will be required commercially by that pulp. It is noticeable in testing pulps with this Beater the Mullen curve rarely has a distinct "peak" with high quality treatment. The "peak" occurs only with low quality treatment. Incidentally, chemical pulps in a good commercial Beater will not show a "peak" in the Mullen curve, no matter how long the pulp is beaten within papermaking limits of Freeess.

Time alone, or revolutions of the roll, are not sufficient to indicate the relative power consuming properties of different pulps. Different pulps require different amounts of power even with the tackle, the roll speed, the batch size, the consistency and the roll load kept constant. It is entirely possible that further study will show a definite relationship between the power required, or the bar clearance for a given load under definite conditions, and the paper making or strength factors of a pulp.

The proper instrument for measuring the proportional power requirement of different pulp is an integrating wattmeter on the driving motor which can be read periodically when samples are taken. The relationship between the time and the power required to develop a given sheet strength, furnish a reliable means for determining the rate at which power may be expended in commercial Beaters and Jordans without injury to the stock.

The CYCLE BEATER normally requires about 5 HP on the regular pulp testing furnish but can consume more with heavy roll adjustments. The 5 HP motor is recommended as it is adequate for any practical treatment of paper pulp.

SPECIFICATIONS OF NOBEL AND WOOD CYCLE BEATER

For General Assembly See Dwg. D-750-A
 For Installation Plans See Dwg. E-640-A

WEIGHT - Approximately 1600# complete with drive but without motor.

CAPACITY - Possible batch sizes range from 2# to 10#, depending upon the consistency. The following table gives the maximum consistency for adequate and uniform circulation for different batch sizes (bone dry) for untreated sulphite or kraft fibre.

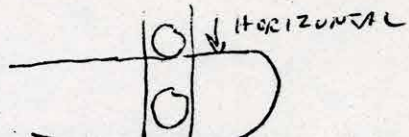
<u>POUNDS OF BONE DRY FIBRE</u>	<u>PERCENT CONSISTENCY BONE DRY</u>
2	2.5
3	3.3
4	3.8
5	4.1
6	4.4
7	4.6
8	4.7
9	4.9
10	5.0

The batch size recommended for pulp testing work is 8# at 4.7% or 4# at 3.8%.

ROLL SUSPENSION - The roll is held in a substantial yoke of welded steel construction, which is pivoted on free turning, snug bronze journals. The weight of the roll and its assembled parts bearing upon the bed plate is approximately 400#. The front end of the roll yoke is supported by a combination of levers with hardened knife-edged journals, which are properly counter-balanced and fitted with a dash pot so that the roll may be accurately adjusted either with reference to the clearance between roll and bedplate bars or with reference to the effective weight of the roll on the bed plate. Adequate provision is made for possible "jumping" of the roll without damage to or mis-adjustment of the balancing equipment. The balance beam, provided with a latch, is used as a quick-lift lever without disarranging the previously adjusted micrometer setting of the roll.

ROLL MICROMETER ADJUSTMENT - The roll may be adjusted to a definite clearance between bars of roll and plate by locking the balance beam in the horizontal position with the pin provided. The handwheel on the vertical shaft has a threaded connection to the supporting leverage system. A dial is calibrated in .001" vertical movement between roll and plate. The zero position of this roll adjustment is obtained with the balance being locked by turning the handwheel until the roll bars touch the bedplate bars with the Beater empty. The dial is then set to zero and fastened to the vertical shaft with the thumb screw. *The roll may then be adjusted to any clearance from the plate by direct reading on the dial.*

~~with the weight on O~~



check this

roll to dissipate weight?
(roll to dissipate weight?)

check this

ROLL WEIGHT ADJUSTMENT - The main balance weight on the balance beam is exactly 10#; the counter-balance weight is adjusted with the roll RUNNING and the beater empty so that the roll is exactly balanced with the main weight on the zero point of the balance beam. The balance beam is then lowered to the "quick lift position" for furnishing the batch. When furnishing is completed any desired load up to 350# may be placed on the stock between roll and bedplate by moving the main weight on the balance beam and adjusting the handwheel so that the beam is horizontal.

If the dial on the vertical shaft has been previously set to the zero position of the roll, the clearance between roll and bedplate will be indicated on the dial.

PROPELLER - The beater has been developed to circulate a small quantity of stock at high density and a Propeller is used on a vertical axis to lift the stock to the proper level in front of the roll in order to compensate for the extreme pitch necessary in the back channel. This propeller has been developed so that it will not plug with unbroken pieces of stock and will not air-bind. The Propeller assists in breaking the batch and in mixing it thoroughly at every revolution to prevent channeling in the tub. The furnish, if in the form of pulp sheets, may be torn to pieces about 3" square and furnished either above the propeller or below it.

STOCK FLOW ADJUSTMENT - The upper end of the Propeller shaft is driven by a variable speed drive, which is adjustable while the Propeller is running. By this means the speed of the Propeller is adjusted to maintain throughout the cycle the level of the stock approaching the Beater roll at the desired point.

TACKLE INSPECTION - Roll and bed plate of this Beater may be critically examined to observe or correct their condition in a few minutes without loss of the relative adjustment between them. The curb, which is fastened to the tub, may be quickly removed and after removal of the Propeller driving belt the yoke carrying the roll is pushed upwards on its pivots until it leans backwards from a vertical position where a stop is provided for holding it. In this position the roll may be rotated by hand and carefully examined. Also, the bedplate is completely exposed for the same purpose. When the roll is lowered again it goes exactly to its former position without fear of misalignment. It is not necessary to move the motor or main drive or use any tools other than a wrench to make this inspection.

DRIVE - The roll is driven at 490 RPM by a standard over-capacity V-belt drive furnished with the Beater. The driven sheave is of such a diameter and the driving sheave so arranged that the effect of the drive, as to its influence on the pressure of the roll and plate, is negligible.

WATER GAUGE - The inside of the Beater tub is fitted with a gauge calibrated in pounds of water so that the exact amount of water desired may be provided before the batch is furnished and thereby the proper consistency obtained.

ROLL: The roll is 15" O.D. x 13" Face and rotates at 490 RPM. It carries 36 Flybars of 5/16" Stainless Steel. The woods are Oak and are locked in with Stainless Steel screws so that no damage may result from the beater standing idle and dry. An extra set of sealing Woods are fixed under the bars to prevent stock from entering into the center of the roll. The roll heads are cast iron fitted with banger irons and carefully balanced. The bars are fastened to the roll heads by the conventional banded construction.

BED PLATE - The bed plate is a stoutly riveted unit consisting of sixteen 5/32" Stainless Steel bars with fifteen 3/32" Oak Woods. It is of a single angle or herringbone construction and is mounted in a plate box holder which is fastened to the underside of the tub. This allows for easy change, or for alternate tackle to be used.

TUB - Cast iron construction with properly rounded fillets and curves at all points to prevent stagnation of stock and promote free circulation.

MAIN BEARINGS - Norma-Hoffman, self-aligning, Ball Bearings.

STOCK SEALS - The tub, the curbsides and the shaft are fitted with special packing frames which adequately prevent leakage or throwing of the stock at the shaft level.

CURB - The curb is one piece, cast iron, solid construction, and carries substantial packings for sealing against stock leakage.

PROPELLER ASSEMBLY - The Propeller shaft is #316 Stainless Steel, carried on specially sealed ball bearings, which do not require lubrication for several years. The variable speed drive is controlled by a handwheel in convenient position. The entire Propeller unit, including the shaft, Propeller and Variable Speed Drive may be removed by loosening of a single nut and readily replaced to its exact former position.

PROPELLER DRIVE - The Propeller is driven by a *Velos* belt from the Beater Roll Shaft. This belt is carried over ball bearing idler pulleys which are carried on a self-adjusting support.

DROP VALVE The drop valve is a Ball type with a 2" passage for dropping the batch, or sampling.

SPATTER CURTAIN - A spatter curtain is provided in front of the roll. and although ordinarily not necessary, it effectually prevents splashing of water and stock, so that it is unnecessary to take special precautions regarding splash in the installation of this beater.