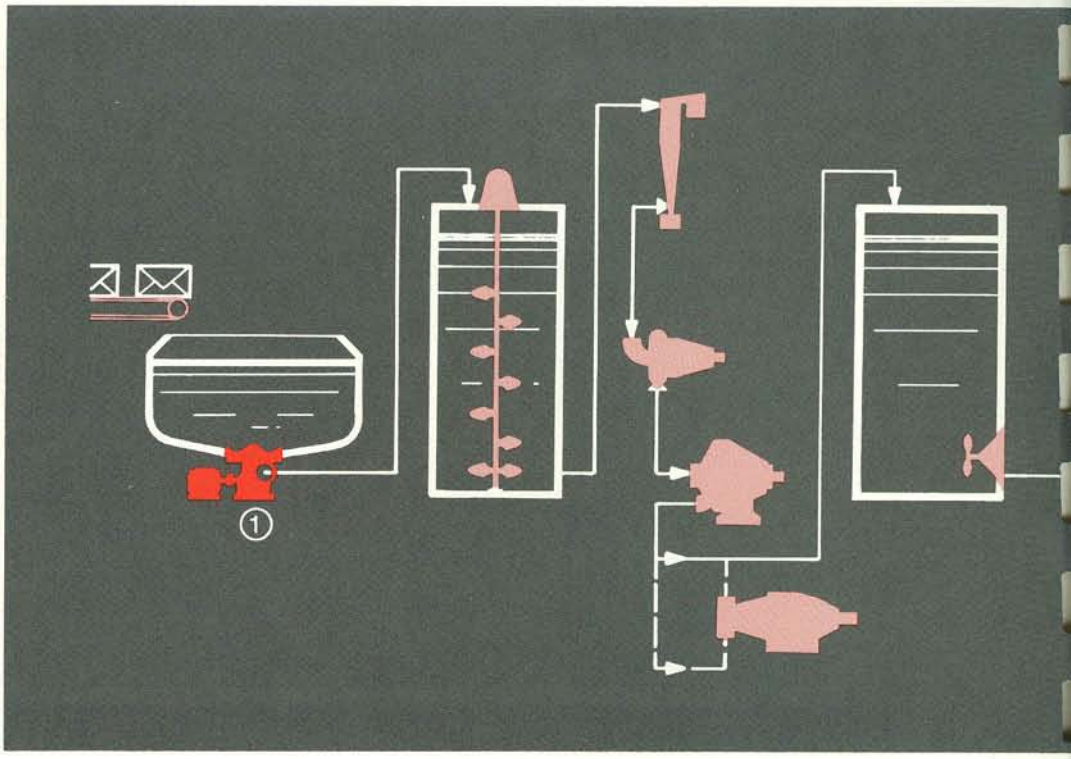
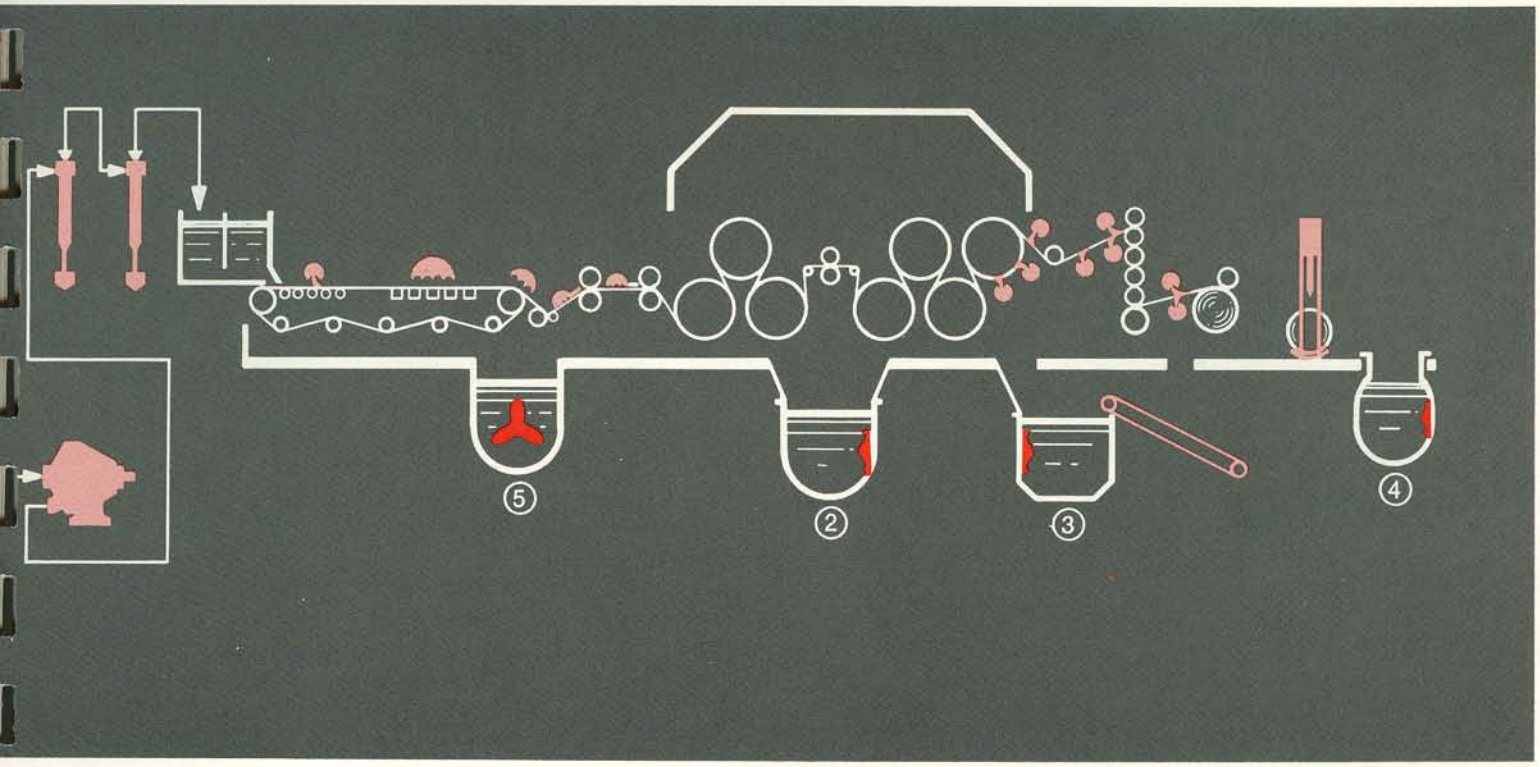
Here in this flow chart the Slush-Maker is shown in five of its most common applications: ① Furnish makeup, either batch or continuous, bale or slab; ② dry-end broke; ③ super-calender broke; ④ finishing-room broke; ⑤ couch-pit; press-pit repulping.

Other Morden equipment for stock preparation, increased machine drainage, paper surface correction and materials handling is shown in shaded figures.



Throughout the mill...furnish makeup, broke repulping under the machine, wastepaper reclamation—the Morden Slush-Maker is the most versatile, most efficient pulper anywhere ...now over 600 in service worldwide.

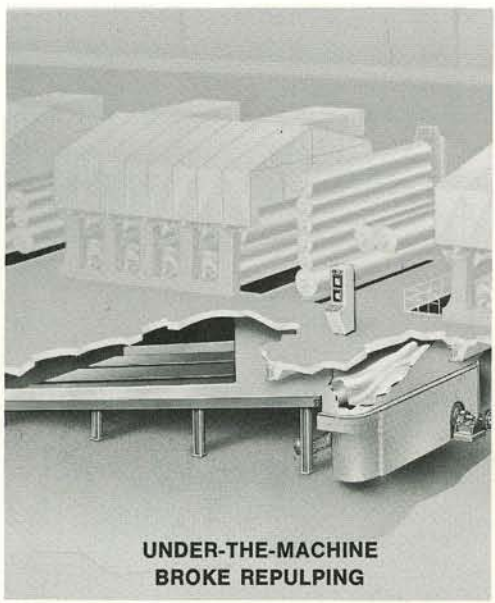


As the time-tested pulper that's an industry standard for the toughest pulping and repulping jobs, the Slush-Maker has proved its performance throughout the mill—or wherever rapid, economic pulping and repulping are needed—to break down bales, slabs, sheets and fiber bundles for subsequent refining and cleaning.

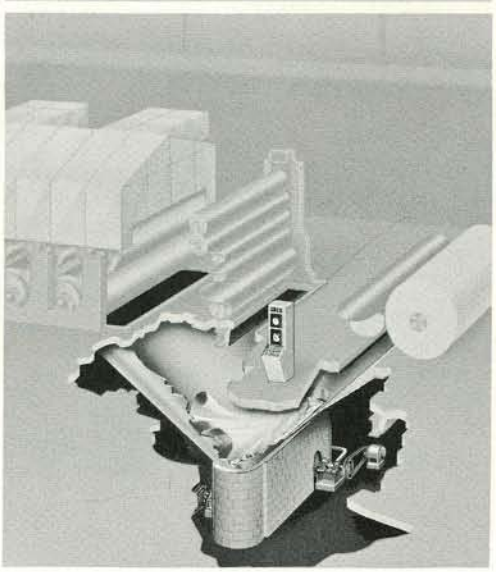
Because of its patented principle, the Slush-Maker is more flexible, more versatile than ordinary pulpers and is rated by the industry as the most effective all-around pulper.

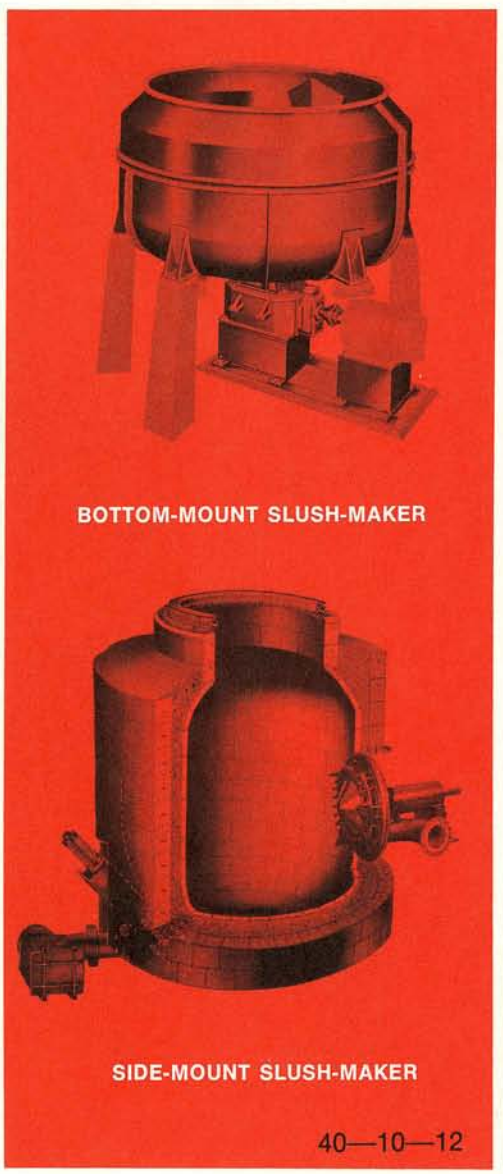
Depending upon mounting design, controls, size, rotor configuration and other custom features, the Slush-Maker efficiently handles any of these applications:

- . . . Furnish makeup—batch and continuous;
- . . . Wastepaper reclamation;
- . . . Under-the-machine broke;
- . . . Finishing room broke and trim;
- . . . Severe wet-strength materials (a specialty).



UNDER-THE-MACHINE BROKE REPULPING





BOTTOM-MOUNT SLUSH-MAKER

SIDE-MOUNT SLUSH-MAKER

Heart of the Slush-Maker: the pulping unit

Here's why the Morden Slush-Maker is efficient . . . producing higher throughput in less time, with less power than competitive concepts . . . especially on wet-strength materials:

The patented principle that has made the Morden Slush-Maker the industry standard for repulping has remained basically unchanged for more than a decade, despite constant design research by Morden and others to improve upon it. It's all in the pulping head, or pulping unit.

The Slush-Maker's design is unique —and decisive in results—yet it is simple. Like all pulpers, it consists essentially of an impeller which draws stock and unbroken fiber bundles across its face and then throws them out centrifugally as they pass between the rotor blades. But this is where the similarity with other pulpers ends.

There are five basic design differences which result in producing more impact and hydraulic shear—more efficiently and trouble free—than with any competitive concept.

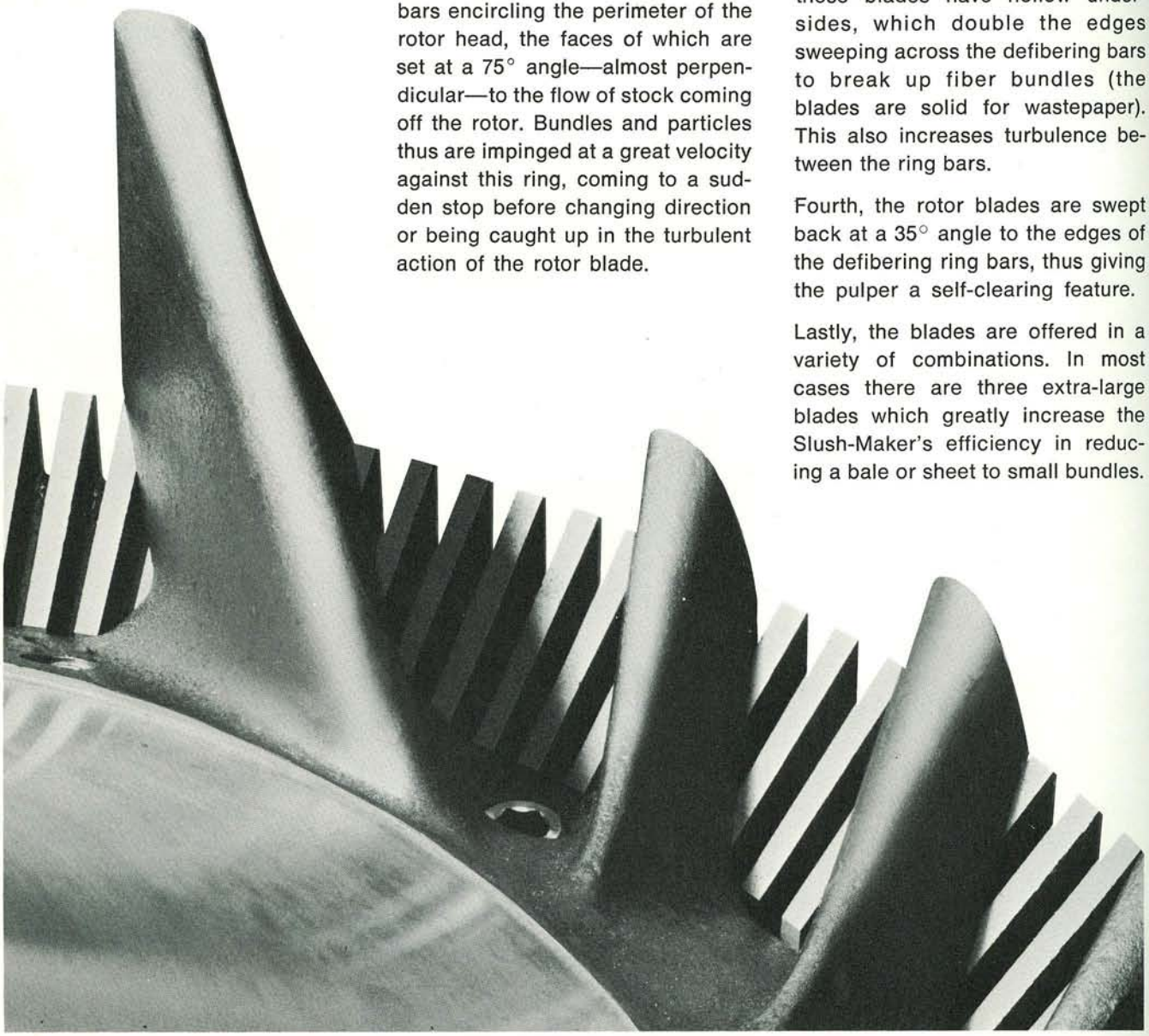
First, there is a ring of defibering bars encircling the perimeter of the rotor head, the faces of which are set at a 75° angle—almost perpendicular—to the flow of stock coming off the rotor. Bundles and particles thus are impinged at a great velocity against this ring, coming to a sudden stop before changing direction or being caught up in the turbulent action of the rotor blade.

Second, the rotor blades sweep across the many teeth (or defibering bars) of the ring at a preset clearance (based upon the pulping efficiency required by your system). Fiber bundles are thrown against the defibering ring and either rubbed apart between rotor blade and ring bar or caught up in the extreme turbulence of the cavity between bars.

Third, the rotor blades themselves are unique. They extend out as inverted V's from the rotor hub, designed to create maximum circulation. In repulping clean furnish, these blades have hollow undersides, which double the edges sweeping across the defibering bars to break up fiber bundles (the blades are solid for wastepaper). This also increases turbulence between the ring bars.

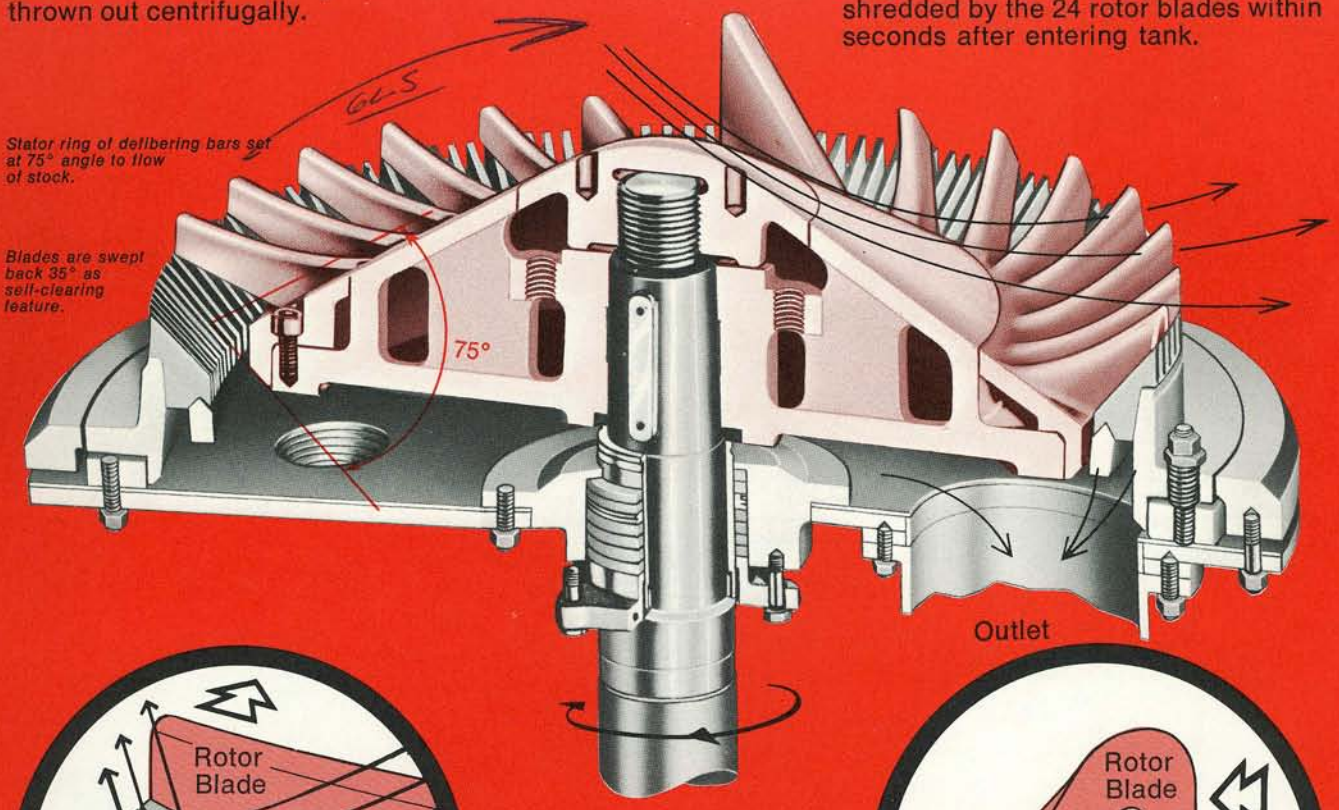
Fourth, the rotor blades are swept back at a 35° angle to the edges of the defibering ring bars, thus giving the pulper a self-clearing feature.

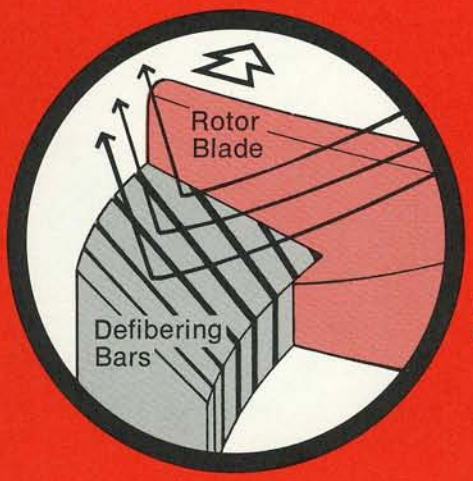
Lastly, the blades are offered in a variety of combinations. In most cases there are three extra-large blades which greatly increase the Slush-Maker's efficiency in reducing a bale or sheet to small bundles.



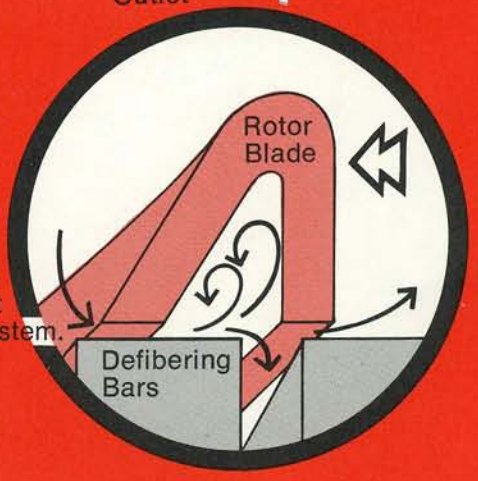
Stock is drawn across impeller face and thrown out centrifugally.

Large chunks are caught and shredded by the 24 rotor blades within seconds after entering tank.





Clearance set at most efficient distance for each individual system.



Fiber bundles are further reduced as they are impinged against the face of the defibering ring at great speed. Abruptly they change direction and are caught in the flow and turbulence of the passing rotor blade.

The smallest flakes are caught between rotor blade and ring bar, where they are subjected to violent defibering action. This impinging and brushing is repeated over and over rapidly. Cavities on the underside of the rotor blades add to the hydraulic turbulence, creating intensive impact and generating shear forces on the fiber bundles.

CONTROLLED EXTRACTION

Extraction can be controlled through the pulping unit (or, on batch, the Slush-Maker is dumped through a cylinder-operated dump valve). Emptying through the pulping unit permits the screening of contaminants and continuous extraction. Primary extraction takes place through the annular gap between the rotor hub and defibering ring; optional slots between the lands on the defibering ring are provided to accommodate higher throughput rates.

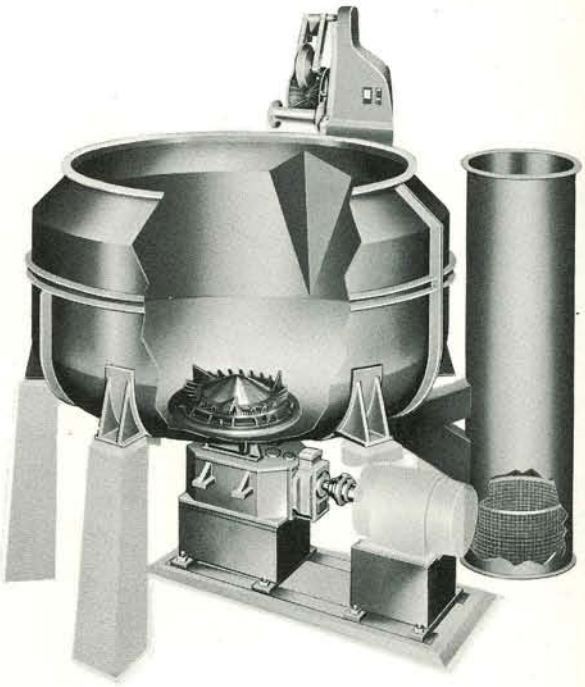
PRIMARY EXTRACTION AT ANNULAR GAP

OPTIONAL SLOTS BETWEEN TEETH AVAILABLE

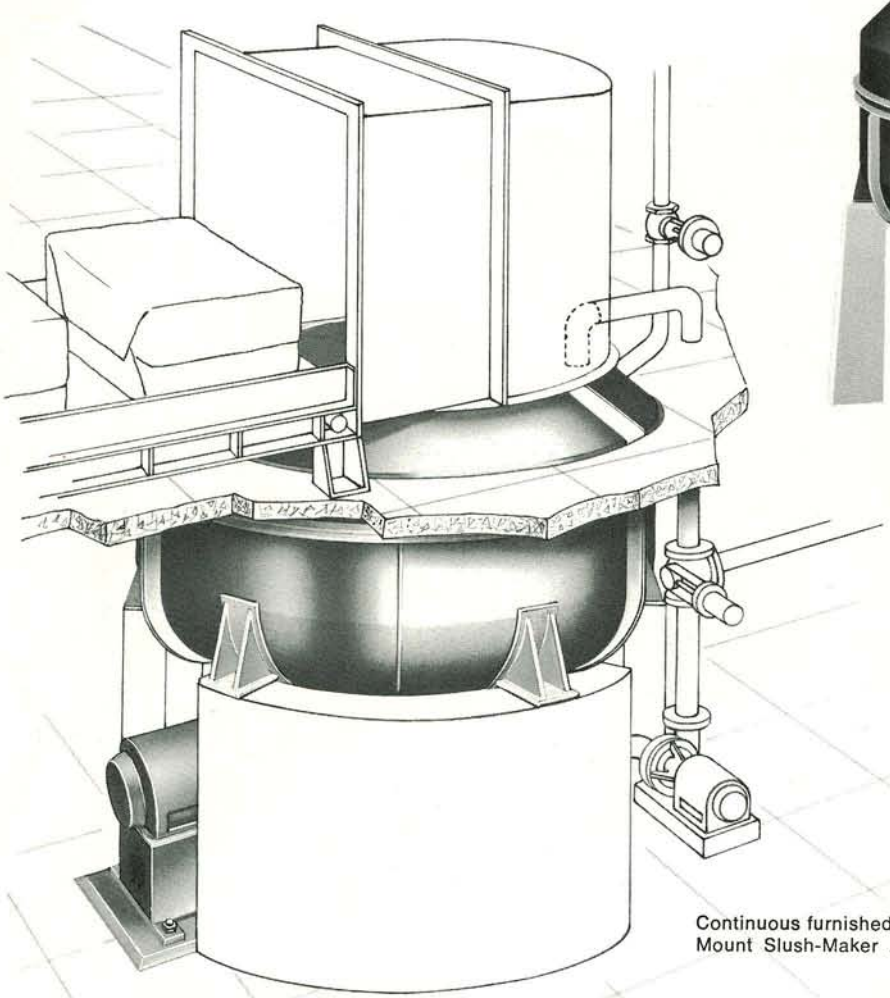
Side-mount, bottom-mount . . . batch or continuous . . . Morden has the experience and engineering capability to develop the right pulping system for your needs.

Variations in furnish and system requirements dictate the type, size and configuration of Slush-Maker, plus properly sized pulping unit, rotor blade configuration, horsepower and various accessories. Morden's field experience aids in the proper selection. Further specification information is found on Page 40-10-18.

Furnish makeup



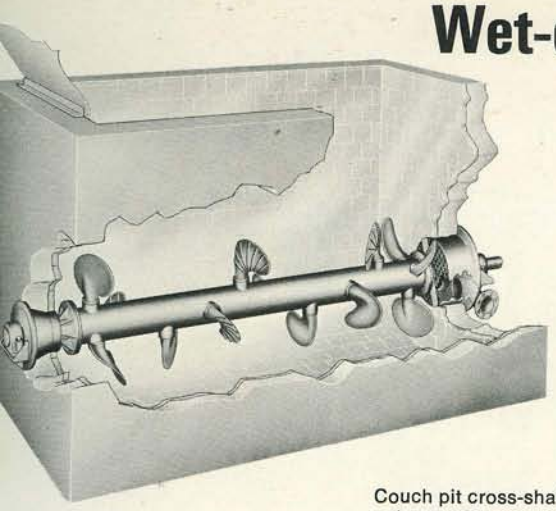
Complete wastepaper makeup system, including specially designed Slush-Maker pulping unit (heavy duty), rag catcher and junk tower (junk elevator optional).



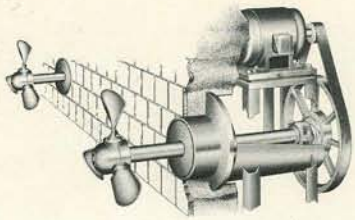
Continuous furnished makeup with Bottom-Mount Slush-Maker . . . bale pulper shown.

Wet-end repulpers

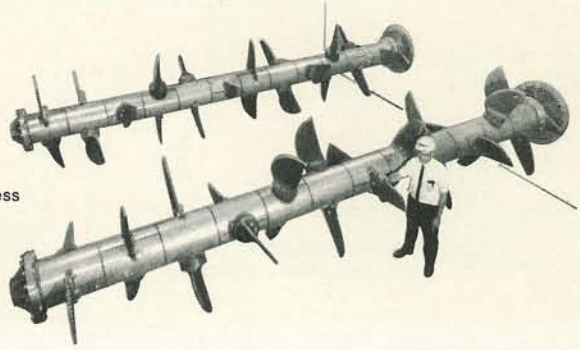
In order to round out full stock preparation system capabilities, Morden offers a wide variety of wet-end repulpers, utilizing Morden-Brinkley horizontal agitators in a wide range of configurations. Here are a few of the typical custom designs.



Couch pit cross-shaft agitator with weedless impeller.

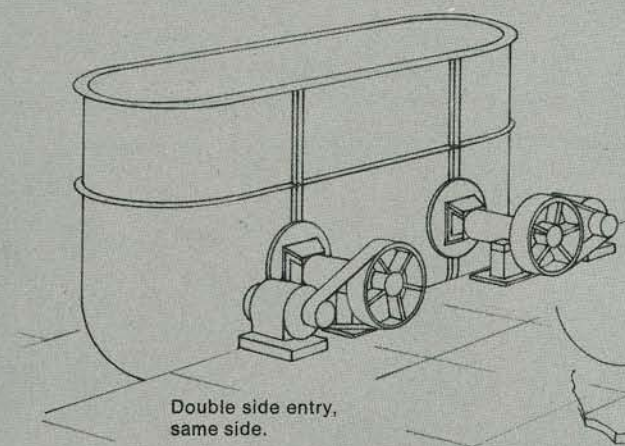


Couch pit—double horizontal inserts for complete agitation.

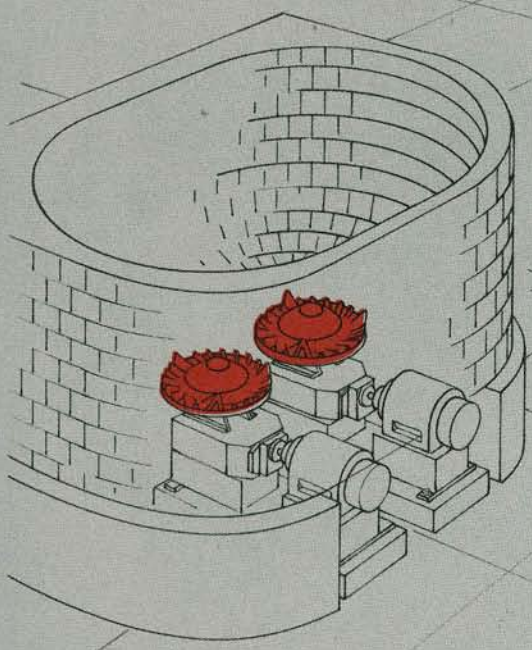


Paddle-type press pit repulper.

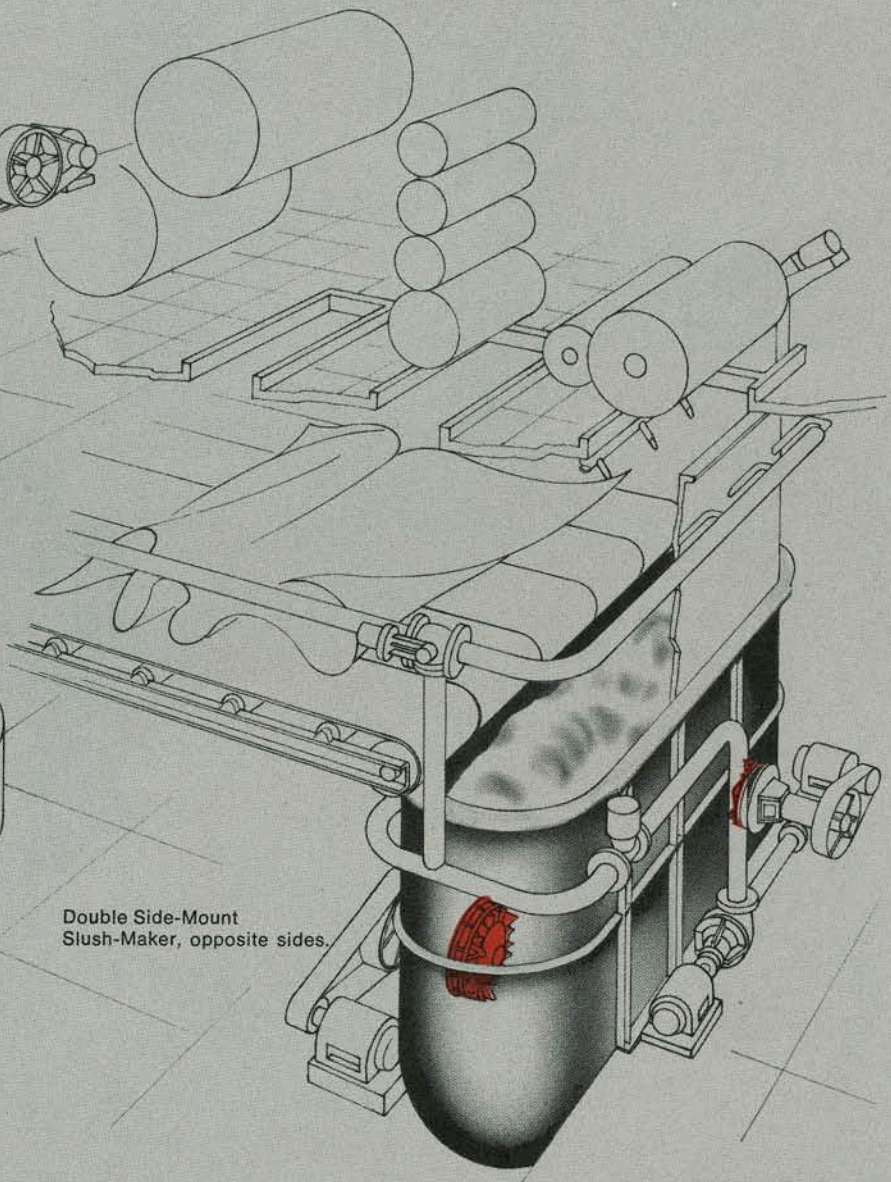
Under-the-machine broke



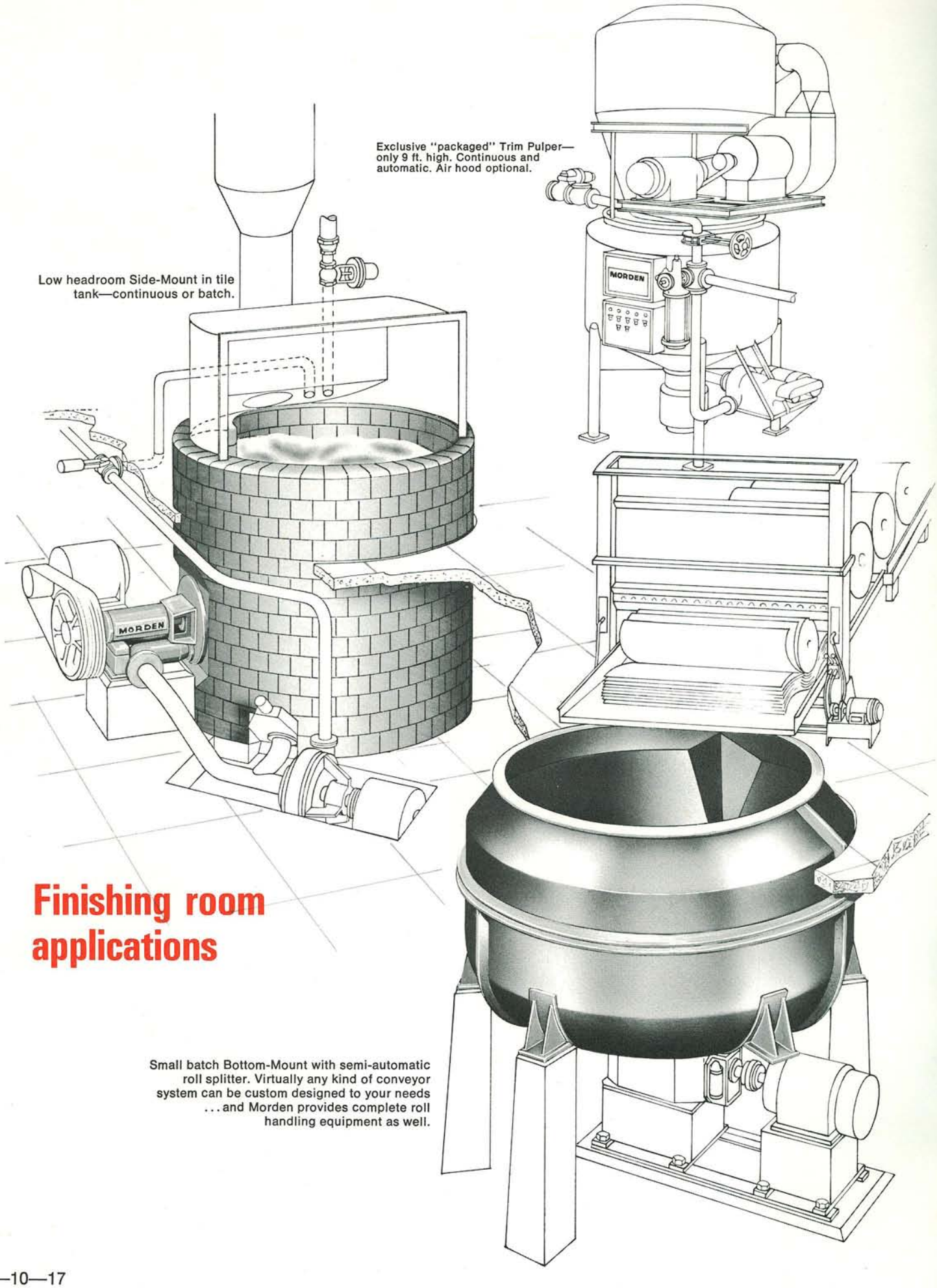
Double side entry, same side.



Double Bottom-Mount Slush-Maker for high-tonnage machine designed for continuous operation to meet paper machine requirements.



Double Side-Mount Slush-Maker, opposite sides.



Exclusive "packaged" Trim Pulper—only 9 ft. high. Continuous and automatic. Air hood optional.

Low headroom Side-Mount in tile tank—continuous or batch.

Finishing room applications

Small batch Bottom-Mount with semi-automatic roll splitter. Virtually any kind of conveyor system can be custom designed to your needs ... and Morden provides complete roll handling equipment as well.

Match pulper variations to your requirements

Continuous
Batch

One pulping unit
Two pulping units
Agitator shafts

Bottom-mount
Side-mount

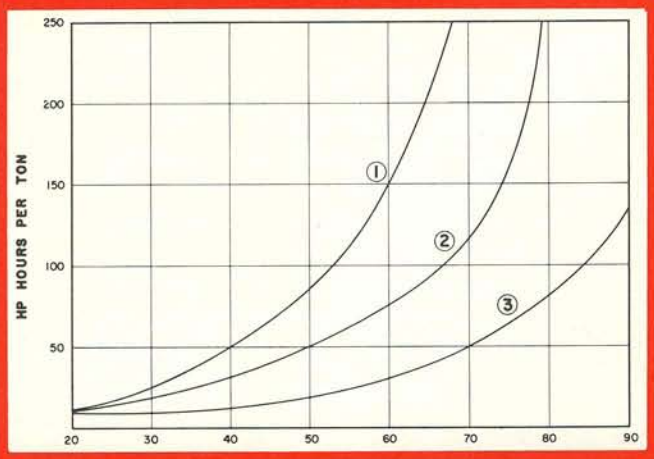
Standard height
Low profile

Tile
Metal
Concrete Tile-lined

Round
Wide oval
Extra wide oval

Batch capacities:	From 250 to 8,000 pounds, depending upon number of rotors and size and speed.
Continuous capacities:	Up to maximum paper machine requirements. Automatic level and consistency controls in prewired, prepiped console.
Rotor variations:	17″, 27″, 34″, 43″, 54″, 66″ and 72″ diameters available in four configurations for different applications.
Power:	From 100 to 800 hp connected.
Consistencies:	Normally 6% for batch and 3% for continuous with variations engineered from 2½% to 6% or higher.
Drive:	V-belt; parallel shaft or right angle reduction gear.
Materials:	Pulping units of alloy iron and chrome steel, or stainless alloy.
	Tanks of mild steel, stainless steel, tile or concrete. Tile-lined for high temperature and low pH operation.

Pulping efficiency



Comparison Tests Show Advantage of Exclusive Defibering Ring and Bar-to-Bar Action

Line ① in the graph above shows the efficiency of the Slush-Maker, when attempting to pulp overissue newsprint in 60° F. water—*WITH THE ROTOR ONLY.*

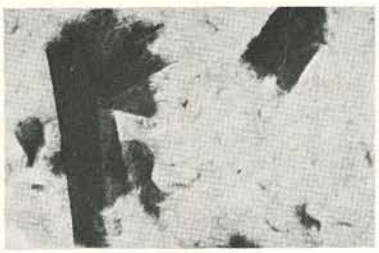
Line ② shows how efficiency is increased when the defibering ring with its barred teeth is added at the perimeter of the rotor blades' arc. In this test the rotor blades are spaced ¼" apart from the ring bars, but particles are still impinged against the bars with great force.

Line ③ shows how efficiency is further increased, when the bar faces are set at 1/32" distance from the rotor blades . . . increasing defibering to a marked degree. At a 70 index on the Morden defibering index (right), line ③ requires only a fifth of the power per ton of line ① and less than half of the power of line ②

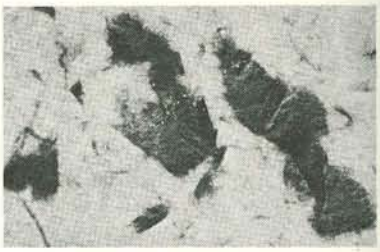
Overissue newsprint at a 90 index (on the Morden scale) can be considered fully defibered, since the remaining specks are principally foreign material. In 120° F. water the power per ton to 90 index would be reduced about one-half.

Photomicrograph of fully repulped furnish shows excellent separation of fibers without damage or cutting.

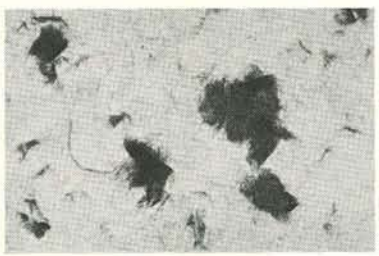
Morden defibering index



#20



#30



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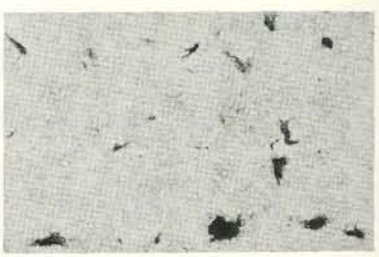
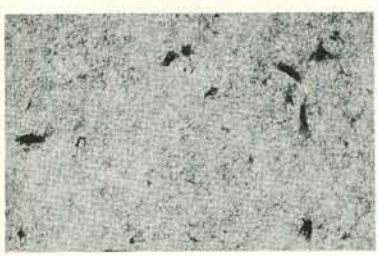
#60



#70



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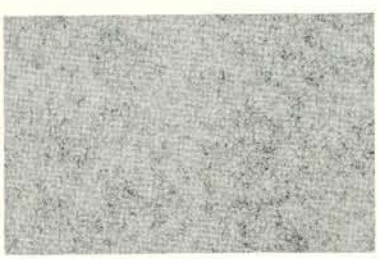
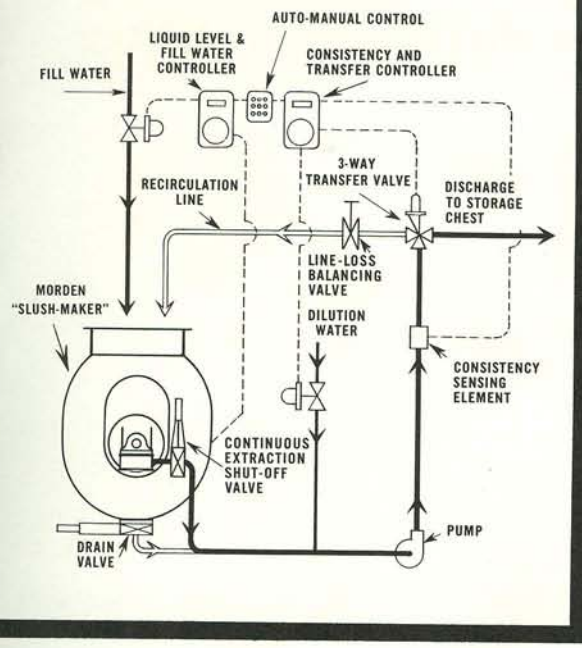
#90



#100

The full-scale photographs show the defibering progression of a pulping cycle in the Slush-Maker. The numbers represent Morden's defibering index scale.

Automatic controls



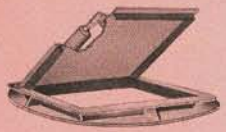
A completely prewired, pre-piped console can be provided to house continuous Slush-Maker controls, recorders, indicators and pushbutton stations for the motors, pumps and valves. A single console is illustrated.

This schematic diagram shows the basic level and consistency control equipment required for automatic, continuous Slush-Maker operation. Morden's custom-designed controls are engineered to the hydraulic system and make an important contribution to the success of a dry-end pulper.

The *level and fill water controller* assures optimum circulation and full submergence of the sheet. The *consistency and transfer controller,* coupled with a consistency sensing element in the pump discharge line, controls consistency in both the Slush-Maker tank and the stock line to the chest. Stock consistency can be held within a predetermined narrow bank within the range of 2% to 4½%.

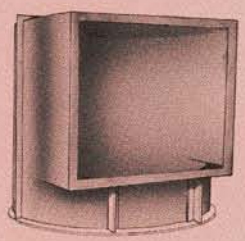
Additional controls are available to provide a warning signal for high consistency, a bypass control for high level in the storage tank, and automatic start for machine broke.

Accessories



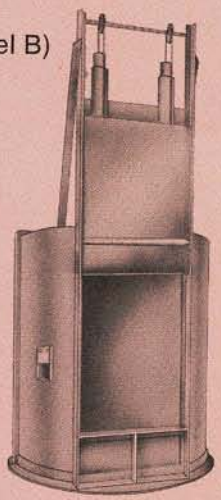
Hood (Model C)

Spray and Fill Ring

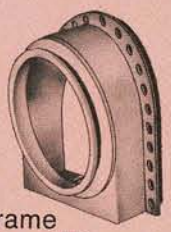


Hood (Model A)

Hood (Model B)

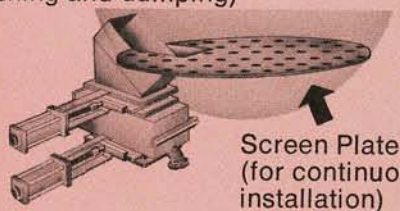


Dump Valve
(bottom type with adapter frame for tile or concrete)



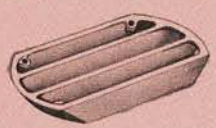
Adapter Frame
(for pulping unit in tile or concrete tank)

Junk Trap
(automatic—intermittent flushing and dumping)

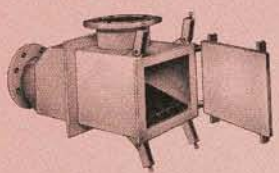


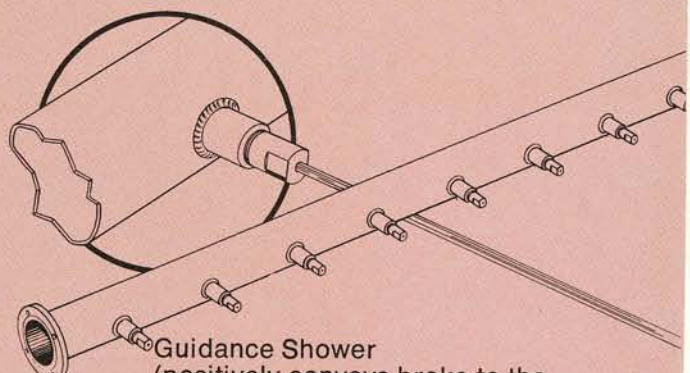
Screen Plate
(for continuous installation)

Dump Valve Grille



Screen Box
(top inlet)





Guidance Shower
(positively conveys broke to the Slush-Maker. Ask for Bulletin #40-30-13)