# United States Patent

[11] **3,584,800**


[72] Inventors **Victor D. Dodd**
**Honey Brook;**
**Harry Lyn Kemper, Narvon, both of, Pa.**



[21] Appl. No. **800,999**
[22] Filed **Feb. 20, 1969**
[45] Patented **June 15, 1971**
[73] Assignee **Somat Corporation**
**Pomeroy, Pa.**


[54] **WASTE PULPING MACHINE WITH SHEAR MEMBERS**
**2 Claims, 5 Drawing Figs.**


[52] **U.S. Cl.** ..... **241/46.06,** 241/74
[51] **Int. Cl.** ..... **B02c 18/12,** B02c 18/18, B02c 18/40
[50] **Field of Search** ..... 241/46.06, 46.11, 46.17, 74



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,852,200 | 9/1958 | Holzer | 241/46.11 |
| 2,947,486 | 8/1960 | Higer | 241/46.11X |
| 3,071,328 | 1/1963 | Higer | 241/46.11 |
| 3,188,942 | 6/1965 | Wandel | 241/46.17X |



*Primary Examiner*—Donald G. Kelly
*Attorney*—Kane, Dalsimer, Kane Sullivan & Kurucz



**ABSTRACT:** A waste-pulping machine of the type utilizing a rotating impeller in which the impeller is provided with one or more blades which can cooperate with one or more stationary blades to provide a shearing action.

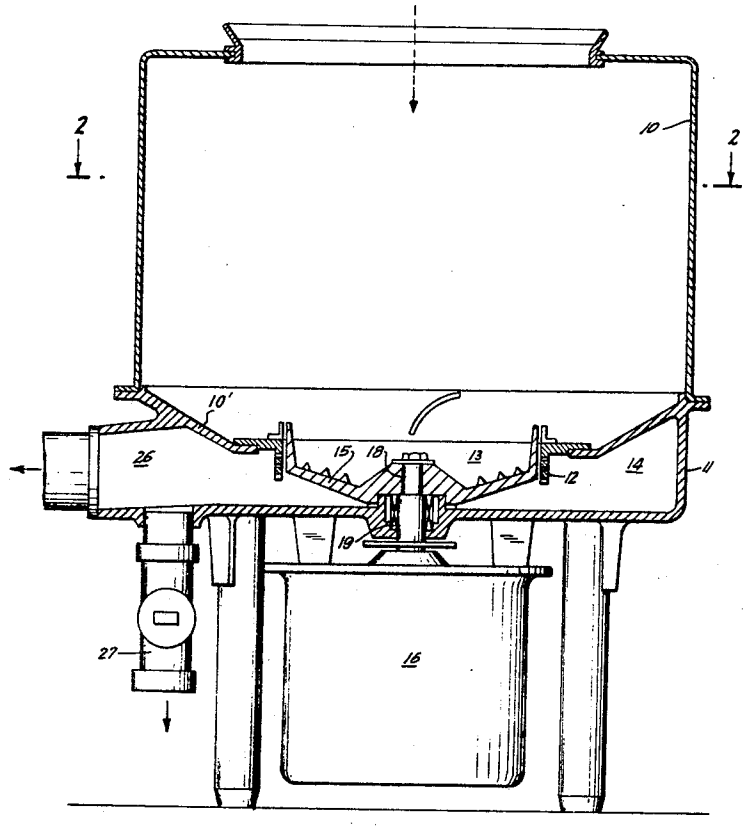
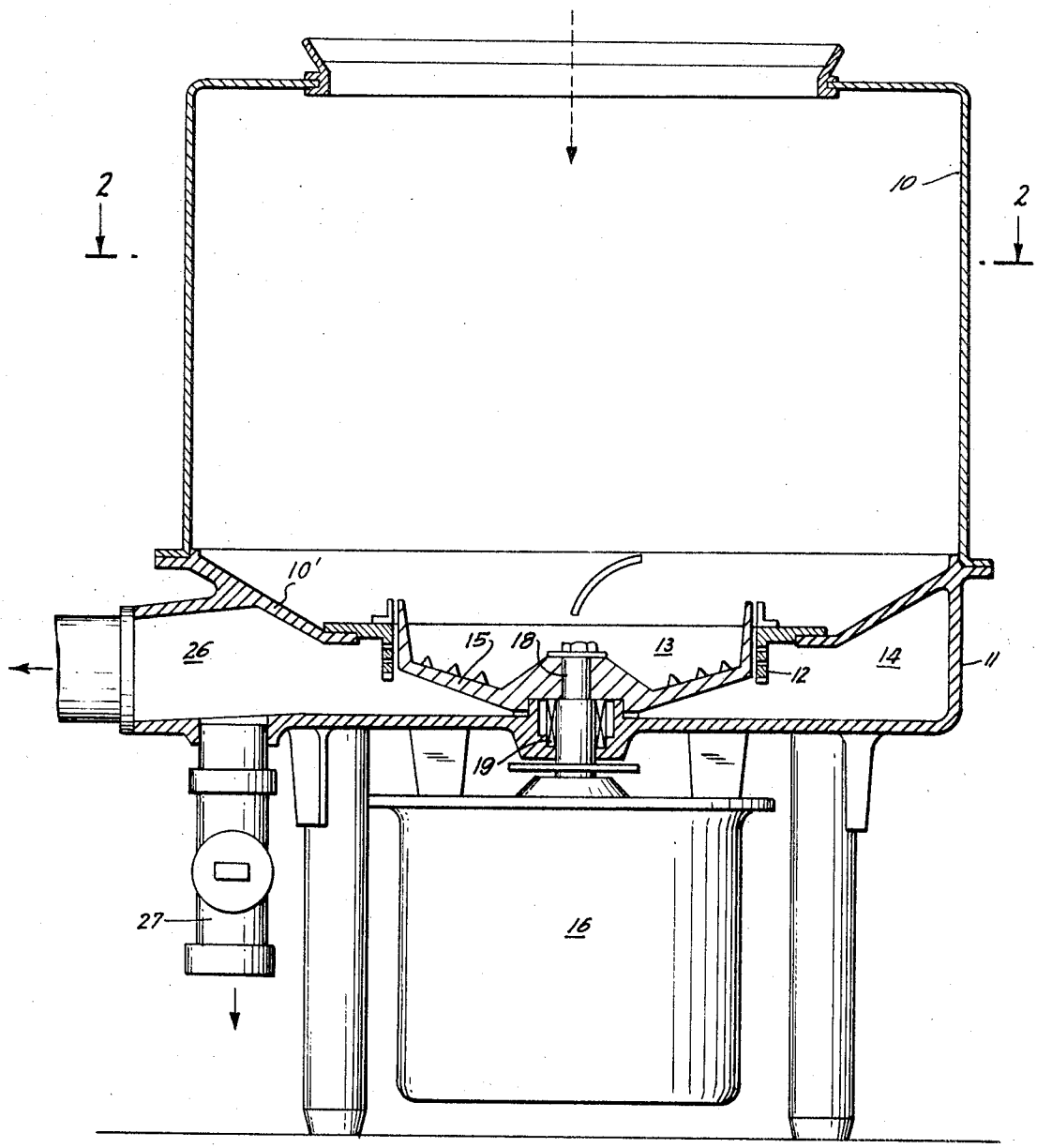



FIG. 1




INVENTORS
VICTOR D. DODD
H. LYN KEMPER
BY
Kane, Dalsimer, Kane, Sullivan and Kurucz
ATTORNEYS

FIG. 2

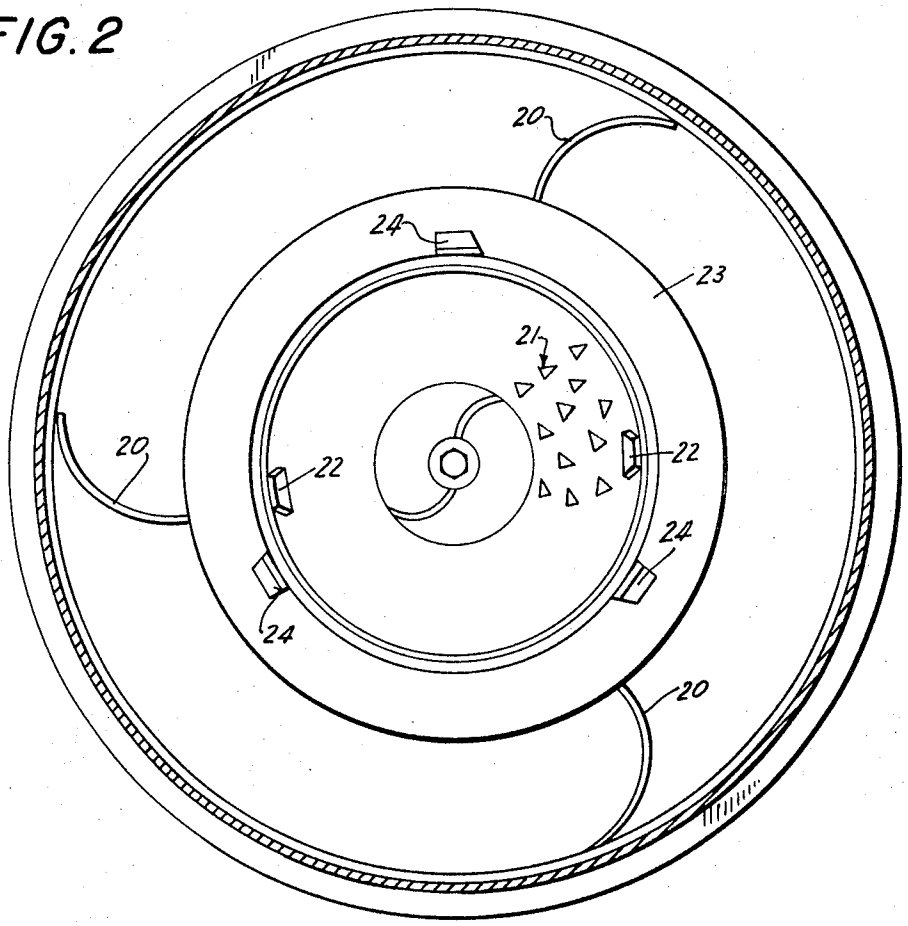
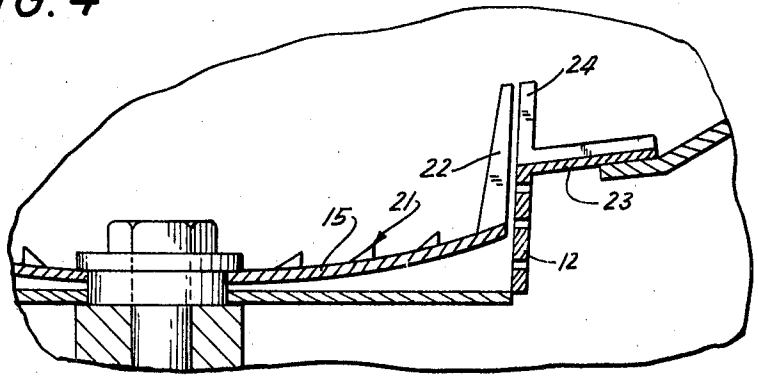
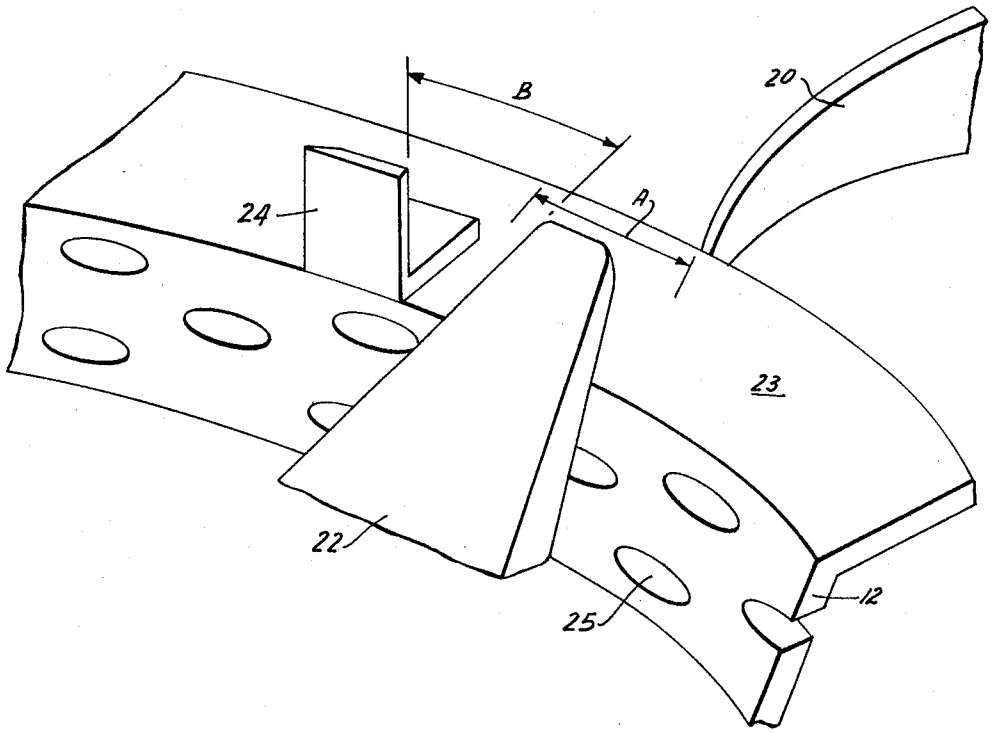



FIG. 4




INVENTORS
VICTOR D. DODD
H. LYN KEMPER
BY
Kane, Dalsimer, Kane, Sullivan & Smith
ATTORNEYS

FIG. 3



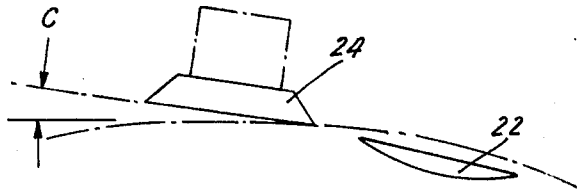




FIG. 5

INVENTORS
VICTOR D. DODD
H. LYN KEMPER
BY
Kane, Dalsimer, Kane, Sullivan & Smith
ATTORNEYS

# WASTE PULPING MACHINE WITH SHEAR MEMBERS

## BACKGROUND OF THE INVENTION

The application of wet pulping equipment for waste disposal is finding increasing acceptance. In equipment of this type waste materials are introduced into an impeller created vortex of water, reduced to a pulp, passed on to a water extraction device where the excess of water is separated and returned to the pulper for reuse. Conventional waste-pulping machines have been designed on the premise that nearly all waste material is of a fibrous and therefore pulpable nature, and are used mainly for food and paper waste. In recent years, a number of advances have been incorporated which have increased the ability of machines of this type to handle the increasing amounts of nonpulpable materials, and in particular, plastics. These include the use of slotted rings surrounding the pulping impeller, wiping ears mounted to the impeller, pumping vanes on the outside of the perforated ring, and retarder blades mounted above the impeller's periphery. The ability to handle plastic material has thus increased so as to permit up to about 10 percent by weight of this material to pass through and thus reduce sorting out of the waste materials.

However, the amount of plastic material in waste has increased still further and very frequently goes beyond 10 percent. Further, this material is tougher. The use of slotted rings has limitations when pumping the less reduced pulp through a pipe line to a remotely located water extractor. Other materials, commonly in waste, such as wire coathangers, are still problem items, usually requiring manual sorting before going into the machine.

## SUMMARY OF THE INVENTION

A waste-pulping machine of the type in which waste materials are introduced into an impeller created vortex of water and reduced to a pulp wherein the impeller is provided with one or more blades constructed and arranged to cooperate with one or more stationary blades to provide a shearing action.

## DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. **1** is a partially sectional elevational view of a waste pulping machine utilizing the present invention;

FIG. **2** is a partially sectional view taken along the line **2–2** in the direction of the arrows in FIG. **1** showing the impeller tank;

FIG. **3** is a segmentary perspective view of stationary and moving shearing blades respectively;

FIG. **4** is a segmentary view in elevation of the blades shown in FIG. **3**; and

FIG. **5** is a diagrammatic view illustrating the angular relationship of stationary and movable blades.

## PREFERRED EMBODIMENT

Referring to the FIGS. cylindrical shell **10** and circular base **11** form the pulping tank. Annular perforated ring **12** separates pulping chamber **13** and slurry chamber **14**. The ring closely surrounds impeller **15** which is driven in rotary motion by motor **16** with shaft **17** keyed to the impeller with key **18** and protected from leakage by mechanical seal **19**. The numeral **10** designates an annular portion of the tank which extends radially inwardly from the wall and which is stationary. The bottom portion terminates in a circular edge which is adjacent the impeller and the ring is between the edge of the bottom portion and the impeller.

Baffles **20** are included to divert material moving around the periphery of the chamber over the impeller area. The impeller is provided with a plurality of cutting teeth **21** on its upper surface and a plurality—two being shown in this embodiment of the invention—of upwardly projecting cutting teeth or shear teeth **22**. The ring **12** is provided with an outwardly directed flange **23** projecting from its upper edge and a plurality of stationary teeth or stationary shearing members **24** are provided projecting upwardly from flange **23**. Three such stationary shear teeth **24** are provided in this embodiment.



Waste and water are introduced into the pulping chamber where the waste is pulped through the action of the impeller until reduced to a size where the solids can pass through the openings **25** in the ring **12** into the slurry chamber, and out the discharge port **26** and into a pump which is not shown for transport to an extractor which is also not shown where the excess water is removed and returned to the pulper. Valve **27** is included for purposes of draining down the machine completely when desired.

As seen in FIG. **3**, shear members **22** and **24** are two parts of a set, the one **22** rotating with the impeller, and the other **24** fixed to the tank. As the impeller rotates, the blade **22** passes across blade **24**. The shape of these parts is such as to very closely approximate the action of a pair of hand scissors as the blades pass one another. The baffle **20** is so positioned as to guide the materials being cut between the shears creating a positive continuous flow of material across the shear faces. The location of the stationary blade **24** in relation to the baffle **20** is not highly critical. This is indicated in FIG. **3** by the letter A. However, the blade or shear member **24** must be positioned so that the flow of water and solids is deflected just in front of the stationary blade **24** allowing the cutter ear **22** to cut at the solids. In a typical example, the included angle of the leading edge of cutting member **22** and the facing vertical edge of cutting member **24** is 35° to 55°, as indicated by the letter B. This enables the stationary blade to hold material so that the cutter blade **22** can get to it in a scissor action. The cutter blade **22** is sloped for two reasons. One of the reasons is to deflect material that cannot be cut out of the blades, such as pipe, bar, etc. The second reason is to keep stringy material from hanging on the moving ear **22** while it is rotating and thereby unbalancing the impeller. This aids in cutting since the surface is always clean. As noted in FIG. **5**, the stationary blade is relieved at an angle C to avoid wedging which takes place when cutting soft materials. It is useful to affix the stationary blade **24** by bracketing to the flange **23** to allow adjustability in relation to the cutting member **22** so that a specific clearance can be maintained as wear takes place.

Such a design aids appreciably in the cutting of material providing nearly unlimited ability to gradually reduce heretofore difficult to handle amounts of plastic, and other nonpulpable material. Obviously, the heavier and harder the shears are constructed, the heavier and tougher the waste materials to be handled can be.

We claim:

**1.** A waste disposal unit comprising a cylindrical tank for receiving waste material and water, a wall of said tank, a bottom portion of said tank extending radially inwardly from said wall, a disc impeller in said tank circumferentially spaced from said wall and supported for rotary motion, said bottom portion terminating in a circular edge adjacent said impeller, an upper surface of said impeller, material disintegrating teeth on said upper surface, a sieve in the form of a tubular member supported in said tank between said bottom portion and said impeller and radially encircling said impeller, said sieve being formed with a plurality of through apertures, a first shear member projecting upwardly from said upper surface, a second shear member supported stationary relative to said first shear member and in spaced relation therewith, said first and second shear members extending above said sieve, means for rotating said impeller, first and second edges of said first and second shear members respectively, said first shear edge moving in the direction of said second shear edge upon rotation of said impeller, and a baffle member supported on said bottom portion and extending upwardly therefrom spaced from said second shear member whereby the flow of materials in said tank is deflected from said bottom portion into said second shear edge.

**2.** A waste disposal unit in accordance with claim **1** in which said first and second shear edges define an angle which is within the range of 35° to 55°.