Dec. 18, 1956 H. S. MESSING 2,774,491

ROTARY FEEDING DEVICE FOR PULP MAKING APPARATUS

Filed July 23, 1953 2 Sheets-Sheet 1

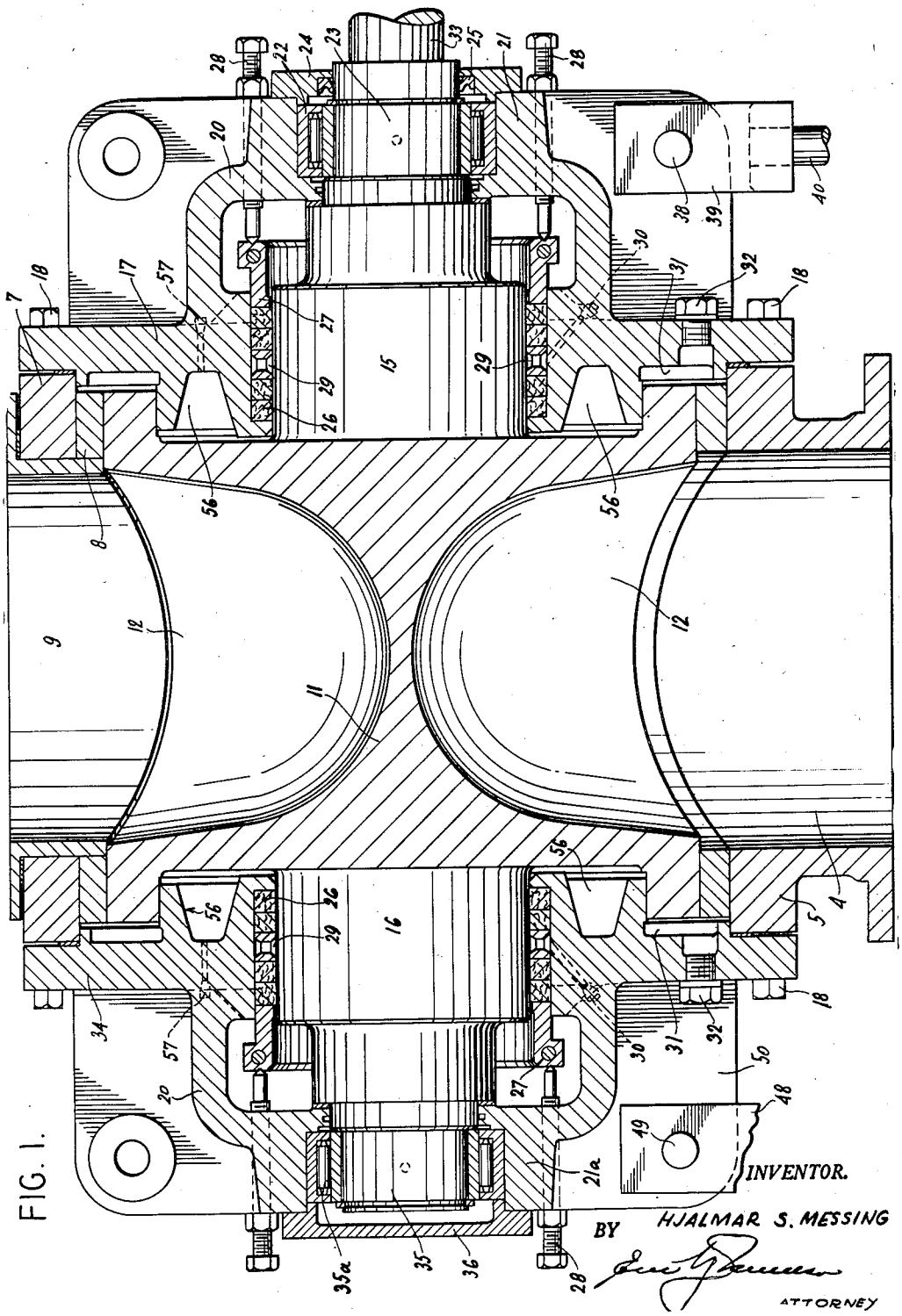


FIG. 1.

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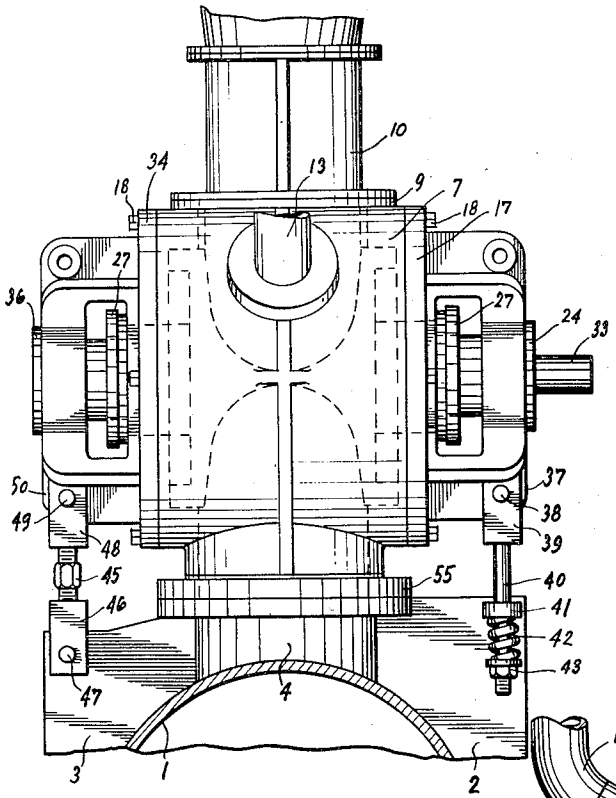


FIG. 2.

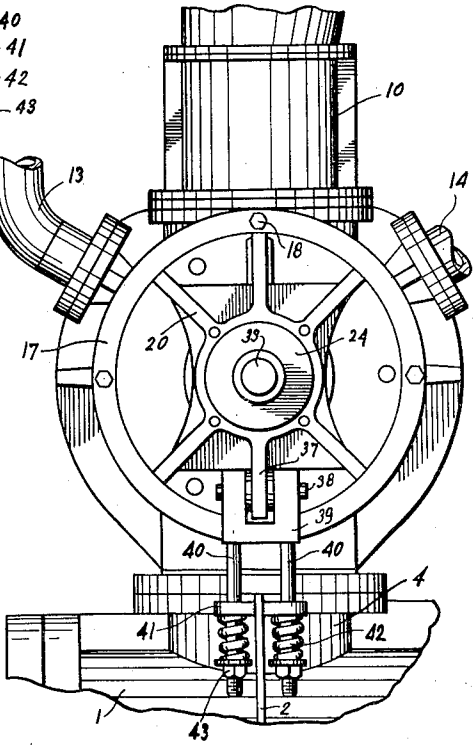


FIG. 3

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ROTARY FEEDING DEVICE FOR PULP MAKING APPARATUS

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3 Claims. (Cl. 214—17)

This invention relates to rotary feeding devices, and particularly to the type employed in connection with the treatment of fibrous material, such as wood fibre from which paper pulp is produced.

It is an object of the present invention to provide a rotary feeder of this type which will be capable of withstanding the high temperatures and steam pressure to which these devices are subjected in the treatment of fibrous material. Due to the high temperatures and pressures to which these machines are subjected, it is difficult to provide a freely-operating device while at the same time preventing leakage and loss of pressure, and particularly around the rotative shaft of the feeder. The present invention contemplates the provision of a structure which will strongly resist leakage and pressure loss despite high temperatures and pressures and at the same time will prevent binding of the parts or excessive friction between them likely to occur because of expansion under high temperature.

It is also an object of the invention to provide a resilient or flexible mounting for certain parts of the feeder, and by means of which compensation will be had for deflection of these parts under relatively high steam pressure.

With these and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

Fig. 1 is a vertical sectional view through a rotary feeder constructed in accordance with the invention;

Fig. 2 is a side elevation of the same, with certain parts being shown in section; and

Fig. 3 is an end view of the same, looking from the right end of Fig. 2.

Referring to the drawings, 1 indicates a portion of a chamber or housing to which the stock is fed by the improved rotary feeder and in which a spiral feeder is operative to move the material while it is being subjected to heat and moisture. The housing 1 which constitutes a supporting base for the feeder, is provided with vertically disposed plates or flanges 2 and 3 and with an inlet pipe 4 provided at the top with a flange or seat 5 on which the rotary feeder is supported. The flange 55 on the housing of the feeder is bolted or otherwise secured to the flange or seat 5.

The housing of the feeder has a cylindrical central portion 7 provided with a lining member 8, and at the top the housing is provided with the inlet opening 9 which attaches to the outlet end 10 from a hopper or other source from which the stock enters the feeder. The rotor of the feeder is shown at 11, and the same is provided with the radially-arranged pockets or recesses 12 so disposed that when one of them is registered with the discharge outlet 4 to discharge its contents, another will be registered with the inlet opening 9 to thereby receive a charge of the stock. Entering into one side

of the housing body 7 is a pipe 13 through which steam may enter, and a discharge pipe 14 is provided as seen in Fig. 3.

The rotor 11 is provided with a shaft of stepped formation and which thus has relatively large diameter parts 15 and 16 located adjacent to the body of the rotor. Closing the end of the housing around the part 15 of the shaft is an end closure member 17 which is secured to the body 7 of the housing by the bolts 18. Said closure member 17 includes a spider bracket 20 having a central hub 21 containing the roller bearing 22 that surrounds a reduced-diameter part 23 of the rotor shaft. A closure plate 24, containing a packing 25, fits around the shaft and maintains the bearing in place. There is also a packing 26 interposed between the large-diameter part 15 of the shaft and the central portion of the closure member 17 which surrounds the part 15 of the shaft. Said packing 26 is maintained in place and compacted as required by means of a split ring 27 adjustably urged against the packing 26 by means of the screws 28 adjustable from the outside of the spider bracket 20. The packing 26 is provided with lubrication ports 29 in communication with a lubrication nipple 30 located on the outside of the end closure member 17. A collection chamber 31 is formed between the housing body 7 and the end closure member 17 into which particles of the stock may collect and this chamber can be cleaned out as required by removal of the screw 32. An annular lubrication chamber 56 is also formed in the end closure 17 and into which a lubricant can be supplied through the nipple 57. The rotor shaft is provided with a projecting end portion 33 for the reception of a sprocket or other driving element so that the rotor can be rotated at the required speed by belt or chain drive from an electric motor.

The opposite side of the housing body 7 is closed by an end closure 34 similar to that shown at 17. Said end closure contains the packing 26 and parts associated therewith as described in connection with the housing closure 17 and the same reference numerals are applied to such parts. Extending from the large-diameter part 16 of the rotor shaft is the reduced end portion designated at 35 and the same is supported by and is rotative in a roller bearing 35 in the hub 21*a* of the end closure 34. A disk 36 is fitted over the end of the roller bearing and the end of the rotor shaft.

The feeder may have its end closures 17 and 34 connected in several ways to the housing 1, and at the right of Fig. 2, the end member 17 is shown as having an arm 37 pivoted at 38 in a clevis 39 provided at the upper end of twin tie rods 40 which extend down through lugs 41 projecting laterally from the flange 2. A coil spring 42 is disposed around each of the rods 40, each coil spring being confined between the nut and washer assembly 43 on each rod and the under side of the lug 41. This spring-loaded arrangement is such that vibration and steam pressure tending to deflect the bearing-supporting brackets 17 and 34 will be compensated for. The coil spring mounting shown at the right of Fig. 2 may be duplicated at the opposite end of the feeder. As an alternative, both of the bearing brackets 17 and 34 might be coupled to the flanges 2 and 3 by adjustable or turnbuckle tie links 45 shown at the left in Fig. 2. Therein, twin links take the place of the rods 40, the links being attached at their lower clevissed ends 46 by the pin 47 to the flange 3 and at their clevissed upper end 48 by the pin 49 to the arm 50. This arrangement may also be used for the connection of the end closure members or bearing brackets 17 and 34 to the flanges 2 and 3.

From the foregoing, the operation of the structure will be readily apparent. As the rotor is rotated, the stock enters through the inlet 9 to fill the pocket or recess 12

in the rotor then directed upwardly and in registry with the inlet opening. At the same time the loaded or charged pocket is downwardly disposed and is discharging through the outlet 4. The steam enters the housing under pressure, and despite heat and pressure within the housing and imposed upon the rotor and the contents thereof, it has been found that no substantial loss of pressure occurs, nor will any binding effect on the rotor or shaft thereof occur due to expansion. It will be noted that each end of the rotor shaft is supported at two points, namely, at its large-diameter portion and at its smaller-diameter portion. The heat generated in the housing is distributed over the large diameter parts of the shaft since those parts are the closest to the housing. Being of substantial area for the distribution of the heat, the tendency to expand and create leakage around these parts of the shaft is minimized and hence it has been found that the feeder may be operated for relatively long periods with a minimum of leakage due to expansion.

Having described one embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. A rotary feeder comprising a rotor having material-holding pockets, a housing enclosing the rotor, the housing having inlet and delivery passages from which material is respectively received and delivered by the pockets, means for supplying steam under pressure into the housing, the rotor having a stepped shaft providing shaft-sections of various diameters, the shaft having relatively large diameter portions situated close to the body of the rotor and small diameter portions situated remotely therefrom, the housing having end closures through which the shaft extends, each of said end closures supporting the shaft at spaced points, one point of support being at the large diameter part of the shaft and the second point of support being at the smaller diameter part of the shaft, a bearing supporting the smaller part of the shaft, a packing interposed between the larger diameter part of the shaft and the parts of the end closures which surround said parts of the shaft, and means engageable with the packing and operable externally of the end closures for compacting the packing.

2. A rotary feeder as provided for in claim 1, wherein the end closures have radial arms, a support on which the feeder is mounted, and pivotal tie-links extended between said arms and the support.

3. A rotary feeder comprising, a rotor having material-holding pockets, a housing enclosing the rotor, the housing having inlet and delivery passages from which material is respectively received and delivered by the pockets, means for supplying steam under pressure into the housing, the rotor having a stepped shaft providing shaft-sections of various diameters, the shaft having relatively large diameter portions situated close to the body of the rotor and small diameter portions situated remotely therefrom, the housing having spider-shaped end closures through which the shaft extends, each of said end closures supporting the shaft at spaced points, one point of support being at the large diameter part of the shaft and the second point of support being at the smaller diameter part of the shaft, a roller bearing supporting the smaller part of the shaft, packings interposed between the larger diameter parts of the shaft and the parts of the end closures which surround said parts of the shaft, and means operative at the outside of the end closures for compacting said packing, the spider-shaped end closures having spaced arms between which parts of said means are accessible for compacting the packing.

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