Dec. 14, 1954 N. H. SANDBERG 2,696,904

DIGESTER FILLING CHUTE

Filed Nov. 18, 1950 3 Sheets-Sheet 1

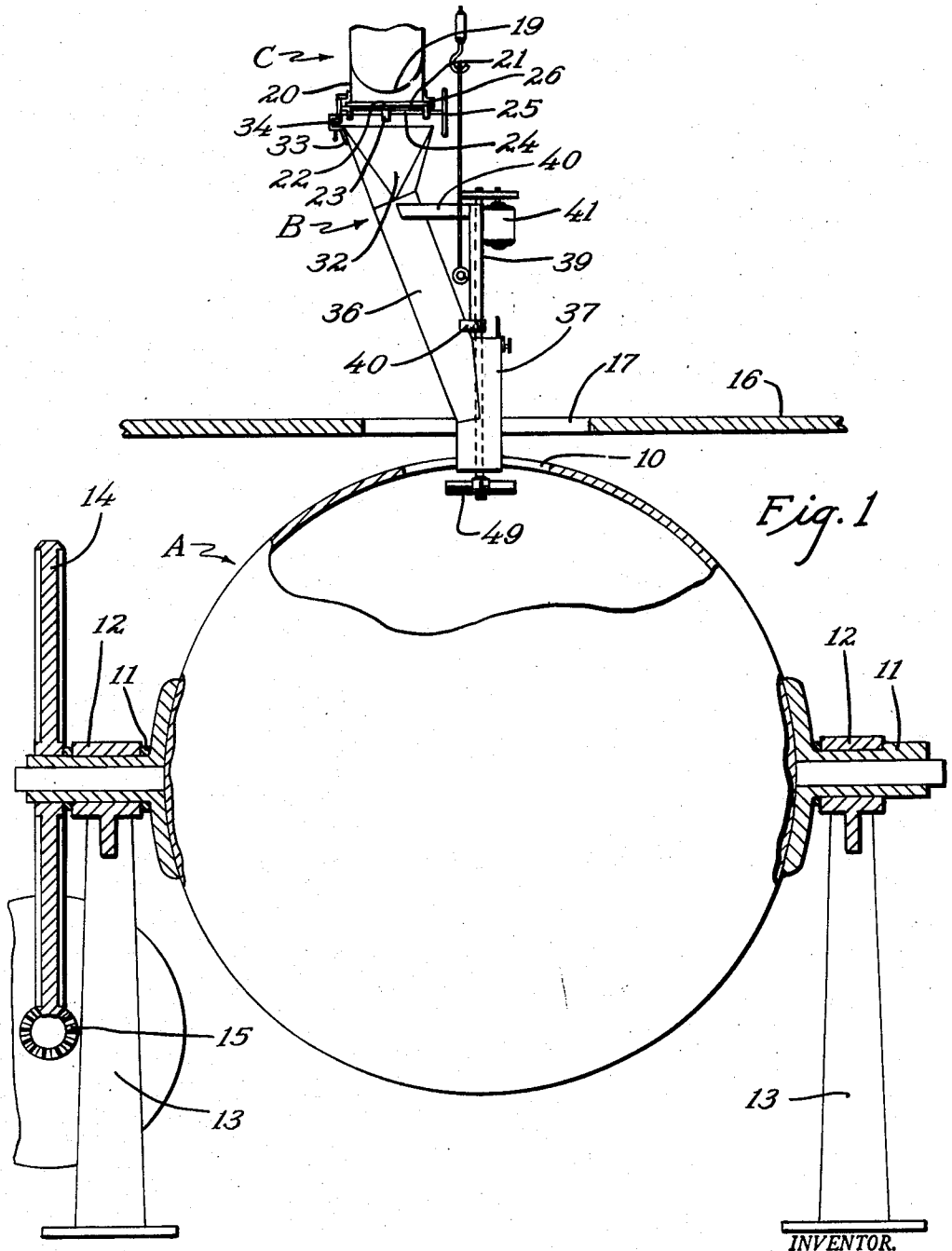


Fig. 1

INVENTOR.
Nels H. Sandberg
BY Robert M. Dunning
ATTORNEY

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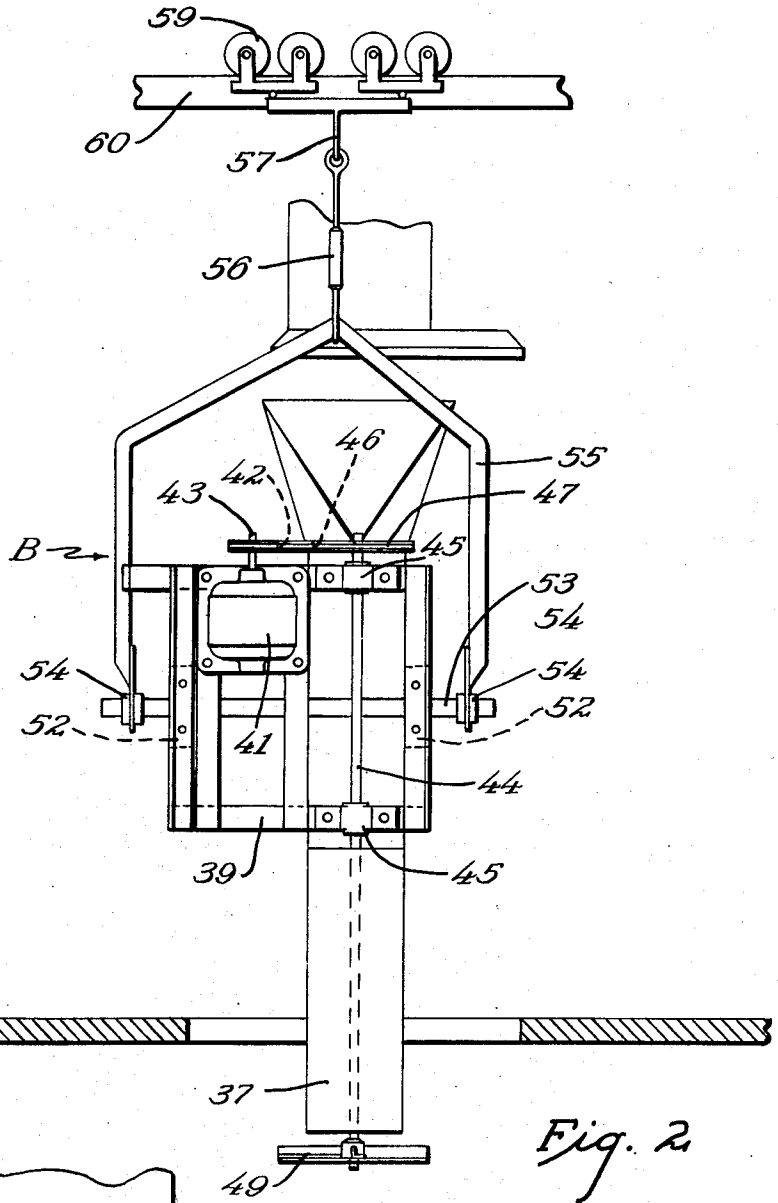


Fig. 2

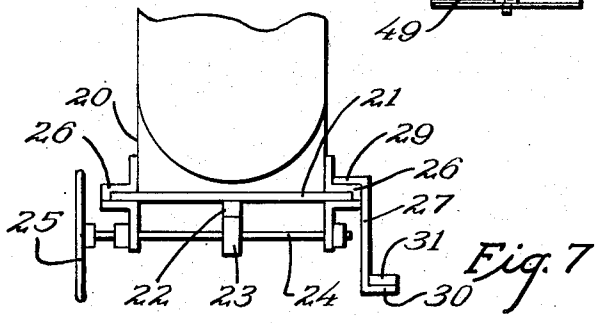


Fig. 7

INVENTOR.
Nels H. Sandberg
BY Robert M. Dunning
ATTORNEY

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DIGESTER FILLING CHUTE

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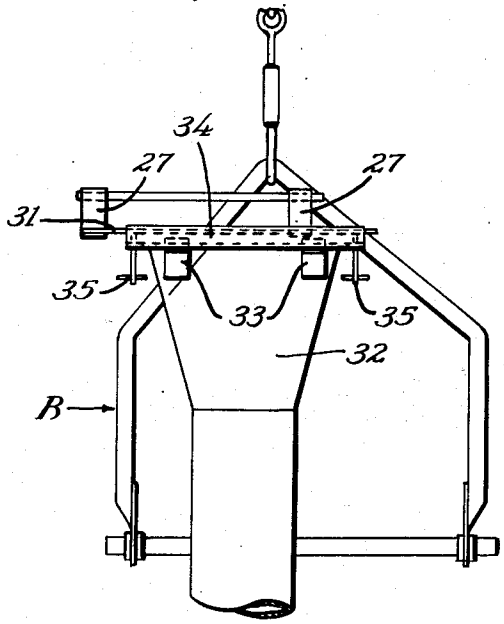


Fig. 3

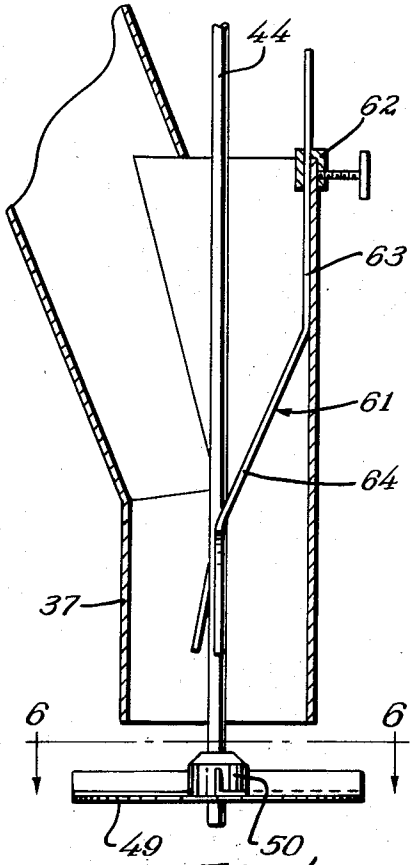


Fig. 4

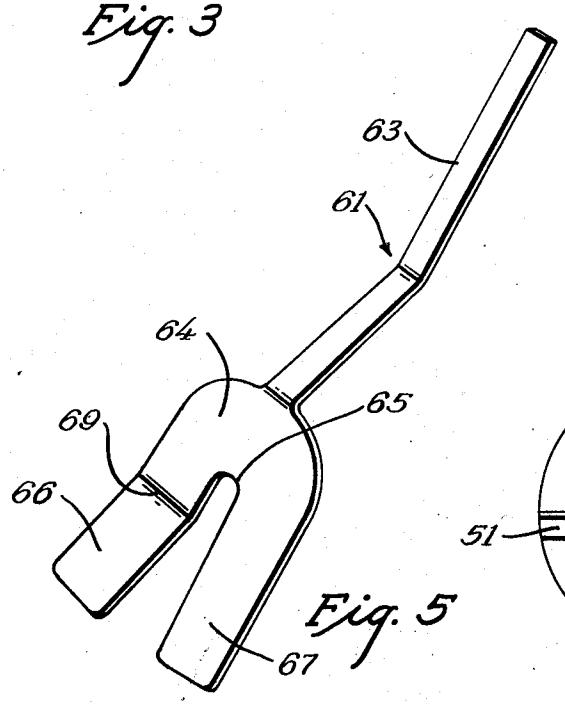


Fig. 5

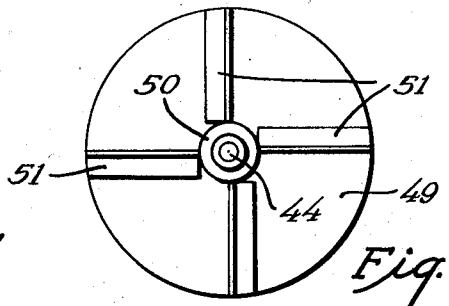


Fig. 6

INVENTOR.
Nels H. Sandberg
BY
Robert M. Dunning
ATTORNEY

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2,696,904

DIGESTER FILLING CHUTE

Nels H. Sandberg, Minneapolis, Minn., assignor to Waldorf Paper Products Company, St. Paul, Minn., a corporation of Minnesota

Application November 18, 1950, Serial No. 196,477

4 Claims. (Cl. 198—52)

My invention relates to an improvement in digester filling chute wherein it is desired to provide a simple and effective means of filling rotary digesters and the like.

In the manufacture of paper pulp, the pulp forming material is often placed in a rotary digester where it is cooked for a predetermined period of time. Difficulty is experienced in completely filling these digesters. Wood chips when poured into the digester have a tendency to build up in conical form, leaving void spaces near the top of the digester. It is usually necessary for a workman to enter the digester and shovel the chips laterally in order to completely fill the digester. In some instances it has been found necessary to close the digester opening, rotate the digester for a period of time to scatter the chips, and then to open the digester in order to fill the remaining space with chips. Such procedures are costly and time consuming.

The present device comprises a chute for guiding wood chips and the like from a lateral conveyor to the digester opening. This chute acts as a movable conduit connecting the source of material supply and the digester opening. The chute is provided with a rotatable paddle wheel at its lower extremity which acts to scatter the chips in all directions from the lower end of the chute. As a result the digester may be quickly filled without the necessity of entering the digester and manually moving the material or rotating the digester to scatter the material.

A feature of the present invention lies in the provision of a chute which attaches beneath an opening in a conveyor and in providing a door in this opening which is movable into and out of closed position. The chute is first attached in place leading into the digester opening and the door is moved so as to allow the chips or other material to enter the chute.

An added feature of the present invention lies in the provision of a chute having a movable deflector therein which acts to deflect the chips onto the scattering device by means of which they are spread in a circular path. This deflector is movable so as to deflect the chips toward any side of the chute and acts to prevent clogging of the chute with the material.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a diagrammatic view partially in section showing the chute in use in a digester.

Figure 2 is an elevation view of the digester.

Figure 3 is an elevation view of the upper portion of the chute showing the manner in which it is attached to a conveyor or the like.

Figure 4 is a sectional view through the lower portion of the chute showing the rotatable deflector blade and the baffle.

Figure 5 is a perspective view of the baffle removed from the chute.

Figure 6 is a sectional view showing the deflector, the position of the section being indicated by the line 6—6 of Figure 4.

Figure 7 is an elevation view of the upper portion of the chute.

The chute is designed for use in conjunction with a rotary digester illustrated in general by the letter A. The digester A is shown as being spherical in shape and having an opening 10 by means of which the body may be filled and emptied. This opening 10 is normally

closed by a pressure door when the device is in operation. Usually steam gauges, steam pipes, and other fittings are connected to the digester, these elements not being illustrated in the drawings, as they are well known in the art.

A pair of trunnions 11 extend axially from the digester body and rotatably support the body. These trunnions 11 are supported in bearings such as 12 supported by suitable standards or framework illustrated in general by the numeral 13. The digester body is usually rotated by means of a gear or worm wheel 14 rotated by a cooperable worm or gear 15.

The digesters A are often mounted beneath a floor or platform 16 provided with apertures such as 17 which may align with the digester opening when this opening is in one rotative position. The digester is ordinarily filled through the opening 17 by any suitable means.

The chute for use in filling the digester is indicated in general by the numeral B. The chute B is usually employed to deliver wood chips or similar pulp forming material from a horizontal conveyor C. The conveyor C may be of any suitable type such as a screw type of conveyor rotatable in a trough-shaped body 19. The conveyor body 19 is provided with a downwardly directed sleeve or elbow 20 which is normally closed by a closure plate 21. One such sleeve 20 is provided for each digester of the series. The door 21 is ordinarily provided with a rack 22 on its undersurface, this rack being engageable with a pinion 23. The pinion 23 is supported upon a transverse shaft 24 provided with a hand wheel 25 by means of which the shaft may be rotated. The plate 21 is supported in opposed channel brackets 26, which extend downwardly to provide bearings for the shaft 24. The channel brackets 26 are formed of two opposed angle iron members connected marginally by a spacing flange slightly deeper than the thickness of the closure plate 21.

As illustrated in Figure 7 of the drawings, a pair of angle brackets 27 are provided with laterally extending flanges 29 resting over and secured to one of the brackets 26. These brackets 27 are also provided with laterally extending flanges 30 at the lower extremities.

A bar 31 is supported by the flanges 30 and extends longitudinally of the conveyor. This bar 31 forms a clamping bar for use in attaching the chute in proper location beneath a conveyor opening.

The chute is provided with a funnel shaped top 32 of proper dimensions to receive the chips or other material dropping from the conveyor C when the corresponding door 21 is opened. The funnel shaped chute top 32 is provided with a pair of spaced angle brackets 33 which connect the chute with a channel 34. The channel 34 is supported with its base on a substantially vertical plane and its opposed sides on parallel substantially horizontal planes. A pair of clamping screws 35 extend through the lower flange of the channel 34 and are designed to clamp against the clamping bar 31 on the conveyor.

When the chute is in place the channel 34 embraces a portion of the bar 31 and is held in this position by the clamping screws 35. By loosening these screws 35, the chute may be disconnected from the bar 31.

The chute B includes a tubular inclined body portion 36 which is connected at its upper end to the lower end of the funnel shaped top 32. The lower end of the tubular section 36 leads into the vertical tubular section 37. Thus the material to enter the digester A drops into the funnel shaped top 32, drops through the inclined chute section 36 and also through the vertical chute section 37.

A generally rectangular frame 39 is connected to the chute section 36 by transverse braces 40. This frame 39 supports an electric motor 41 having a pulley 42 upon its motor shaft 43. The frame 39 also supports a vertically extending shaft 44 by the use of spaced bearings 45. A pulley 46 on the shaft 44 is connected by a belt 47 to the pulley 42. Thus upon rotation of the motor 41, the shaft 44 is similarly rotated.

The shaft 44 is supported substantially axially of the tubular section 37 of the chute. A disc 49 is provided with a hub 50 mounted upon the lower extremity of

the shaft **44** beneath the lower end of the chute section **37**. A series of angularly spaced angle members **51** are supported upon the upper surface of the disc **49** as indicated in Figure 6. These angles **51** act as blades to throw chips and similar material outwardly.

The frame **39** also supports a pair of bearings **52** which support a transverse shaft **53**. The shaft **53** is mounted in sleeves **54** at the lower extremity of an inverted U-shaped yoke **55**. The yoke **55** straddles a portion of the apparatus and acts to support the same. The upper extremity of the yoke **55** is connected by an adjustable turn buckle **56** to a hook **57** supported by a trolley **59** mounted upon a rail **60**. Thus the filling device may be moved from one position to another along the rail **60**. Furthermore, the device may be pivoted about the axis of the shaft **53** so as to raise the lower extremity of the chute out of the aperture **10** in the digester for use of the aperture **17** in the floor or platform **16**.

A baffle **61** is supported by a clamp **62** to the upper extremity of the tubular chute section **37**. This baffle **61** includes an anchoring end **63** designed to extend along the wall of the tubular section **37** and an inclined end **64** which inclines toward the opposite wall of the chute section from that to which the baffle is anchored. The deflector end **64** is bifurcated by a slot **65** forming two separate baffle portions **66** and **67** designed to extend on opposite sides of the shaft **44**. Preferably one end **66** of the baffle is bent along a transverse line as indicated at **69** to extend downwardly axially of the tubular member while the other end inclines across the chute section.

When it is desired to fill a digester A, the opening **10** of the digester is uncovered and the chute B is moved into position above the digester. The lower chute section and the deflector plate **49** are inserted through the openings **17** and **10** to terminate within the digester. Simultaneously the channel **34** at the upper end of the chute is positioned to engage the clamping bar **31** and to be held in place thereupon by clamping screws **35**.

When the chute is properly located, the motor **41** is turned on so that the deflector **49** will rotate. The hand wheel **25** is next operated to roll back the door **21** from its closed position. The chips or other materials which are conveyed along the conveyor **19** will now fall through the door opening of the elbow or sleeve **20**, will drop into the upper end of the chute down through the chute sections **36** and **37** and onto the deflector **49**. This deflector throws the material outwardly in a generally circular pattern insuring the proper filling of the digester.

It will be seen that with such an arrangement much time and effort may be saved. In any event where a conveyor is used to convey the pulp forming material, some

type of chute must be provided to guide the chips into the digester. By use of this filling chute the necessity of entering the digester to manually spread the chips is avoided. Furthermore, the task of closing the digester, rotating the same to spread the chips and reopening the digester is obviated. As a result the operation may be completed in a fraction of the time previously required.

In accordance with the patent statutes, I have described the principles of construction and operation of my digester filling chute, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A filling chute for use in distributing material including a substantially vertical chute section, an inclined chute section connected to the upper end of said vertical chute section, a rotary deflector positioned beneath said vertical chute section, a deflector shaft extending through said vertical chute section, and a baffle supported within said vertical chute section and supoprted at a downwardly inclined angle, said baffle filling substantially one-half of the cross sectional area of the vertically extending chute section.

2. The structure defined in claim 1 and including a bifurcated end on said baffle straddling said deflector shaft.

3. The structure defined in claim 1 and in which the baffle includes a vertically extending support, and including a means for supporting said support in adjustably fixed relation to said vertical chute section.

4. The structure defined in claim 1 and in which the baffle is provided with a bifurcated end straddling said deflector shaft, and in which one side of said bifurcated end is bent out of the inclined plane of the baffle to extend substantially in a plane through the axis of the shaft.

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