

Feb. 5, 1924.

1,482,524

F. ROBINSON

BIN SHOVELER

Filed Jan. 6, 1923

2 Sheets-Sheet 1

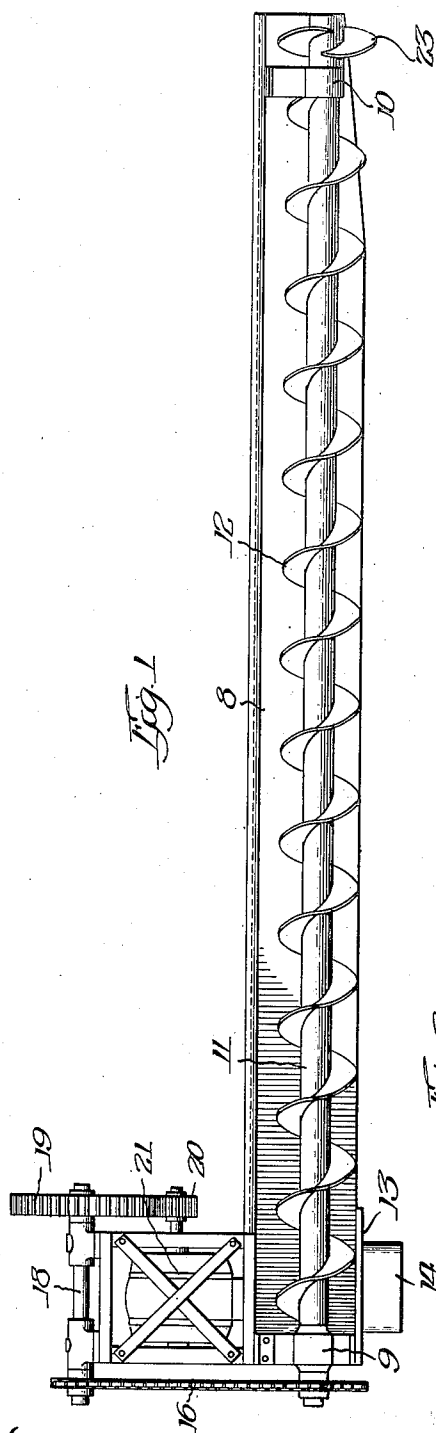


Fig. 1

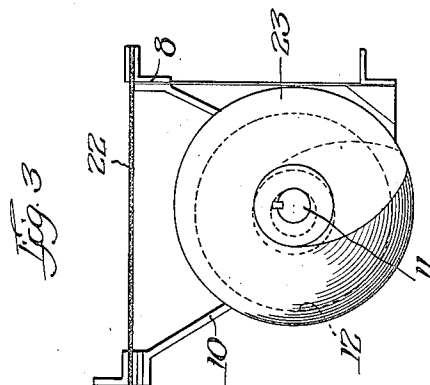


Fig. 3

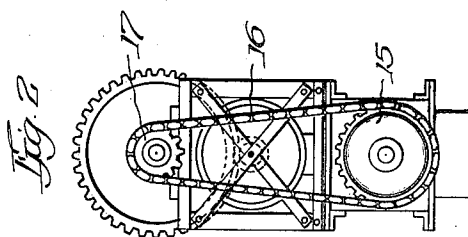


Fig. 2

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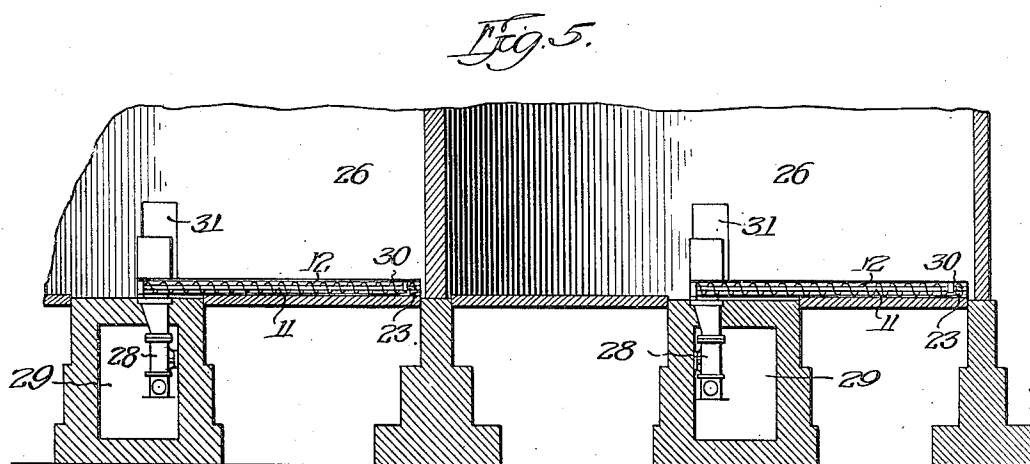
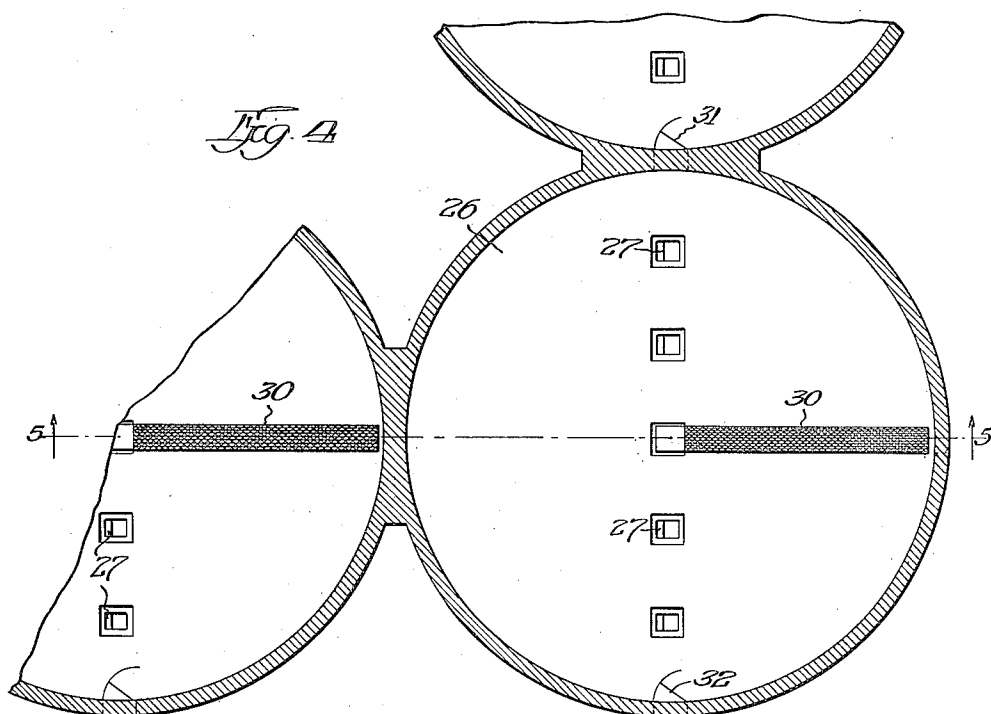
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BIN SHOVELER

Filed Jan. 6, 1923

2 Sheets-Sheet 2



Inventor:

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UNITED STATES PATENT OFFICE.

FRED ROBINSON, OF DULUTH, MINNESOTA.

BIN SHOVELER.

Application filed January 6, 1923. Serial No. 610,972.

To all whom it may concern:

Be it known that I, FRED ROBINSON, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in a Bin Shovel, of which the following is a specification.

This invention relates to a new and improved discharging machine and more particularly to a machine adapted to discharge loose material from bins.

Certain materials such, for example, as cement are commonly stored in bulk in relatively large bins which are often of circular cross-section. These bins, as generally constructed, are provided with a series of spaced openings in the bin floors and a permanent conveyor is located below the floor adjacent the openings. With bins provided with flat floors, a certain amount of material will remain in the bins after the maximum amount possible has passed by gravity through the floor openings and carried off by the conveyor. The amount remaining will, of course, depend upon the nature of the material and its angle of repose. It is necessary to provide some additional means to remove this remaining material. It can be removed manually by shoveling, but such removal is relatively expensive and particularly with material such as cement, the labor of removal is extremely arduous for the workers.

It is an object of the present invention to provide an apparatus adapted to rapidly and efficiently remove material remaining in storage bins or chambers of the character described.

It is a further object to provide an apparatus of this type which may be readily installed and removed from the storage chamber.

It is also an object to provide an apparatus which is self-propelled and which progresses during its operation.

It is an additional object to provide a conveyor having means adapted to vary the relation of its axis with the floor of the chamber during its operation so as to more efficiently work into the material.

Other and further objects will appear as the description proceeds.

I have illustrated a preferred embodiment of my invention in the accompanying drawings, in which—

Figure 1 is an elevation of the apparatus;

Figure 2 is a view of Figure 1 as seen from the left;

Figure 3 is a view of Figure 1 as seen from the right, but upon an enlarged scale;

Figure 4 is a fragmentary plan view showing the relation of my apparatus to the bins with which it is adapted to be used; and

Figure 5 is a section taken on line 5—5 of Figure 4.

Referring particularly to Figures 1 to 3, the apparatus comprises the frame 8 which is provided with the journals 9 and 10. The conveyor shaft 11 is carried in these journals and is provided with the spiral conveying flange 12. The pivot member 13 is secured upon the lower face of the inner end of the frame 8, the portion 14 of the member being cylindrical in outline and being provided with a cylindrical opening there-through. The shaft 11 is provided upon its inner end with the sprocket wheel 15. The wheel 15 is driven by the sprocket chain 16 from sprocket wheel 17 carried on shaft 18. The gear wheel 19 is secured to the opposite end of shaft 18 and is in mesh with the gear 20 which is carried upon the shaft of the motor 21.

As best shown in Figure 3, the upper surface of the frame 8 is closed by the screen 22. The outer or free end of the conveyor shaft 11 is provided with the eccentric member 23 which is suitably keyed to the shaft. This eccentric member is approximately circular in outline and is so placed that it extends beyond the conveying flange of the conveyor throughout its periphery, as best shown in Figure 3.

The conveyor is particularly adapted for use with circular bins of the type shown in Figures 4 and 5. The bins 26 are provided with a plurality of aligned discharge openings 27 located in the floor. These discharge openings 27 communicate with a conveyor 28 carried in tunnel 29 below the floors, as best shown in Figure 5. One of the five openings is located at the center of the circular bin. The removable discharge conveyor is shown in place in Figures 4 and 5 and is designated by reference character 30.

In removing material from the bin 26, the fixed or permanent conveyor 28 is operated until no more material in the bin flows through the openings 27. The material will have reached its angle of repose and will be sloping up towards the periphery of the bin. The door 31 connecting the bin with

the adjacent bin or a similar outer door 32, is opened and the removable conveyor is introduced through the door. The portion 14 of the member 13 of the conveyor is inserted
5 in the central opening 27 in the bin floor. Power is supplied to the motor 21 by suitable electrical connection and the motor and chain drive rotates the conveyor shaft 11.

The conveyor is supported at its inner end
10 by the member 13 and at its outer end by the eccentric 23. The periphery of the eccentric rests upon the material or upon the bin floor and as the conveyor moves forward, it is raised and lowered a short distance by the operation of the eccentric. This
15 raising and lowering adds materially to the efficiency of the conveyor in that it prevents the material from becoming packed before the conveyor as it advances. The conveyor
20 flange 12 carries the material towards the center and it passes through cylindrical member 14 to the permanent conveyor 28 which it will be understood is simultaneously operated.

25 The eccentric serves as a traction wheel to cause the outer or free end of the conveyor to travel forward and it is caused to swing in a circular path about the fixed end and the journal portion 14 of the member 13,
30 thus covering in its travel the full area of the circular bin.

35 While I have illustrated one preferred form of my construction, it is adapted to be changed to suit varying conditions and methods of operation. It is my intention to cover all such modifications as come within the scope of the appended claims.

I claim:

1. In combination with a storage chamber having a discharge opening formed therein, a discharging conveyor adapted to be removably associated with the opening in the chamber, said conveyor having a portion adapted to be inserted in the opening, said
40 portion serving as a pivot about which the conveyor is adapted to revolve during its operation. 45

2. A screw conveyor provided adjacent one end with a vertical pivot about which it is adapted to rotate and provided adjacent the free end with an eccentric supporting member adapted to be rotated with the screw conveyor about its axis. 50

3. A screw conveyor adapted to travel relative to the surface upon which it rests, and an eccentric member carried by the conveyor and adapted to be rotated during the operations of the conveyor, said member engaging the supporting surface and adapted to vary the relation of the conveyor to the surface. 60

4. A screw conveyor adapted to travel relative to the surface upon which it rests, and an eccentric member carried by the conveyor and adapted to be rotated during the operations of the conveyor, said member being approximately circular in outline and serving by its engagement with the supporting surface to advance the conveyor relative to the surface during the operation of the conveyor. 70

Signed at Duluth, Minnesota, this 2nd day of December, 1922.

FRED ROBINSON.