Dec. 9, 1930. R. L. WILCOX 1,784,124

HOPPER MECHANISM

Filed Dec. 9. 1927 3 Sheets-Sheet 1

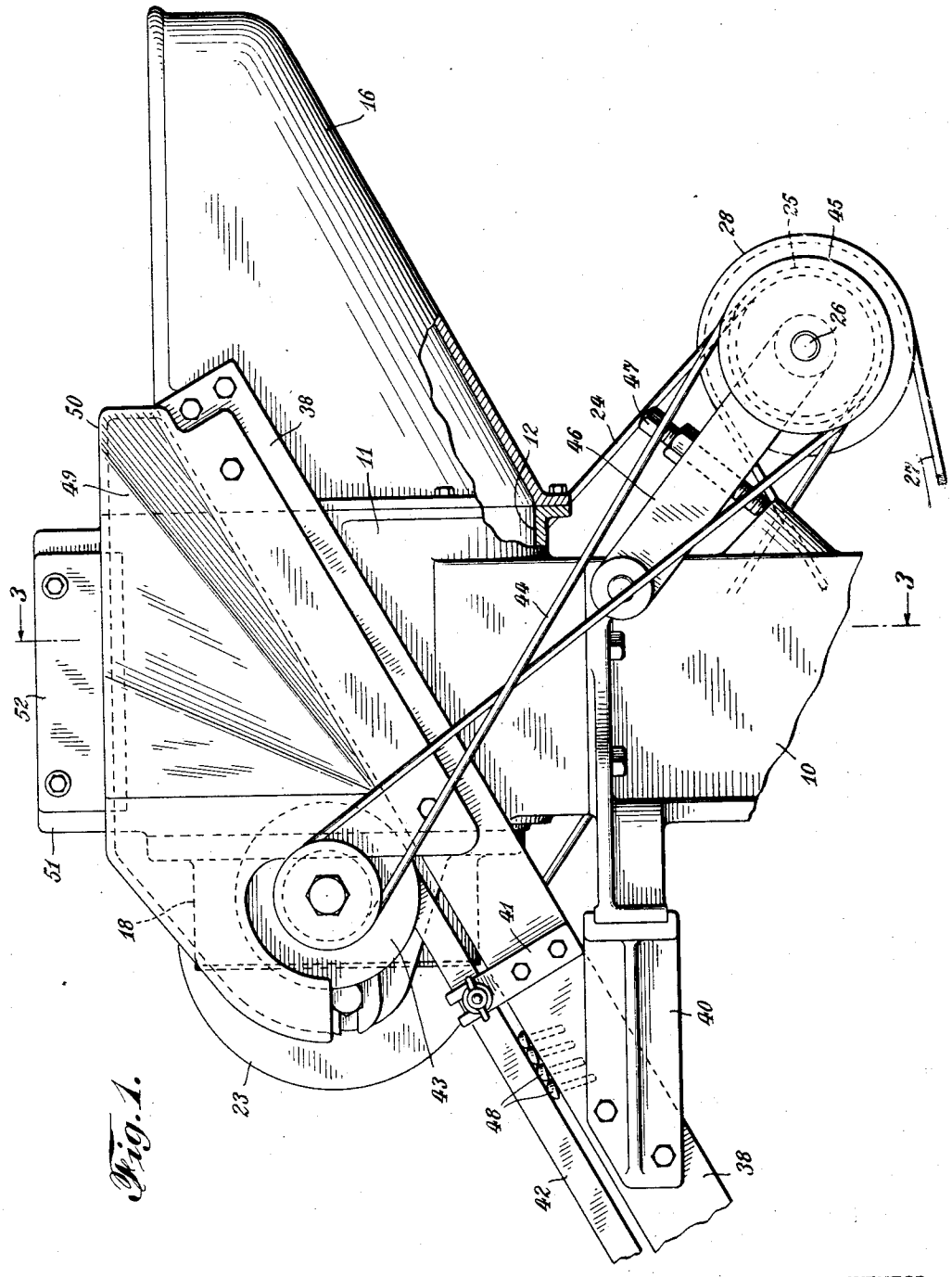


Fig. 1.

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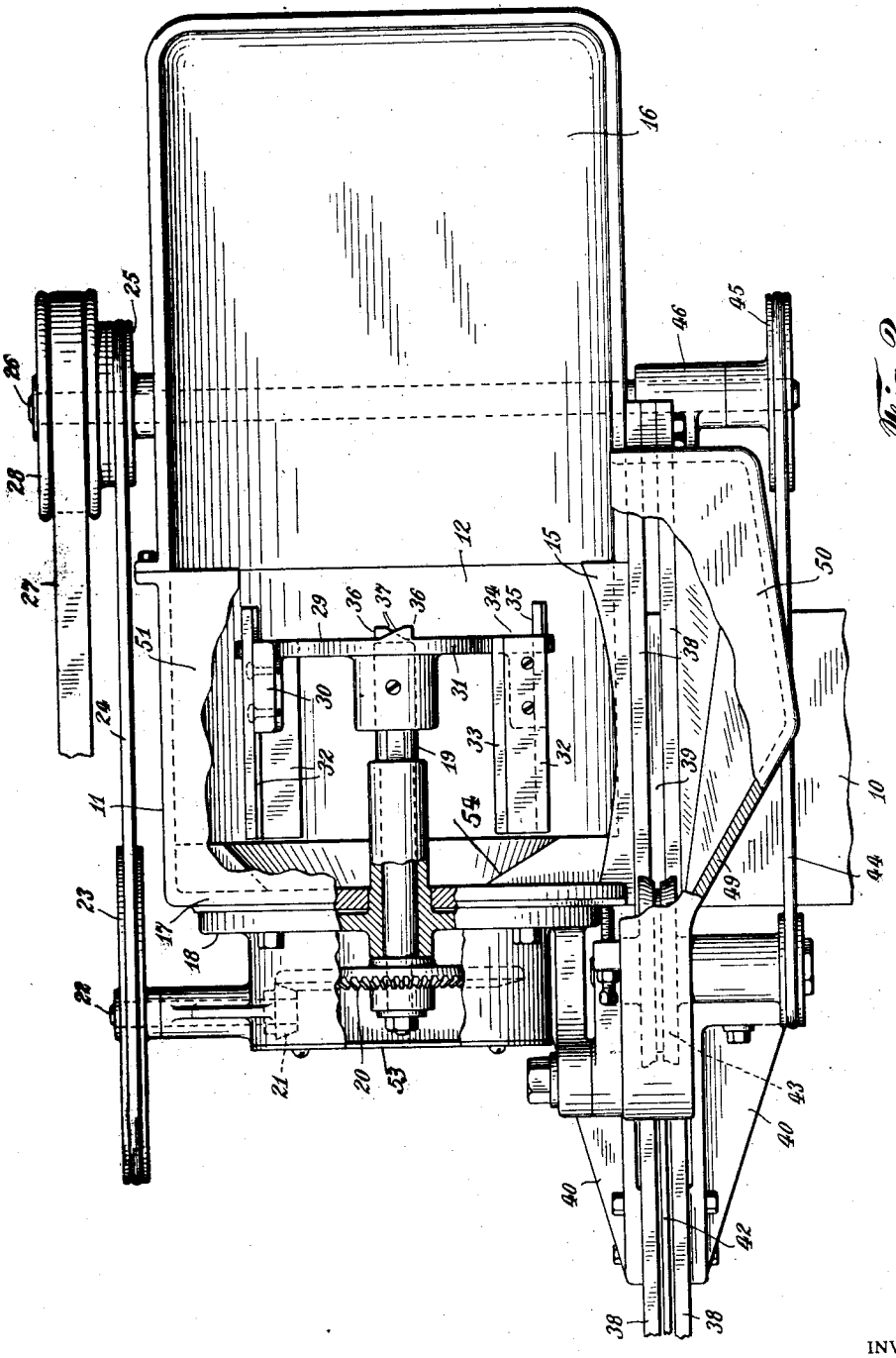


Fig. 2.

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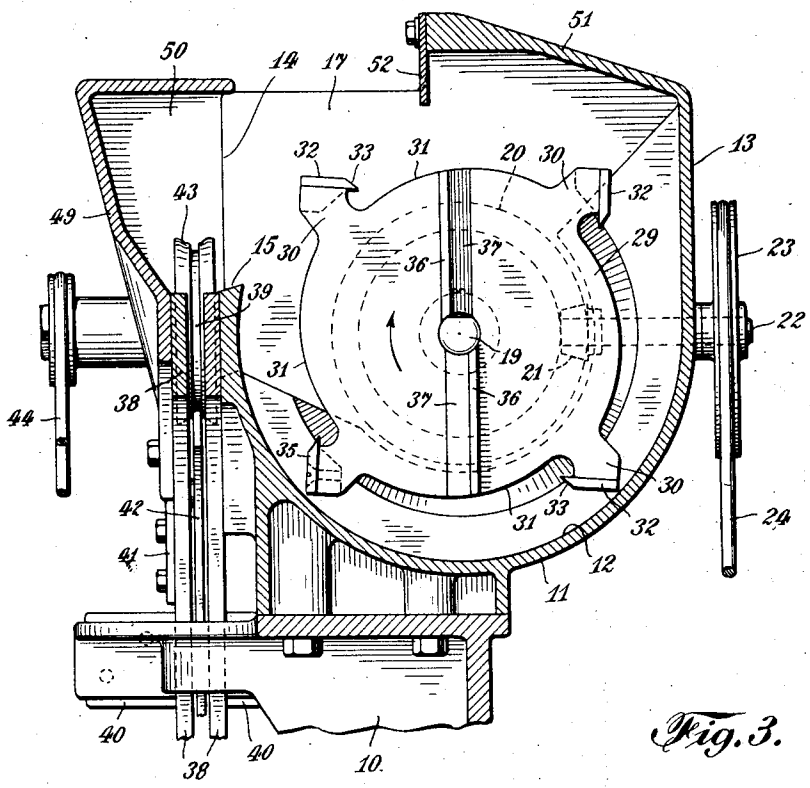


Fig. 3.

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Patented Dec. 9, 1930

1,784,124

UNITED STATES PATENT OFFICE

RICHARD LESTER WILCOX, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT

HOPPER MECHANISM

Application filed December 9, 1927. Serial No. 238,963.

This invention relates to new and improved hopper mechanism.

The object of this invention, among other things, is to provide mechanism of this character wherein practically all of the elements by which the blanks or articles are successively presented to the chute elements are within the walls of the hopper, and adapted for blanks or articles of varying sizes and shapes, without adjustment of such elements, and wherein it may be mounted adjacent to and in close proximity to other mechanism, thus minimizing the space necessary to deliver such blanks or articles from the chute to the tools.

To these, and other ends, my invention consists in the new and improved hopper mechanism, having certain details of construction and combinations of parts, as will be hereinafter described and more particularly pointed out in the claims.

In the specification and accompanying drawings I have illustrated an embodiment of one form of my invention, and wherein like numerals of reference designate like parts in the several figures;

Figure 1 is a side view of the improved hopper mechanism;

Figure 2 is a fragmentary plan view thereof; and

Figure 3 is a transverse sectional view, taken upon line 3—3 of Figure 1.

This hopper mechanism is preferably supported upon a standard 10, or other fixed part, and in the form shown comprises a body member 11, having a bottom with an inner circular face 12, a side wall 13 upon one side, and having an opening 14 therethrough upon the opposite side wall, provided with an outwardly and downwardly flaring face 15. This body member is partially covered by an extension 51 of the side wall 13.

At one end of the body member 11 is a trough member 16, having an inclined bottom, the lower end of which registers with an open end of the body member 11, so that articles thrown indiscriminately into the trough will slide over the inclined bottom onto the circular face 12. The inclined bottom of the trough insures delivery of all of the blanks or articles into the body member as soon as space is available therefor.

Fixed to the end wall 17 of the body member 11, having a conical face 54 thereon, is a bracket 18, within which is journaled a shaft 19, having a beveled gear 20 thereon, the teeth of which mesh into those of the bevel pinion 21 on a shaft 22 also journaled in the bracket. The pulley 23 on this latter shaft is connected by a belt 24 with a driving pulley 25 on the shaft 26, which is rotated through the belt 27, engaging a pulley 28 thereon. The barrel portion of the bracket is covered by the closure plate 53, so that both the gear 20 and pinion rotate in an enclosed space.

Within the body member is a rotor member, comprising a rotor head 29 fixed on the shaft 19, and having a plurality of lugs 30 projecting outwardly therefrom. That portion of the periphery 31 of the rotor head between these lugs being eccentric to the axis of the rotor member, I have shown four of such lugs but a greater or less number may be provided as may seem desirable or advantageous. On one face of each lug 30 is an arm 32 with a beveled edge 33, which extends laterally from the rotor head. I prefer to provide these arms of varying lengths so that the ends of some will teminate at the face of the rotor head, as shown at 34 in Figure 2, while others extend outwardly therefrom, as indicated at 35. The outwardly extending portions 35 perform the same function as the arms 32 and also agitate the mass of blanks or articles in the body member during the rotation of the rotor member. The radial ribs 36 as they travel with the rotor head also agitate the mass of blanks, this action being facilitated by the oppositely arranged flaring faces 37. Two of such ribs are shown, but a greater or less number may be substituted as desired.

Secured in an inclined plane adjacent to the body member 11, and leading downwardly therefrom, are the chute plates 38, between which is an open space 39 that receives the shank of the blanks, if in the form of rivets, screws, bolts, or the like.

The chute plates are secured in various ways, one convenient way being a bracket 40

connected with the standard 10 or the like. Over the open space 39 and adjustable relatively to the chute plates 38 by the bracket 41 is the cover plate 42. Journaled adjacent to the chute plates and the body member is a clearance wheel 43 which strips the chute of all blanks or articles improperly aligned thereon. This clearance mechanism is only one of the many forms of such mechanisms that may be used, and therefore, is not described herein in detail.

The clearance wheel 43 is rotated by a belt 44 from a wheel 45 upon the shaft 26. This shaft is journaled in arms 46 pivotally connected with the standard 10 and moved upon its pivot mounting by a screw 47 or the like, which impinges against a fixed part. With arms mounted as shown, the belts 24 and 44 may be tightened, within a limited range, by moving the arms 46 upon their pivot mountings.

In operation, a mass of blanks is tossed indiscriminately into the trough 16 and they slide therefrom into the body member and against the face of the rotor head, some of the blanks passing thereby between the periphery sectors 31 and the inner face of the body member and into the path of the arms 32. As the rotor member revolves, the arms 32 successively move the blanks in their path along the inside face of the body member and these blanks drop over the inclined face 15 and onto the top of the chute plates 38. Those correctly aligned pass downwardly therebetween, substantially as shown in Figure 1, wherein 48 indicates the blanks. Those blanks not correctly aligned are engaged by the clearance wheel 43 and may be tossed back into the body member to again join the mass of blanks therein. The extensions 35 of the arms 32 and the ribs 36 agitate the mass of blanks during the movement of the rotor member, resulting in a continuous stream of blanks passing by the rotor head into the path of the arms 32.

The angular wall 49 on the side member 50 forms a closure for one side of the body member 11, particularly opposite the opening 14 and assists in the delivery of the blanks to the chute plates, if the blanks are thrown outwardly, either by the rotor member or the clearance wheel.

The peripheral portions 31 of the rotor head being eccentric, insure an enlarging open space between the concentric circular face 12 and the rotor head during the rotation of the latter. Therefore, the blanks will not become jammed between the periphery of the rotor head during its rotation and the inner walls of the body member.

The beveled edges 33 on the arms 32 and the wiper 52 prevent a blank hanging thereon after it should have been delivered to the chute mechanism.

This type of hopper mechanism will operate equally as well upon long or short blanks or others having various shapes in cross section, and requires no adjustment to accommodate blanks that vary either in size or shape. Hopper mechanisms of the prior art require adjustment of one or more parts or the substitution of other parts for blanks of various sizes and shapes.

It is practically impossible for this mechanism to become clogged or jammed and thereby prevent the delivery of a continuous stream of blanks from the chute mechanism.

Heretofore the blanks have been lifted out of the mass of blanks in the hopper and delivered to the chute by a reciprocating plate or the like, that moves from the bottom of the hopper, thus requiring considerable space below the hopper, and thereby preventing a close assembly of the hopper with the operating tools that receive the blanks from the chute. The old form of hopper mechanism cannot be mounted, except in rare instances, over other working parts of the machine.

My improved hopper is self-contained, having a rotor member instead of a reciprocating member for delivery of blanks therefrom, and has no part thereunder requiring space. Hence, this hopper mechanism may be mounted over other working parts of a machine, thus minimizing space and making possible the use of the hopper sufficiently close to other operating parts as to very much enlarge its field of adaptability and desirability. As there is no opening in the bottom of the body member or trough member the same is liquid tight and will hold a liquid or lubricant, by means of which the blanks may be completely lubricated in such cases as may seem desirable. When so used, the mass of blanks will be entirely or partially immersed in the liquid or lubricant. As the rotary arms pick up the blanks in the hopper, any surplus liquid or lubricant will drain back into the hopper and not be carried over to the chute mechanism. This simple means of lubricating a blank obviates the use of additional parts, which usually include a pump or the like. The liquid or lubricant is also held in bulk and does not spread out and flow over the machine as where the blank is lubricated at the operating tools.

In the hopper mechanism herein described the rotor mechanism passes through the mass of blanks and the liquid, if the latter is used, and the blanks slide along the inside wall of the hopper as they are pushed upward by the rotor arms until such time as they drop from the rotor arms onto the outwardly flaring face 15 and then into the chute. The rotor arms after discharging the blanks continue in an upward path a further distance before against engaging the mass of blanks. This means and method of operation is different from the general prior art, wherein the blanks enter pockets or recesses in the rotating mem-

ber and as thus pocketed move with the rotor member and away from the walls of the hopper to the extreme upward limit of the movement of the pocket and are discharged therefrom generally by gravity onto a chute mechanism during the downward travel of the pocket, which chute mechanism is in line with and projects in substantially the same plane as the pockets. Thus, in the device herein the blanks are never pocketed in the rotor member, and are out of engagement with the rotor member before the arms arrive at their extreme up position, while in the art referred to, the blanks are pocketed in the rotor member until after the latter has passed its extreme up position and has covered a portion of its down stroke.

The rotor member herein is without pockets or recesses to receive only a single or a limited number of articles, but the arms are separate and distinct from each other without pockets and push the blanks forward in advance thereof. Again, each arm engages and advances a plurality of articles as distinguished from one and these are automatically cleared into the chute over a shoulder in a stream so that the longer the arm the faster will be the delivery of articles to the chute. In the old devices this is not possible, only a limited number of pockets can be provided in the rotor member, which will operate at a predetermined speed and thereafter discharge a predetermined number of articles. This speed, however, cannot be increased to enlarge the number of articles delivered to the chute, because with such increased speed the rotor member travels too fast and the articles cannot find their way into the pockets.

There are minor changes and alterations that may be made within my invention, aside from those herein suggested, and I would, therefore, have it understood, that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A hopper having a receptacle to receive blanks or the like in an indiscriminate mass; means for segregating some of the blanks from the mass and carrying them along the inside face of the receptacle to a delivery point, comprising a rotor member having a rotor head and a plurality of arms connected therewith at substantially a right angle thereto, some of said arms projecting on both sides of the rotor head and other of the arms projecting upon only one side thereof.

2. In combination with an article receiving chute, an article receiving hopper, a rotor having a head in the hopper, and a series of relatively widely spaced article lifting means carried by the rotor and disposed approximately parallel to the chute whereby to simultaneously lift a number of the articles onto the chute from that portion of the hopper upon one side of the rotor head, the parts of the periphery of the rotor head in the spaces between said arms being eccentric to the axis of the rotor whereby to permit articles to pass thereby from one side of the rotor head to the other.

3. In combination with an article receiving chute, a hopper having a curved bottom which at one side communicates with said chute, a trough having an inclined bottom which discharges into an end of the hopper, a rotor in the hopper having a head confronting the trough which forms a partial closure for the trough, spaced means extending rearwardly from the head and away from the trough for simultaneously moving a number of the articles over the hopper bottom and upwardly and across said side thereof onto the chute, and agitating means for the articles on the front of the head and confronting the trough.

4. In combination with an article receiving chute, a hopper having a curved bottom which at one side communicates with said chute, a trough leading to the hopper, a rotor in the hopper having a head and away from the trough, and a series of blank moving means carried by the head, certain of said means extending laterally of and on each of the sides of the head, said means being formed to simultaneously move a number of the articles over the hopper bottom and upwardly and across said side thereof onto the chute.

5. In combination with an article receiving chute, a hopper having a curved bottom which at one side communicates with said chute, and having a wall with an opening therein, a trough, having an inclined bottom for feeding articles into the hopper through said opening in said wall thereof by gravity, a rotor in the hopper having a head which confronts the said opening in the hopper wall, and a series of spaced article moving members carried by the rotor and projecting rearwardly thereof for simultaneously moving a number of blanks over the hopper bottom and upwardly and across said side thereof onto the chute, the periphery of said rotor head forming spaces with the opening in said hopper wall through which spaces the articles pass into the hopper from the trough.

6. In combination with an article receiving chute, a hopper having a curved bottom which at one side communicates with said chute, and having a wall with an opening therein, a trough, having an inclined bottom for feeding articles into the hopper through said opening in said wall thereof by gravity, a rotor in the hopper having a head which confronts the said opening in the hopper

wall, and a series of spaced article moving members carried by the rotor and projecting rearwardly thereof for simultaneously moving a number of blanks over the hopper bottom and upwardly and across said side thereof onto the chute, the periphery of said rotor head in the spaces between the article moving members being eccentric to the axis of the rotor and forming spaces with the opening in said hopper wall through which spaces the articles pass into the hopper from the trough.

7. In combination with a hopper having a trough with an inclined bottom associated therewith to feed the articles toward the hopper by gravity; a rotor member within the hopper having a rotor head at one end and a plurality of arms connected therewith and projecting laterally from said head, said rotor head being so formed as to permit only a limited number of articles from the trough to pass thereby into the path of the rotating arms; and means for rotating said rotor member.

8. In combination with a hopper; a rotor member within the hopper having a rotor head at one end and a plurality of lifting members forming part thereof and extending laterally from the head; and a trough to receive a mass of articles, the said rotor head forming a partial closure for the trough and permitting only a limited number of said articles to escape from the mass and pass into that portion of the hopper swept by said lifting members, whereby the volume of articles in the hopper is less than in the trough until the same are approximately exhaused from the trough.

9. A rigid hopper having a curved bottom and an opening at one side over which the articles are discharged, a rotor within said hopper, and a plurality of arms connected at their ends to said rotor and extending substantially parallel with the axis of rotation of the rotor and projecting beyond the latter to provide free space between the arms both across the axis of rotation of the rotor and substantially parallel therewith to receive the articles en masse and through which space the arms travel in their rotation and push along said curved bottom a plurality of the articles to said discharge opening.

In testimony whereof, I have hereunto affixed my signature.

RICHARD LESTER WILCOX.