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DELIVERY OF SLIVERS FROM TEXTILE MACHINES INTO CANS

Filed March 20, 1929 3 Sheets-Sheet 1

Fig. 1.

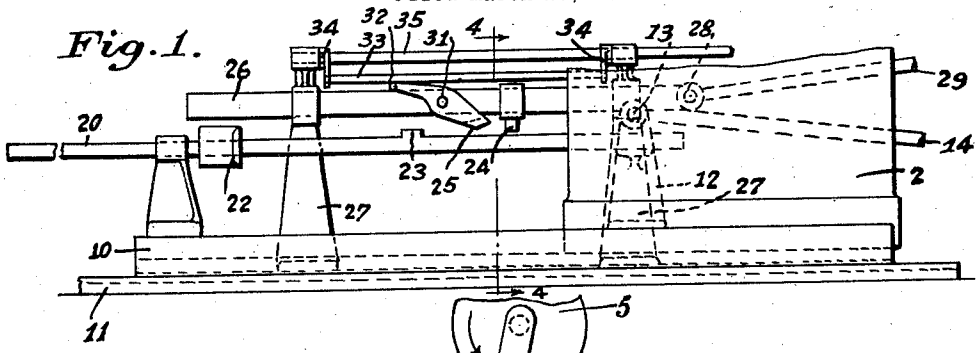
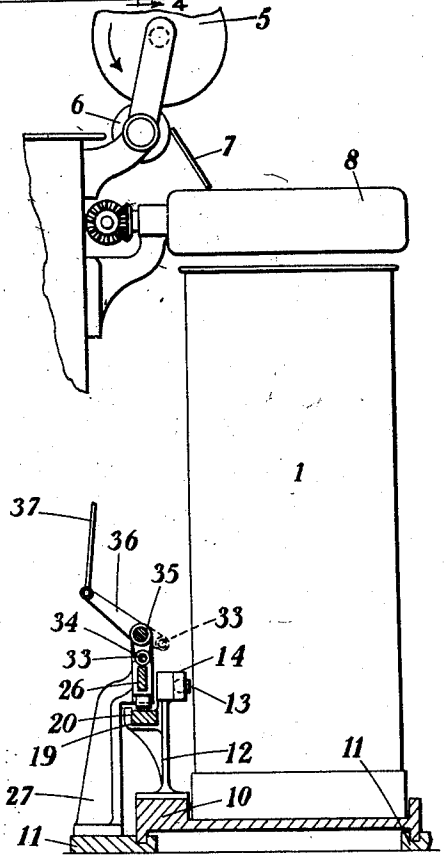


Fig. 4.



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Filed March 20, 1929 3 Sheets-Sheet 2

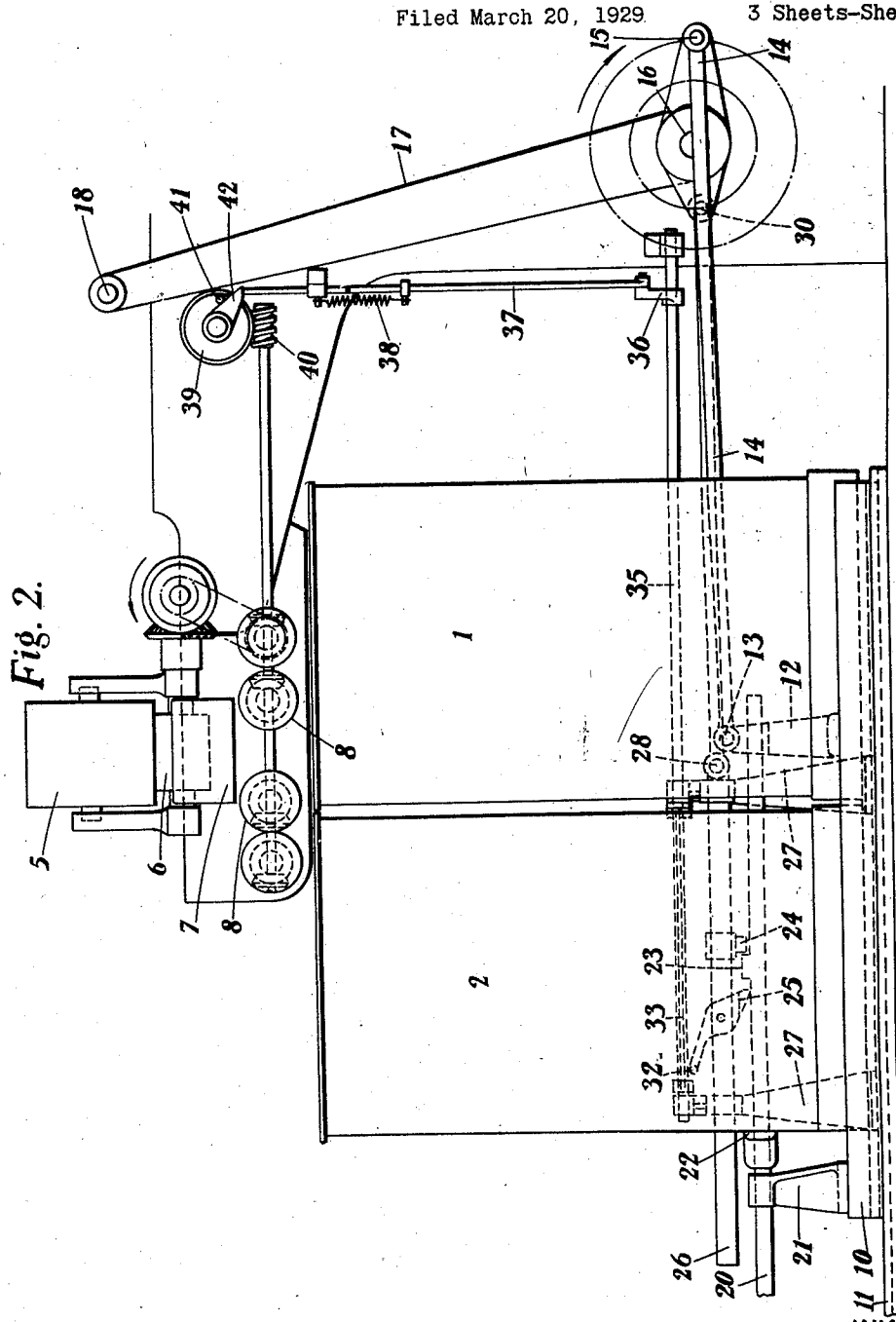

Fig. 2.

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Filed March 20, 1929 3 Sheets-Sheet 3

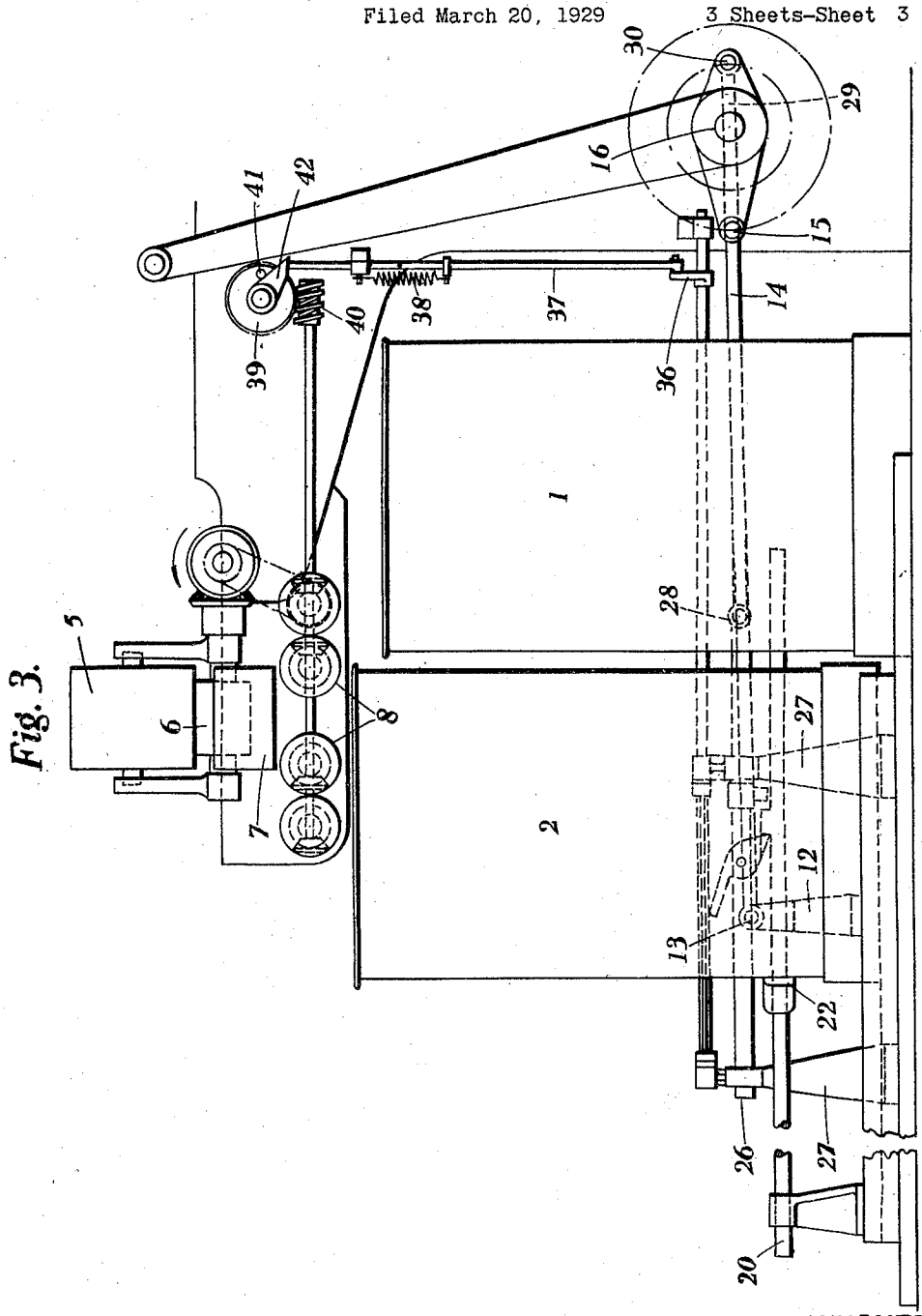

Fig. 3.

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UNITED STATES PATENT OFFICE

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DELIVERY OF SLIVERS FROM TEXTILE MACHINES INTO CANS

Application filed March 20, 1929, Serial No. 348,524, and in Great Britain May 14, 1928.

This invention relates to the delivery of slivers from textile machines into cans. In machines such as carding engines, in which a heavy sliver is delivered at a high speed, a considerable amount of work is involved in removing by hand the cans as they become filled and replacing them by empty ones. Even where large cans are employed, the time taken to fill one of these may be only about five minutes so that the operator has to remove a large can filled with sliver and replace it by an empty one every five minutes or so. The object of the present invention is to provide a mechanism which will avoid the labour hitherto required in changing the cans by hand, and which will permit the changing or doffing of cans to be effected more expeditiously, thereby increasing the output of the machine and operator.

According to the present invention, the novel mechanism is adapted to remove a filled can from the delivering position and to replace it by an empty can automatically. The empty can in moving into the delivering position moves preferably the filled can at the same time out of the delivering position. For this purpose, two cans may be moved by a pair of supports which reciprocate together during filling but move in opposite directions when a can has become filled, the empty can then being moved automatically into the position to receive sliver while the filled can is pushed out of the way by the empty can.

In order that the nature of the invention may be understood clearly and the manner in which it is to be carried into effect, one construction in accordance with the invention will now be described by way of example as applied to a carding engine, and with reference to the accompanying drawings. In these drawings:—

Figures 1, 2 and 3 are corresponding front elevations of the mechanism, showing it in three different positions, Figure 1 being a partial view only but drawn to a somewhat larger scale, while Figures 2 and 3 are more complete views.

Figure 4 shows a partial cross-section taken on the line IV—IV of Figure 1.

The sliver is being delivered between the rollers 5 and 6 and over a plate 7, then between positively driven packing rollers 8, which in the positions of Figures 2 and 4 are delivering the sliver into the can 1, while in the position of Figure 3 delivery into the second can 2 has commenced, the can 1 having been filled. The cans are placed on a sliding platform 10 which works in floor slides or rails 11 as seen in Figure 4. On the side of the platform nearest to the carding engine is secured a bracket 12 having a connecting rod 14 pivotally connected thereto at 13, the other end of this connecting rod being mounted on a crank pin 15 on an arm projecting from a shaft 16. This shaft is driven, for example, by chain 17 from a shaft 18 deriving its power from any suitable driven member of the machine, for example from the doffer of the card. By this connection the platform 10 is moved to and fro transversely as the shaft 16 rotates so as to cause the sliver delivered by the rollers 5 and 6 to be laid in a zigzag form as is usual, in the can on the said platform. The cans illustrated are oval or oblong in form to permit of such laying.

In normal operation, a can on the platform, in the position of the can 1 in Figures 2 and 4, is receiving the sliver, while a second can 2 is placed on the platform beside the can 1 ready to take over the delivery of the sliver when the can 1 is discharged filled. The mechanism for effecting this change-over is as follows:—

The bracket 12 has a rearward extension 19, Figure 4, and in this extension works a pull-bar 20 which is also supported in a bracket 21 near the other end of the carriage 10. Fixed to the pull-bar 20 is an arm 22 projecting across the platform 10, or at least far enough across the same to take a good bearing against the end of a can when placed in the position of the can 2 thereon, as in Figure 2. The pull-bar 20 has a projection 23 thereon adapted to be engaged as hereinafter described, on the one hand by a fixed abutment 24, and on the other hand by a pawl 25 mounted on a catch-bar 26. This catch-bar is arranged to slide in two supporting brackets 27, shown as being mounted on the rear floor slide or rail 11 in Figure 4. The

catch-bar 26 has pivotally connected to it at 28 a rod 29, whose other end is mounted on a crank pin 30 on an arm mounted on the crank shaft 16. The throw of the crank pin 30 is less than that of the crank pin 15, the crank pin 30 being approximately diametrically opposite to the crank pin 15 as seen clearly in Figures 2 and 3, which show the parts in their two extreme positions respectively.

The pawl 25 is pivoted at 31 on the catch-bar 26 and has a projecting pin 32 at its rearwardly projecting end. This pin 32 is normally held depressed by a rail 33 carried between cranks 34 on a shaft 35 which is supported in upward extensions of the brackets 27. At the far end of the shaft 35 is an arm 36 to which is linked a push-rod 37 normally held up by a spring 38. The rod is shown depressed in Figures 2 and 3, but elevated in Figure 4, so that the rail 33 is close above the top of the catch-bar 26. In the depressed position of the rod 37, the rail 33 occupies the position indicated in dotted lines in Figure 4.

The lever 36 is only required to be raised for doffing when a can is filled after an interval of, say, five minutes, during which period the can has made several reciprocations while the shaft 16 rotates. In order to give a doffing action a worm-wheel 39 is provided driven at slow speed by a worm 40, and carrying a projecting pin 41 which serves to push round an operating arm 42 in a path which brings it into line with the top of the push-rod 37. Once in each revolution of the worm-wheel 39, the arm 42 holds the push-rod 37 depressed during one complete revolution at least of the shaft 16, and while the rod 37 is depressed the rail 33 is held raised, so releasing the pawl 25 and allowing it to engage behind the projection 23 on the pull-bar 20.

Assuming now that the can 1 has been filled and that it is required to doff it and to bring the can 2 into receiving position, the parts will have attained the position of Figure 2. In this figure, the arm 42 has just depressed the push-rod 37 and raised the rail 33 so as to allow the pawl 25 to drop behind projection 23 on the movement to the left of catch-bar 26, while the pull-bar 20 has moved over as far as possible toward the right in the right-hand travel of the carriage 10. The sliver can 1 is resting on the carriage 10 but is free to be pushed off from the right-hand end thereof. During the next half-turn of the shaft 16, the carriage 10 is moved toward the left as the crank pin 15 moves through 180° from the position of Figure 2 to that of Figure 3, while at the same time the crank pin 30 has moved through 180° to its right-hand position as in Figure 3, drawing the catch-bar 26 over toward the right. In this movement the pawl 25 engaging with projection 23 draws the pull-bar 20 over toward the right, so that the arm 22 moves the can 2 towards the right through the distance of the throw of crank 30, while the carriage 10 is being moved to the left through the greater distance of the throw of crank 15. The sum of these two crank throws is equal to the length of a sliver can, and the result is that the can 2 is pushed along as seen in Figure 3 to the position on the carriage 10 formerly occupied by the can 1, while the can 1 is pushed off the end of the carriage and deposited on the floor as in Figure 3. In the next half-turn of the shaft 16, the carriage 10 moves toward the right again pushing before it the can 1 until it is completely out of the way of the movement of the operated parts, while the can 2 continues to occupy on the carriage the position formerly taken up by the can 1. The sliver is broken in the doffing of the can 1 as in Figure 3, and thereafter begins to be piled into the can 2 which is in position to receive it.

As the parts continue to move, the arm 42 passes off the push-rod 37 and this latter rises under the action of spring 38 causing the rail 33 to fall again, whereby the pawl 25 is lifted clear of the projection 23 on the pull-bar 20. The pull-bar 20 is thrust toward the left again by the projection 24 on the catch-bar 26, and when the pawl 25 ceases to act, the pull-bar 20 is left pushed over toward the left-hand side as in Figure 1, while the catch-bar 26 is free to reciprocate idly until its pawl is thrown into action again on the next rotation of the worm-wheel 39. There is now space for a further empty can to be laid on the platform 10 between the can 2 and the arm 22 projecting from the pull-bar 20. The operator can put the empty can in this position at any time after the pull-bar 20 has ceased to reciprocate oppositely to the carriage 10, and before a further rotation of the worm-wheel 39 causes a further doffing movement to be effected.

The ideal condition would be one in which the arm 42 held the push-rod 37 depressed only for one revolution of shaft 16, but no harm is done if the pawl 25 engages two or three times with the projection 23 before the arm 42 slips off the push-rod and allows it to return while depressing the rail 33 again so as to hold the pawl 25 out of action. This can be overcome by a suitable design of the arm 42. In practice, however, as the machine minder will first of all devote his attention to the full can, no delay due to this actually occurs.

The construction described above and illustrated in the drawings is intended to serve by way of example only, and it will be evident that it might be modified in many respects without departing from the spirit of the in-

vention. For example, the pawl and push-rod mechanism might be replaced by any equivalent mechanism actuated after pre-determined intervals of time to cause the arm 22 or an equivalent member to be moved in a direction opposite to that of the main carriage when it is required to doff a filled can. The means for feeding the sliver to the can may be varied, and the particular feed arrangement illustrated is intended to serve by way of example only.

I claim:—

1. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, means for reciprocating said carriage, a member adapted to engage said can to remove same from said carriage, a driving element for said member and means for operatively connecting said driving element to said member after a predetermined amount of sliver has been delivered from the delivery mechanism of the textile machine.

2. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, means for reciprocating said carriage, a member adapted to engage said can to remove same from said carriage, a driving element for said member, means for reciprocating said driving element to move it at any instant in the opposite direction to the direction of movement of said carriage, and means for operatively connecting said driving element to said member after a predetermined amount of sliver has been delivered from the delivery mechanism of the textile machine.

3. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage of sufficient length to support two cans side-by-side, the can undergoing filling and an empty can, and a member periodically moved relatively to said carriage in a path to engage said empty can to discharge from said carriage said can undergoing filling and to move said empty can into the filling position.

4. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage of sufficient length to support two cans side-by-side, the can undergoing filling and an empty can, a member mounted to slide relatively to said carriage and in position to engage directly said empty can, a driving element for said member and means for coupling said driving element and said member periodically to actuate said member to discharge from said carriage said can undergoing filling.

5. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, a driving shaft, a crank secured thereto, a rod connecting said crank and said carriage to reciprocate the latter, a second crank secured to said shaft substantially in opposition to said first-mentioned crank, a slidably-mounted catch-bar, a rod connecting said catch-bar to said second crank to reciprocate said catch-bar, a pull-bar slidably mounted in said carriage, and means for coupling said catch-bar to said pull-bar after a predetermined amount of sliver has been delivered into the can, to actuate said pull-bar to remove the can from the carriage.

6. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, a driving shaft, a crank secured thereto, a rod connecting said crank to said carriage to reciprocate the latter, a second crank secured to said shaft substantially in opposition to said first-mentioned crank, said cranks having an aggregate throw equivalent to the dimension of a can in the direction of reciprocation of said carriage, a slidably-mounted catch-bar, a rod connecting said catch-bar to said second crank to reciprocate said catch-bar, a pull-bar slidably mounted in said carriage, and means for coupling said catch-bar to said pull-bar after a predetermined amount of sliver has been delivered into the can, to actuate said pull-bar to remove the can from the carriage.

7. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, a driving shaft, a crank secured thereto, a rod connecting said crank and said carriage to reciprocate the latter, a second crank secured to said shaft substantially in opposition to said first-mentioned crank, a slidably-mounted catch-bar, a rod connecting said catch-bar to said second crank to reciprocate said catch-bar, a pull-bar slidably mounted in said carriage, a coupling device for connecting said pull-bar to said catch-bar periodically actuated from the delivery mechanism of the textile machine.

8. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage of sufficient length to support side-by-side the can undergoing filling and an empty can, a driving shaft, a pair of cranks secured to said shaft in substantially opposite position, one of said cranks being linked to said carriage to reciprocate same and having a throw of the amount required for zig-zagging the sliver in the can undergoing filling, said second crank having a throw of an amount which

when added to that of said first crank gives a displacement equal to the dimension of a can in the direction of reciprocation of said carriage, a driving element linked to said second crank, a member slidably mounted relatively to said carriage and located in position to engage directly said empty can and pawl mechanism thrown into action to couple said member to said driving element only at intervals of time corresponding to the time normally taken to fill a can with sliver.

9. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, means for reciprocating said carriage, a member adapted to engage said can to remove same from said carriage, a driving element for said member, a coupling device adapted to connect said driving element to said member, a rotatable arm operatively driven from the delivery mechanism of the textile machine and a linkage connecting said arm to said coupling device to actuate the latter periodically.

10. An apparatus for doffing cans filled from the delivery mechanism of a textile machine, comprising in combination a slidably-mounted carriage to support the can, a driving shaft, a crank secured thereto, a rod connecting said crank and said carriage to reciprocate the latter, a second crank secured to said shaft substantially in opposition to said first-mentioned crank, a slidably-mounted catch-bar, a rod connecting said catch-bar to said second crank to reciprocate said catch-bar, a pull-bar slidably mounted in said carriage, pawl mechanism for coupling said catch-bar to said pull-bar, a worm-wheel in driving connection with the delivery mechanism of the textile machine, an arm rotated by said worm-wheel and an operative connection between said arm and said pawl mechanism to actuate the latter at each revolution of said arm to remove the filled can from said carriage.

In witness whereof I hereunto subscribe my name this 26th day of February, 1929.

JACK P. MACKIE.