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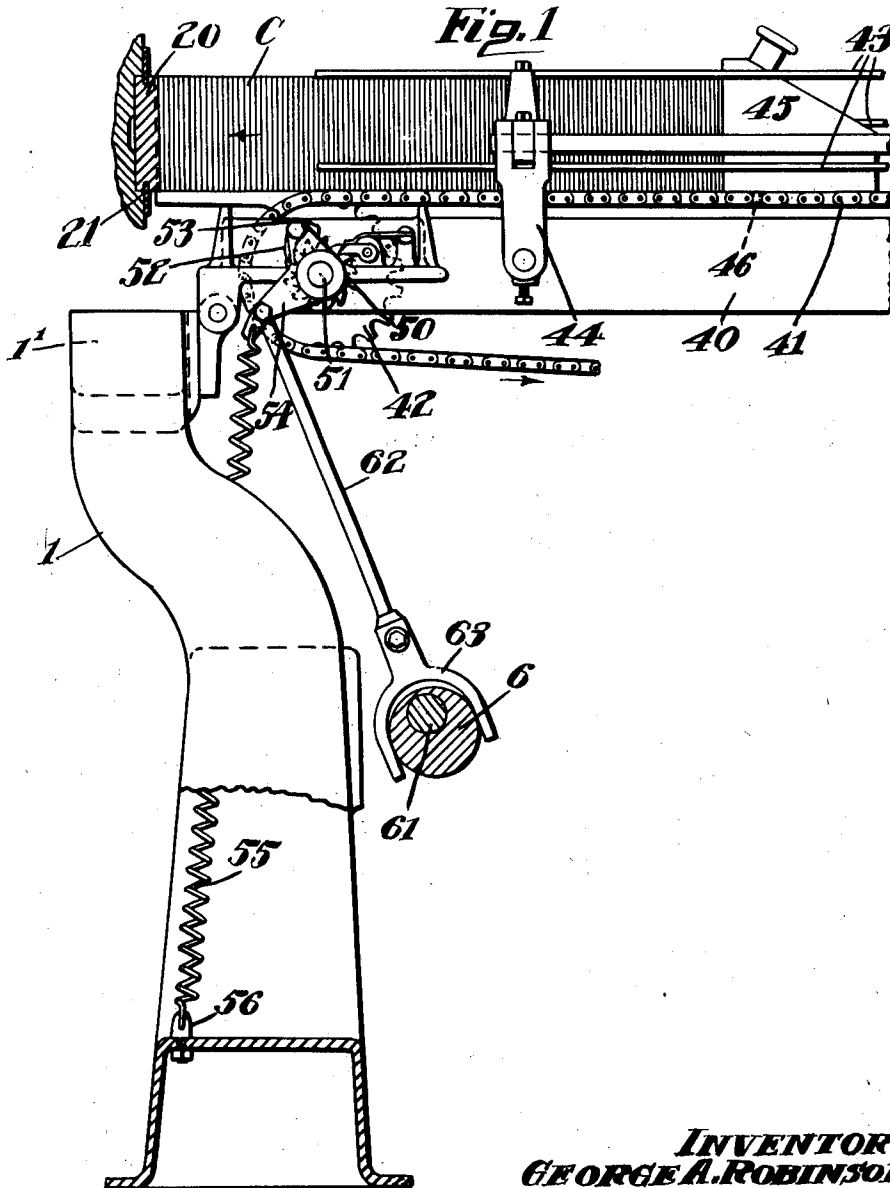
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G. A. ROBINSON

COMPENSATOR FOR CARTON CONVEYERS

Original Filed Oct. 16, 1922

2 Sheets-Sheet 1



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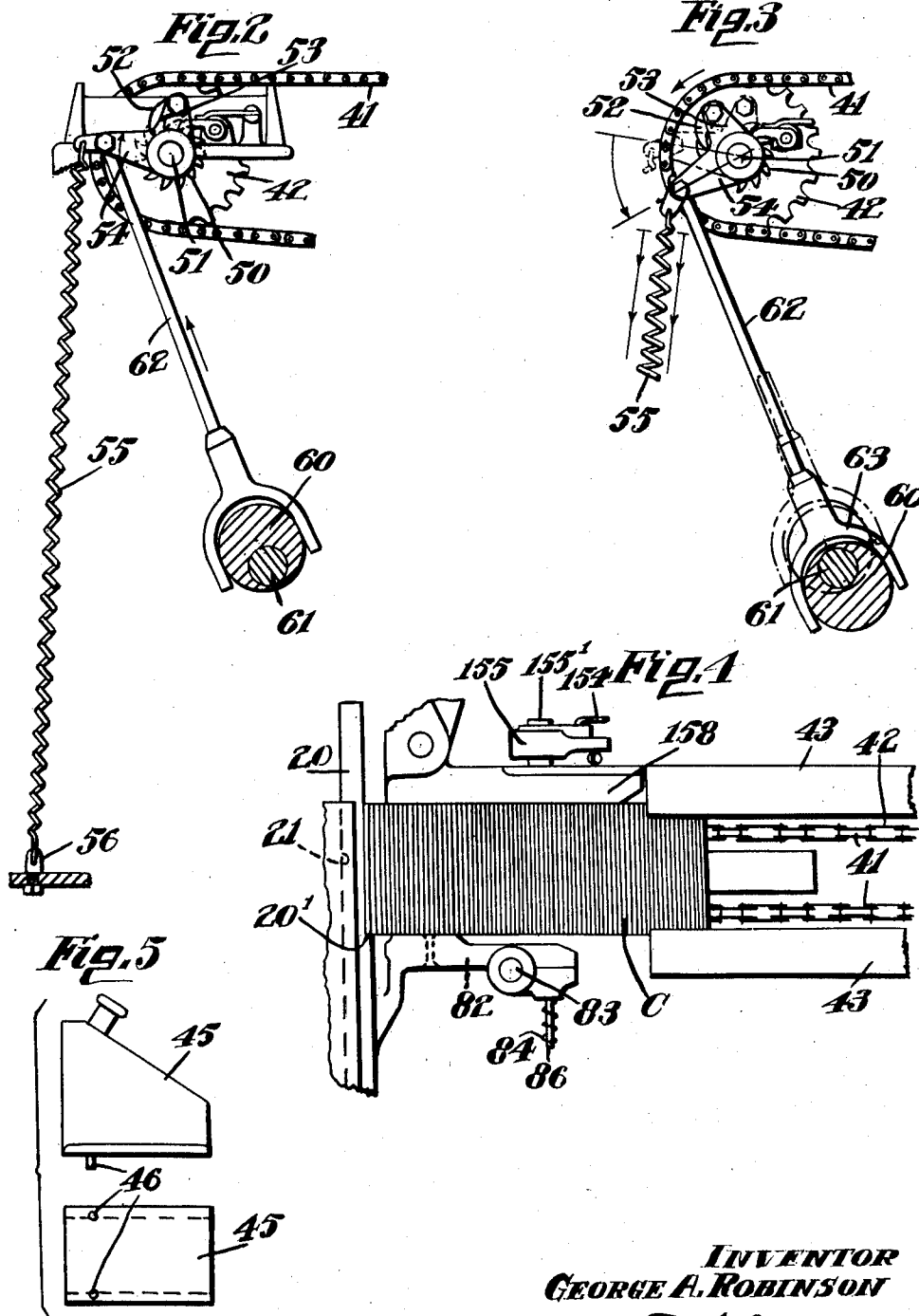
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

GEORGE A. ROBINSON, OF BATTLE CREEK, MICHIGAN, ASSIGNOR TO PNEUMATIC SCALE CORPORATION, LTD., OF NORFOLK DOWNS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

COMPENSATOR FOR CARTON CONVEYERS.

Original application filed October 16, 1922, Serial No. 594,796. Divided and this application filed January 9, 1926. Serial No. 80,254.

This invention is a division of my prior application for a carton feeding and opening machine, filed October 16, 1922, Serial No. 594,796, and relates particularly to the carton feed conveyer and its drive. Although of general utility and capable of employment in a variety of adaptations, I shall discuss my invention particularly herein in its application to the feeding of knock-down cartons, in which use it finds a field of immediate utility.

According to my general concept, a pack of knocked-down cartons is supported in vertically edgewise juxtaposed position on a horizontal conveyer, as distinguished from machines of the vertical stack type in which the cartons are supported flatwise upon each other in a pile.

With a conveyer of this type, it is desirable that the pack automatically shall be moved forwardly a distance substantially equal to the thickness of the carton removed at each operation of the carton transfer mechanism. If it were not for the variations which occur in the cartons themselves, this might be accomplished by a positive intermittent drive for the conveyer, or if it were not for the danger of destroying the bottoms of the cartons, the conveyer might be driven continuously. These factors, however, make it essential that the conveyer shall move only with the pack and that the pack shall move forward a distance substantially equal to the thickness of the carton removed. I, therefore, employ a drive for the conveyer which is continuous in the sense that the driving force is sufficient to carry the carton pack forwardly only while the cartons are being removed and which in a sense is intermittent, in that the conveyer and pack move only with each other, the arrangement being such that the driving force is automatically restored upon reduction thereof, due to the successive removal of the cartons from the conveyer.

Detachably mounted on the conveyer to move therewith is a follower which constantly bears against the rearmost carton of the pack. The foremost cartons on the conveyer are successively and singly removed therefrom and transferred to a carton pocket or receiver, preferably being opened during such transfer, by any suitable mechanism, as

for example, the mechanism disclosed in my said application, Serial No. 594,796. When the carton pack requires replenishment, the follower is detached from the conveyer, without stopping either the conveyer or the machine, the pack refilled, and the follower replaced on the conveyer in position to again bear against the rearmost carton of the pack.

The construction and operation of my invention, together with a practical embodiment thereof adapted for the feed of knock-down cartons, is described and illustrated in the accompanying specification and drawings, and the characteristic features of novelty are particularly pointed out in the appended claims. Throughout the specification and drawings like reference characters are employed to indicate corresponding parts, and in the drawings:

Fig. 1 is a side elevation partly in section, of the automatic compensating feed mechanism at the delivery end of a carton conveyer of the type shown in my prior application Serial No. 594,796.

Fig. 2 is a detail view of the ratchet system of said feed.

Fig. 3 is a further detail of the same in opposite phase of throw.

Fig. 4 is a partial plan view of Fig. 1, and

Fig. 5 a detail view of the follower block.

I have indicated at 40 a conveyer frame, and at 41 a horizontally disposed conveyer of the chain feed type running on sprockets, one of which is indicated at 42. Supported on the conveyer in vertically edgewise juxtaposed position is a pack of cartons C which are thus advanced longitudinally of the frame towards the carton transfer mechanism, indicated generally by the numeral 20 in Figs. 1 and 4, where the foremost cartons in the pack are successively removed therefrom. For the purposes of this application, the carton transfer mechanism 20 is shown as a transverse slide which acts to remove the endmost carton of the pack from the discharge end of the conveyer and carry it to a carton pocket, not shown, the cartons being opened in any suitable manner during such transfer.

The sprocket 42 is driven by a ratchet drive comprising a ratchet 50 mounted on the sprocket shaft 51 and rotated by a pawl

52 carried by the short arm 53 of a bell crank lever which is loosely mounted on the shaft 51. This pawl is reset by an eccentric 60 on the main power shaft 61 of the machine through a rod 62 which is connected at its upper end to the long arm 54 of the bell crank lever and its lower end is forked to embrace the eccentric 60 and be engaged thereby whenever the rod 62 lowers. The arm 54 is also connected with a continuous driving force, as the spring 55 which is fastened at 56 to the base of the machine and continuously tends to rock the pawl arm 53 and thus turn the sprockets 42 to advance the conveyer 41, (Fig. 2). This spring 55 thus constitutes a predetermined motive power for the conveyer drive.

The return motion of the pawl 52 is effected by the eccentric 60 which resets the pawl whenever the transfer mechanism 20 has reduced the number of cartons sufficiently to allow the spring 55 to draw down the arm 54 so that the eccentric 60 finds bearing at its bottom, (Fig. 3). It thus resets the pawl to advance the carrier under the action of the spring 55 whenever the reduction of pressure adjacent the transverse slide permits the action of the spring 55.

The spring 55 therefore keeps the pressure within predetermined limits on the blanks in advance of the follower 45. This follower 45 consists of a heavy block having pins 46, (Fig. 5) in its lower face which engage with each of the conveyer chains 41. As the cartons are placed on the conveyer the block 45 is placed behind them as a follower to hold the cartons erect and to insure their advance and their free presentation to the transfer mechanism 20. When the carton pack requires replenishment, the follower 45 is detached from the conveyer chains, without stopping either the conveyer or the machine, the pack refilled, and the follower replaced on the chains in position to again bear against the rearmost carton in the pack and feed the pack forwardly as the chains rotate.

In order to have the transfer mechanism 20 accurately and evenly engage the edge of the most advanced carton in the pack and remove it therefrom without danger of crumpling or tearing it, it is necessary that the blanks be presented with a uniform pressure as maintained by the ratchet connection 50 and the spring 55 which keeps the conveyer block or follower 45 up against the carton pack. The tension on the spring 55 is restored at frequent intervals by the eccentric 60. Thus, the driving force for the conveyer, which may be by spring or weight, but as here shown is by spring (55) is a continuous force in that it is constantly in condition to be applied, but is only restored intermittently, i. e. only as the endmost cartons are successively removed from the de-

livery end of the conveyer by the carton transfer mechanism. The spring moves the conveyer, and with it the pack, forwardly a distance corresponding substantially to the thickness of the carton removed at each stroke of the carton transfer mechanism. As the cartons are successively removed, the spring gradually loses power and requires resetting. When this condition occurs, i. e. when the arm 54 has been drawn down to the position shown in Fig. 3, the eccentric 60 automatically acts to re-set the parts by raising the rod 62 (dotted line showing of Fig. 3) to withdraw the pawl 52 from the ratchet 50 and carry it back a tooth space in the ratchet, thereby retensioning the spring.

Various modifications in the construction and operation of the device may obviously be resorted to, all without departing from the spirit of my invention if within the limits of the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. In a feed for carton blanks or the like, a transfer mechanism, and a conveyer delivering thereto under pressure, a pawl and ratchet drive for the conveyer, means for actuating the drive at predetermined pressure, and means for resetting the pawl to maintain the delivery pressure constant after reduction through transfer.
2. In a feed for carton blanks or the like, a transfer mechanism, and a rotatable endless conveyer delivering thereto under pressure, a pressure actuating drive for the conveyer, and means for restoring the driving pressure to maintain the delivery pressure constant after reduction through transfer.
3. In a feed for knock-down cartons, a transfer mechanism, a rotatable endless conveyer delivering thereto, means for maintaining a driving force on said conveyer, and means automatically effective upon reduction of the driving force by removal of the cartons from said conveyer to restore said driving force.
4. In a feed for knock-down cartons, a transfer mechanism, a rotatable endless conveyer delivering thereto, means for maintaining a driving force on said conveyer, and means automatically effective upon reduction of the driving force by removal of the cartons from said conveyer to restore said driving force, and a follower moving with the conveyer and adapted to continuously bear against the rearmost carton on the conveyer, and detachable from said conveyer to permit replenishment of the carton pack.
5. In a feed for knock-down cartons, an intermittently operating transfer mechanism, a rotatable endless conveyer delivering thereto, a conveyer driving force available to carry the carton pack forwardly a dis-

5 tance substantially equal to the thickness of the carton removed at each stroke of said transfer mechanism, and means automatically effective upon reduction of the driving pressure by removal of the cartons from the conveyer to restore said driving force.

10 6. In a feed for knock-down cartons, a transfer mechanism, a conveyer delivering thereto, a ratchet fast on one of the conveyer shafts, a pawl normally engaged with said ratchet, means for maintaining a driving force on said pawl, and means automatically effective upon reduction of the driving force by removal of the cartons from said conveyer to disengage said pawl from said ratchet and restore said driving force.

15 7. In a feed for knock-down cartons, a transfer mechanism, a rotatable endless carton conveyer, means for maintaining a potential driving force on said conveyer, and automatic means to re-establish periodically the potential driving force of said driving means.

20 8. In a feed for knock-down cartons, a transfer mechanism, a rotatable endless carton conveyer, means for maintaining a potential driving force on said conveyer, and automatic means to maintain substantially constant the potential driving force of said driving means.

25 9. In a feed for knock-down cartons, a transfer mechanism, a rotatable endless carton conveyer, means for maintaining a potential driving force on said conveyer, and intermittently operating means for automatically-reestablishing the potential driving force of the driving means.

30 10. In a feed for knock-down cartons, a transfer mechanism, a horizontally disposed rotatable endless conveyer, means for maintaining a potential driving force on said conveyer, and automatic means for periodically restoring the potential driving force of the driving means as it becomes depleted by removal of cartons from said conveyer.

35 11. In a feed for knock-down cartons, a transfer mechanism, a conveyer delivering

thereto, means for maintaining a driving force on said conveyer, means automatically effective on reduction of the driving force by successive removal of the cartons on said conveyer periodically to reestablish said driving force, and a follower moving with the conveyer adapted to bear against the rear-most carton of the conveyer and positively and detachably connected to said conveyer to permit replacement of the carton pack.

40 12. In a feed for carton blanks or the like, a transfer mechanism, a conveyer delivering thereto, a pawl and ratchet for the conveyer, a potential driving force acting through said pawl and ratchet to drive said conveyer, and means for periodically re-establishing said driving force as the cartons are successively removed from the conveyer.

45 13. In a feed for knock-down cartons, a transfer mechanism, a rotatable endless conveyer delivering thereto, and a potential driving force for driving said conveyer, effective to move said conveyer only as each carton is individually removed by the transfer means.

50 14. In a feed for knock-down cartons, a transfer mechanism, a carton conveyer movable in one direction only and delivering to the transfer mechanism, means for maintaining a driving force on said conveyer, and means automatically effective on reduction of the driving force periodically to reestablish said driving force while maintaining the uni-directional travel of the conveyer.

55 15. In a feed for knock-down cartons, a transfer mechanism, a carton conveyer movable in one direction only and delivering to the transfer mechanism, means for maintaining a potential driving force on said conveyer, and automatic means to maintain substantially constant the potential driving force on said conveyer while maintaining the uni-directional travel of the conveyer.

In testimony whereof I affix my signature.

GEORGE A. ROBINSON.