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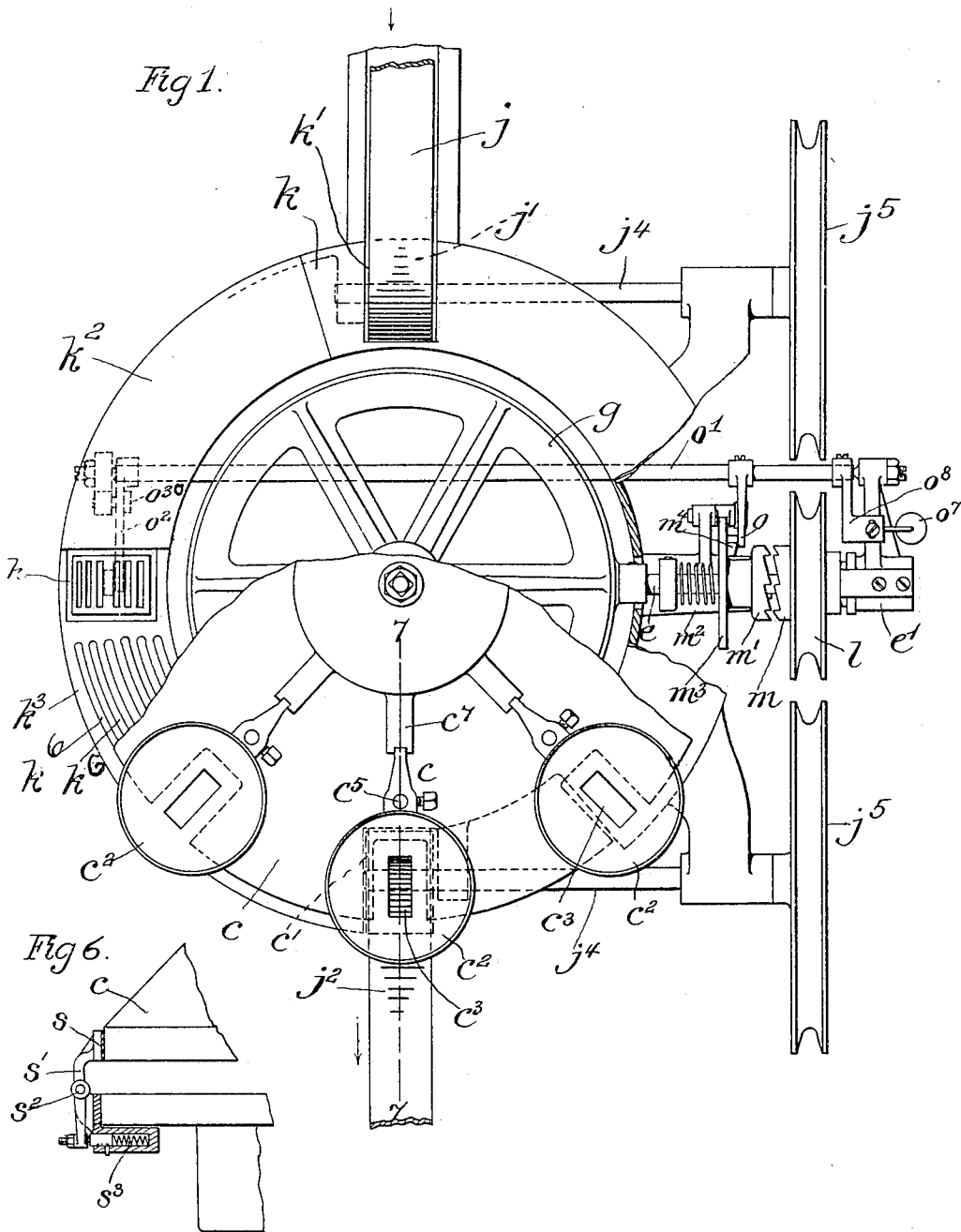
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BOX FILLING MACHINE.

APPLICATION FILED FEB. 18, 1904. RENEWED APR. 7, 1905.

3 SHEETS—SHEET 1.



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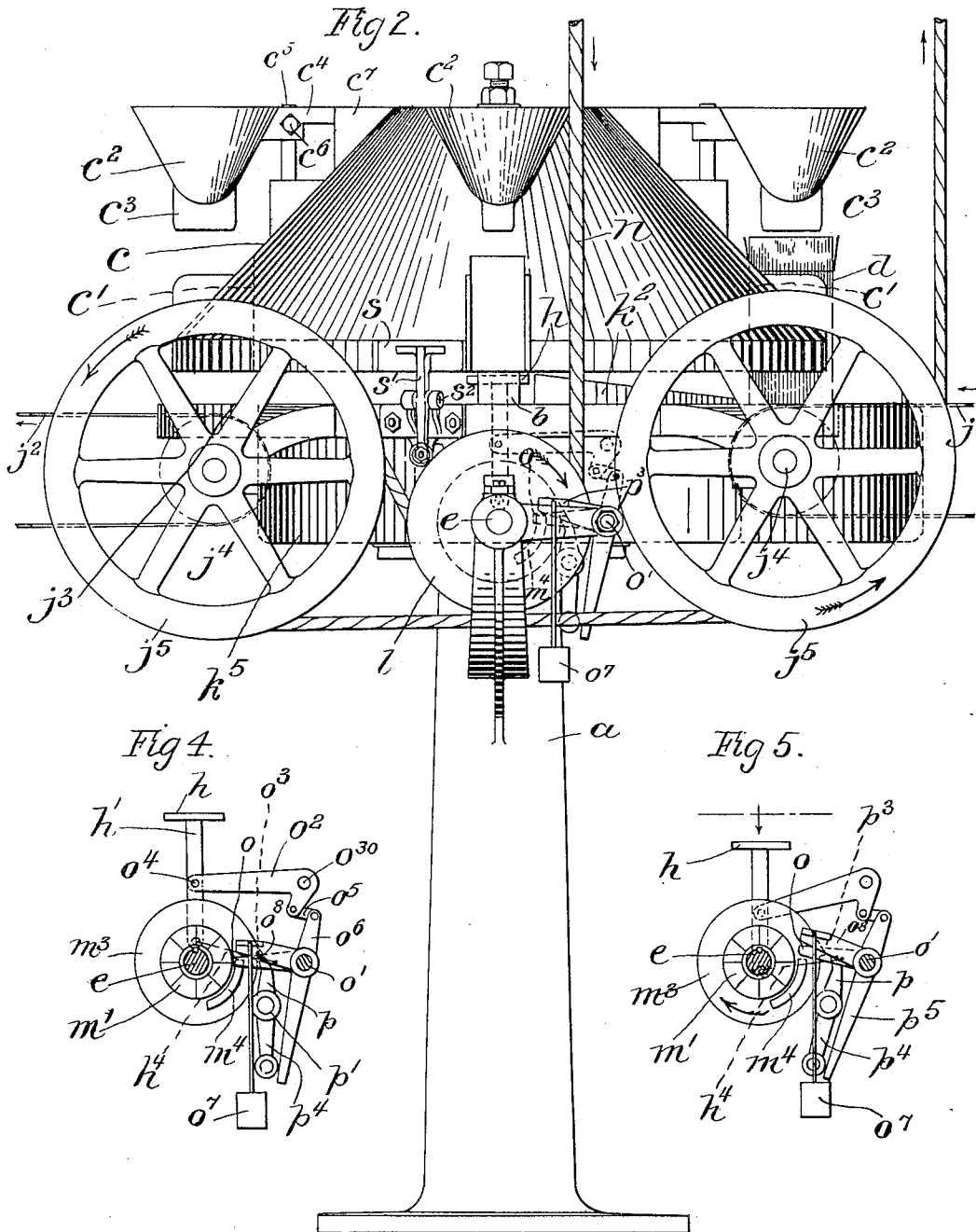
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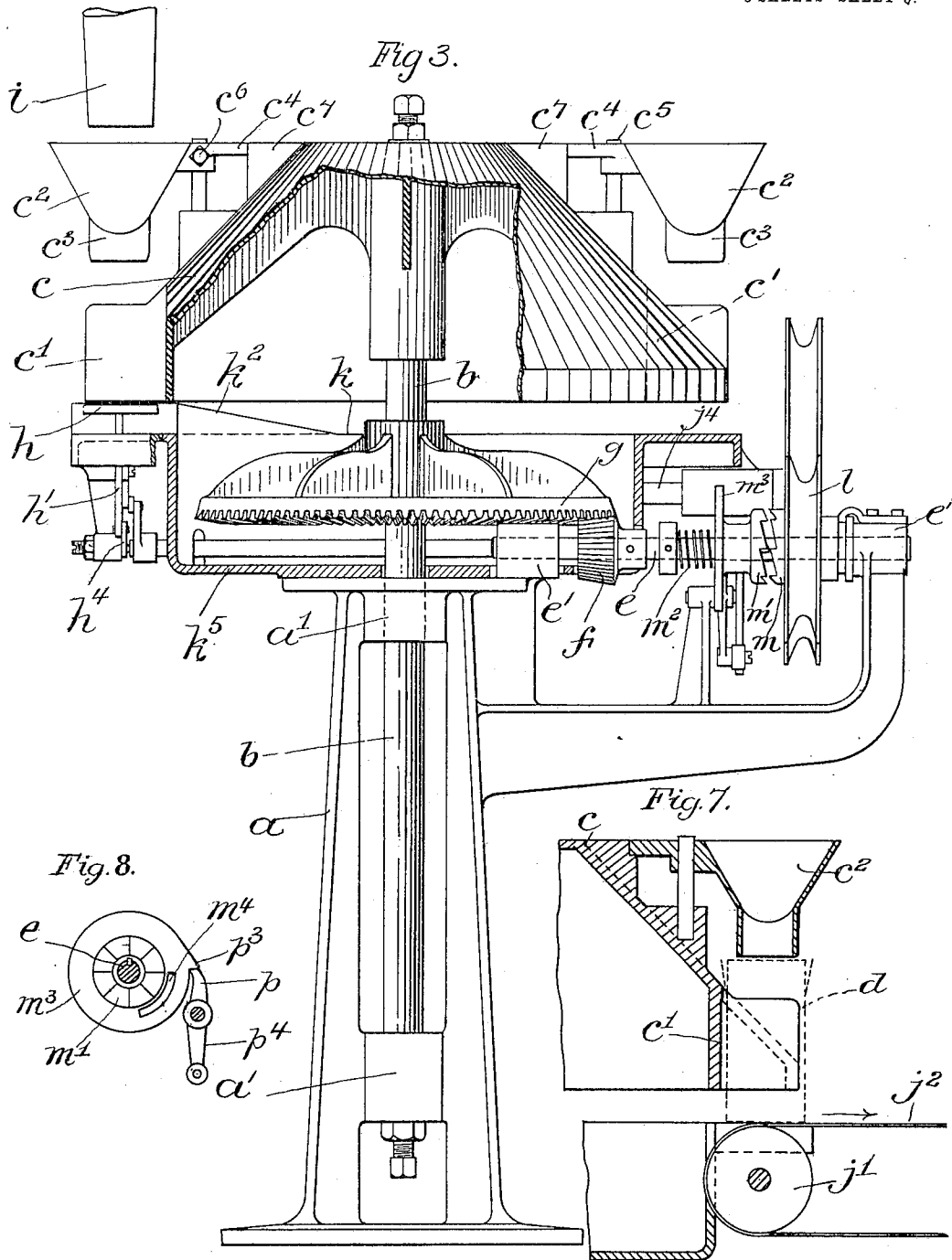
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ALBION L. F. MITCHELL, OF BOSTON, MASSACHUSETTS, AND CHARLES W. AIKEN, OF EAST ORANGE, NEW JERSEY.

BOX-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 793,014, dated June 20, 1905.

Application filed February 18, 1904. Renewed April 7, 1905. Serial No. 254,373.

To all whom it may concern:

Be it known that we, ALBION L. F. MITCHELL, of Boston, in the county of Suffolk and State of Massachusetts, and CHARLES W. AIKEN, of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Box-Filling Machines, of which the following is a specification.

This invention relates to machines for automatically filling boxes or cartons which are closed at one end and open at the other; and it has for its object to provide a machine adapted to automatically advance an empty box to a filling position, arrest the box in said position while it is being filled, and cause the weight of the filled box to actuate mechanism to advance the box to a delivering position and at the same time advance another empty box to the receiving position.

The invention consists in the several improvements, which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a box-filling machine embodying our invention, portions being broken away. Fig. 2 represents a side elevation of the machine. Fig. 3 represents a partial side elevation and partial vertical section, the machine being viewed from different points in Figs. 2 and 3. Figs. 4 and 5 represent side views of the platform, which is depressed by the weight of a filled box, and portions of the mechanism cooperating with said platform in stopping and starting the rotary head or box-carrier hereinafter referred to. Fig. 6 represents a fragmentary view showing the brake which acts on the rotary carrier. Fig. 7 represents a section on line 7 7 of Fig. 1. Fig. 8 represents a view similar to a portion of Fig. 4.

The same reference characters indicate the same parts in all the figures.

In the drawings, *a* represents a supporting-standard having bearings *a'* *a'*, supporting a vertical shaft *b*. To the upper portion of said shaft is affixed a rotary head *c*, which is preferably of frusto-conical form and is provided

at the base portion of its margin with a series of pockets or recesses *c'*, each of which is vertically arranged and is endless, or, in other words, open at its upper and lower ends, so that a box or carton *d* introduced into either of said pockets is adapted to be moved progressively in a curved path by the rotation of the head and at the same time to move vertically in the pocket in which it is inserted.

e represents a horizontal shaft, which is journaled in bearings *e'* *e'*, affixed to the standard *a*, and is connected by bevel-gears *f* *g* with the carrier-shaft *h*, one of said gears being attached to the driving-shaft and the other to the carrier-shaft.

h represents a vertically-movable platform, which is yieldingly supported with its upper surface slightly below the plane of the lower edge of the carrier *c*, the position of the platform *h* being such that a box engaged with one of the pockets of said carrier will be deposited by the rotary movement of the carrier upon the upper surface of the platform. The platform *h* is located below a fixed feed spout or conduit *i*, which is connected with a feeding mechanism for the material to be inserted in the boxes, said feeding mechanism being organized to discharge at predetermined periods a given quantity of material sufficient to fill a box engaged with the carrier.

Empty boxes are presented to the head or carrier at a point in the latter at one side of the platform *h*, the boxes being preferably presented by a conveyer-belt *j*, mounted on supporting-pulleys, one of which is shown at *j'*. The upper stretch of the conveyer *j* is substantially flush with a segmental track *k*, extending between the conveyer and the platform *h*. The conveyer *j* extends into a recess *k'* at one end of the segmental track *k*, so that a box advanced by the conveyer into one of the pockets of the carrier *c* is in position to be moved laterally from the conveyer by the rotation of the carrier along the track *k*, the carrier sweeping the box off from the conveyer and onto the track *k*, which supports the weight of the box. The segmental track *k* is formed to raise the box during its movement from the conveyer *j* to the platform *h*,

said carrier having an incline h^2 , the higher end of which is substantially flush with the platform h when the latter is in its raised position, as shown in Fig. 3. The platform h is normally supported by means hereinafter described in the raised position shown in Figs. 3 and 4, its upper surface being flush with the higher end of the incline h^2 and is adapted to be depressed by the weight of a filled box. The charge-delivering mechanism is timed to deliver a charge to an empty box as soon as the latter is deposited upon the platform by the rotation of the carrier.

l represents a driver or driving-pulley, which is adapted to rotate the shaft e and is separably connected therewith by means of a clutch member m , affixed to the driver l , and a sliding clutch member m' , which is rotatively engaged with and adapted to slide upon the shaft e , the member m' being pressed toward and into engagement with the member m by means of a spring m^2 . To the clutch member m' is affixed a disk m^3 , having an inclined or cam-shaped rib m^4 . The driver l is continuously rotated by means of a belt n , engaged therewith, and the clutch member m' is normally engaged by the spring m^2 with the clutch member m of the driver.

o represents a movable abutment which is arranged in the path of movement of the cam m^4 and is adapted to act on said cam in such manner as to separate the clutch member m' from the member m at a given point in the rotation of the said clutch members, thus stopping the rotation of the shaft e , the mechanism being timed to stop the rotation of the shaft and of the box-carrier c when a box has been deposited upon the platform h . The abutment o is connected with the platform h in such manner that the depression of the platform by the weight of the charge inserted in a box upon the platform causes the displacement of the abutment, as shown in Fig. 5, the clutch member m' being thus released, so that the spring m^2 again engages it with the clutch member m . The rotation of the shaft e and the carrier is thus resumed, the carrier being thus caused to sweep the loaded box from the platform h , which is now in its depressed position, onto a segmental track k^3 , which is flush with the upper surface of the depressed platform and extends from the platform to a delivering-conveyer j^2 , located at the opposite side of the axis of the head from the conveyer j . The conveyer j^2 is supported by pulleys j^3 , one of which is shown in Fig. 2, the upper stretch of the conveyer j^2 being substantially flush with the track k^3 .

The conveyers j and j^2 are continuously impelled by suitable means, the means comprising shafts j^4 j^4 , supporting the pulleys j^1 and j^3 , and belt-engaging pulleys j^5 j^5 , fast to the shafts j^4 j^4 and engaged with the driving-belt n , as shown in Fig. 2.

The means for connecting the platform h

with the movable abutment o comprise a rock-shaft o' , journaled in fixed bearings, the abutment o being an arm affixed to said rock-shaft, a bell-crank lever o^2 , pivoted at o^{30} to a fixed support, one arm of said lever being pivoted at o^1 to a shank h' , supporting the platform h , the other arm of said bell-crank lever being connected by a link o^5 with an arm o^6 , affixed to the rock-shaft o' . The platform h is normally held in its raised position (shown in Fig. 4) by means of a weight o^7 , suspended from an arm o^8 , affixed to the rock-shaft o' . When a box on the platform h is filled, the weight of the charge depresses the platform, as shown in Fig. 5, thus causing an upward movement of the abutment o through the described mechanism and disengaging said abutment from the cam m^4 , as shown in Fig. 5.

It will be seen from the foregoing that when the shaft e is connected with its driver by the clutch members m and m' the rotation of the shaft, which is accompanied by a rotation of the box-carrier c , causes the automatic separation of the clutch member m' from the clutch member m and the stoppage of the rotation of the carrier. It will also be seen that the loading of a box upon the platform h , which occurs simultaneously with or directly after the stoppage of the carrier, causes the release of the clutch member m' and the resumption of the rotation of the carrier. The described mechanism is so timed and the box-receiving pockets in the carrier are so arranged that at each stoppage of the carrier one pocket is in position to receive a box from the conveyer j , another pocket is in position to hold a box on the platform h , and a third pocket is in position to present a loaded box to the conveyer j^2 . The stoppage of the rotation of the carrier is of sufficient duration to permit the insertion of a box into a pocket at one side of the carrier, the removal of a box from the opposite side of the carrier, and the depression of the platform h .

The head c is preferably provided with a series of funnels c^2 , overhanging the pockets c^1 , each funnel being provided with a discharge-spout c^3 and formed to receive the charge delivered by the chute i , the spout c^3 delivering the charge into the open end of the box or cart on d . The funnels c^2 may be detachably engaged with the head c , each funnel having a shank c^4 , which is perforated to receive a vertical stud c^5 , affixed to the head, the shank being affixed to said stud by a set-screw c^6 and engaged at its inner end with a notch in an ear or lug c^7 , formed on the head c .

The track portions k , k^2 , and k^3 are preferably flanges formed on a cup-shaped base k^5 , supported by the standard a .

s represents a brake which is yieldingly pressed against the peripheral portion of the base of the head c to prevent the rotation of the head by its own momentum, the said brake being preferably supported by a lever s' , piv-

oted at s^2 to a fixed support, the lower end of said lever being pressed outwardly by a spring s^3 to hold the brake in yielding contact with the head c .

5 To maintain the shank h' , supporting the platform h , in a substantially vertical position, we connect the lower end of said shank with a fixed support by a link or pivoted arm h^1 , Fig. 3, said link being conventionally represented by dotted lines in Figs. 4 and 5.

10 Some of the material discharged into the boxes on the platform h is liable to be spilled onto the segmental track k^3 and stand in the path of the filled box when it is moved along said track. To provide for the escape of said material and prevent it from being pushed along by the box, we provide the track k^3 with a series of elongated outlets k^6 , which are slots obliquely arranged with relation to the path of the box, so that the box has a slight movement crosswise of the edges of the slots, and is thus adapted to scrape the surplus material into the slots.

15 To insure the stoppage of the rotary head in the exact predetermined position desired, we provide an automatic stop p , which is a dog pivoted at p' and arranged to cooperate automatically with a tooth or shoulder p^3 , Fig. 8, formed on the disk m^3 . The stop or dog p is normally held in position to engage the shoulder p^3 by suitable means, such as by a weighted arm p^4 , formed on the dog p , the arrangement being such that the dog engages the shoulder at the same time that the higher end of the cam m^4 engages the abutment o and causes the separation of the clutch member m' from the clutch member m , the rotation of the head being thus positively and accurately stopped. When the abutment o is displaced to release the sliding clutch member m' , an arm p^5 , affixed to the rock-shaft o' , is moved by the partial rotation of said rock-shaft into contact with the weighted arm p^4 , thus throwing the dog p out of engagement with the shoulder p^3 , as shown in Fig. 5, so that the head-rotating mechanism is free to operate.

We claim—

1. A box-filling machine comprising a rotary carrier having box-engaging means adapted to impart a progressive movement to a box, a driving-shaft connected with the carrier, a driver for said shaft, separable clutch members carried by the shaft and driver, means for delivering a charge of material to a box engaged by the carrier, and means operated by the rotation of the shaft for disconnecting the clutch members to stop the carrier at predetermined intervals, and by a loaded box for connecting said members to start the carrier.

2. A box-filling machine comprising a rotary carrier having box-engaging means adapted to impart a progressive movement to a box, a driving-shaft connected with the car-

rier, a driver for said shaft, separable clutch members carried by said shaft, one of said members having a cam and being yieldingly pressed into engagement with the other member which is affixed to the shaft, a movable abutment normally in position to cooperate with said cam in displacing the movable clutch member to stop the carrier, means for delivering a charge of material to a box engaged by the carrier, and means actuated by a loaded box for displacing said abutment and thereby permitting the connection of the clutch members to start the carrier.

3. A box-filling machine comprising a rotary head or carrier having a vertically-arranged box-engaging pocket adapted to impart a progressive movement to a box, a movable platform which is normally elevated and is adapted to be depressed by the weight of a filled box, means for guiding a box engaged by said carrier to the platform when the latter is in its elevated position, means for guiding a filled box away from the platform when the latter is depressed, a driving-shaft connected with the carrier, a driver for said shaft, separable clutch members carried by the shaft and driver, and means operated by the rotation of the shaft for disconnecting the clutch members to stop the carrier at predetermined intervals, and by the depression of the platform for connecting said members to start the carrier.

4. A box-filling machine comprising a rotary head or carrier having vertically-arranged box-engaging pockets adapted to impart a progressive movement to a series of boxes, a vertically-movable platform which is normally elevated and is adapted to be depressed by the weight of a filled box, an inclined track for guiding a box engaged by the carrier to the raised position of the platform, a substantially horizontal track for guiding a filled box away from the depressed position of the platform, a driving-shaft connected with the carrier, a driver for said shaft, separable clutch members carried by the shaft and driver, and means operated by the rotation of the shaft for stopping the carrier at predetermined intervals and by the depression of the platform for connecting said members to start the carrier.

5. A box-filling machine comprising a rotary carrier having a box-receiving pocket or recess, a supplying-conveyer for introducing an empty box into a pocket at the receiving side of the carrier, a delivering-conveyer for removing a filled box from a pocket at the delivering side of the carrier, mechanism for alternately moving and arresting the carrier, said mechanism including a vertically-movable platform located below the path of the carrier between the said conveyers, said platform being yieldingly supported and adapted to be depressed by a filled box thereon, a shaft connected with the carrier, a driver for said

shaft, separable clutch members carried by the shaft and driver, means operated by rotation of the shaft for disconnecting the clutch members and stopping the carrier at predetermined intervals and by the depression of the platform for connecting said members to start the carrier, a segmental inclined track between the supplying-carrier and the platform, adapted to receive a box from the said carrier and raise it to the normal level of the platform, and a second segmental track between the platform and the discharging-conveyer, adapted to receive a filled box from the depressed platform and guide it to the discharging-conveyer.

6. A box-filling machine comprising a box-supplying conveyer, a box-delivering conveyer, a rotary carrier overhanging the two conveyers and having a box-engaging pocket adapted to receive a box from one conveyer and deliver the box to the other conveyer, a chute or conduit located over the carrier in position to discharge material into a box engaged by a pocket between the conveyers, a driving-shaft connected with the carrier, a driver for said shaft, separable clutch members carried by the shaft and driver, and means operated by the rotation of the shaft for disconnecting the clutch members to stop the carrier at predetermined intervals, and by a loaded box for connecting said members to start the carrier.

7. A box-filling machine comprising a rotary carrier having a box-engaging pocket adapted to impart a progressive movement to a box and provided with a funnel overhanging said pocket, a fixed chute or conduit located over the carrier in position to deliver material to said funnel, a driving-shaft connected with the carrier, a driver for said shaft, separable clutch members carried by the shaft and driver, and means operated by the rotation of the shaft for disconnecting the clutch members to stop the carrier when the funnel is under the chute and by a loaded box for connecting said members to start the carrier.

8. A box-filling machine comprising a rotary carrier having a box-engaging pocket, mechanism for rotating the carrier, automatic means for periodically stopping the carrier, a normally raised yielding platform under the carrier, means for conducting material to a box on said platform, a fixed segmental track at one side of the platform for guiding an empty box to said platform, and a fixed segmental track at the opposite side of the platform for guiding a filled box from the platform, the last-mentioned track having outlets for waste material which are eccentric to the path of a filled box moving over said track, whereby the box is caused to brush waste material from the track into said openings.

9. A box-filling machine comprising a rotary carrier having box-engaging means

adapted to impart a progressive movement to a box, a driving-shaft connected with the carrier, a driver for said shaft, separable clutch members carried by the shaft and driver, means operated by the rotation of the shaft for disconnecting the clutch members to stop the carrier at predetermined intervals, an automatic stop for positively arresting the driving-shaft when said clutch members are separated, and means actuated by a loaded box engaged with the carrier for connecting said clutch members to start the carrier, said means having provisions for displacing the stop.

10. A box-filling machine comprising a rotary carrier having box-engaging means adapted to impart a progressive movement to a box, mechanism for rotating the carrier, said mechanism including a sliding clutch member having a cam, a rock-shaft having an arm constituting an abutment normally in the path of said cam and adapted to cooperate with the latter in displacing said clutch member to stop the carrier, a yieldingly-supported box-supporting platform, and connections between said platform and the rock-shaft, whereby downward movement of the platform caused by a filled box is caused to turn the rock-shaft and displace the abutment.

11. A box-filling machine comprising a rotary carrier having a box-receiving pocket or recess, a supplying-conveyer for introducing empty boxes into the pocket at the receiving side of the carrier, a delivering-conveyer for removing a filled box from a pocket at the delivering side of the carrier, automatic means for periodically stopping the carrier, said means including a driving-pulley, separable clutch members, a movable abutment normally in position to cause the separation of said clutch members, means actuated by a filled box for displacing the abutment and starting the carrier, pulleys supporting said conveyers, and a driving-belt engaged with the driving-pulley and with belt-pulleys on the shafts of the conveyer-supporting pulleys.

12. A box-filling machine comprising a rotary carrier having box-engaging means, mechanism for rotating the carrier, said mechanism including a clutch member having a cam, a rock-shaft having an abutment-arm normally in the path of said cam and adapted to cooperate with the latter in displacing the clutch member to stop the carrier, a platform arranged to support a box moved by the carrier, connections between the rock-shaft and platform, and a weighted arm attached to the rock-shaft and adapted to normally support the abutment-arm out of the path of the cam and the platform in a raised position.

13. A box-filling machine comprising a rotary carrier having box-engaging means, mechanism for rotating the carrier, said mechanism including a clutch member having a cam and a stop-shoulder, a rock-shaft having

an abutment-arm normally in the path of said
cam and adapted to cooperate with the latter
in displacing the clutch member to stop the
carrier, said rock-shaft having also a stop-dis-
5 placing arm, a platform arranged to support
a box moved by the carrier, connections be-
tween the rock-shaft and platform, a weighted
arm attached to the rock-shaft and adapted
to normally support the abutment-arm out of
10 the path of the cam and the platform in a
raised position, and a pivoted weighted stop-
dog adapted to normally engage the stop-
shoulder on the clutch member, said dog be-

ing arranged to be displaced by the displacing-
arm on the rock-shaft.

In testimony whereof we have affixed our
signatures in presence of two witnesses.

ALBION L. F. MITCHELL.
CHARLES W. AIKEN.

Witnesses to signature of A. L. F. M.:

C. F. BROWN,
E. BATCHELDER.

Witnesses to signature of C. W. A.:

JAS. J. CONOR,
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