June 26, 1923. 1,459,880

E. T. ENRIGHT

BAG OPENING MACHINE

Filed June 10, 1922

Fig. 1.

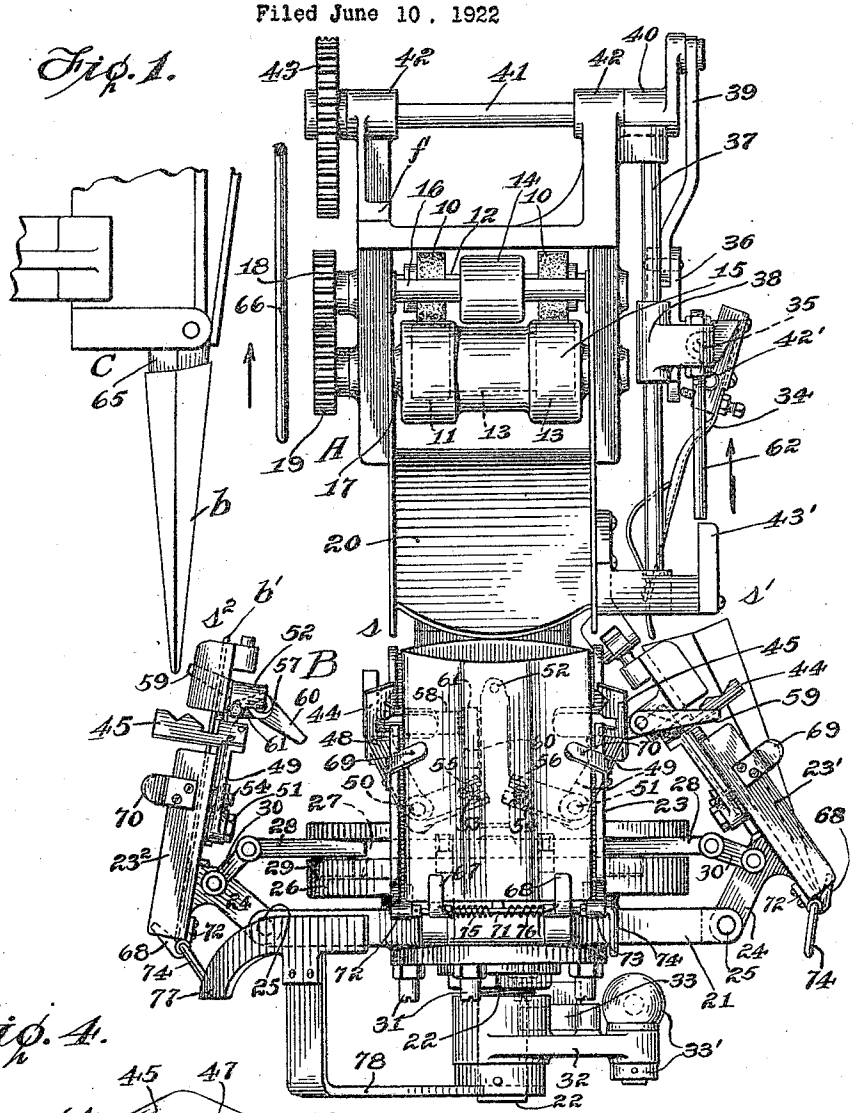


Fig. 4.

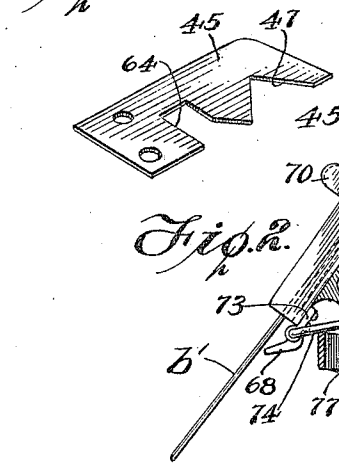
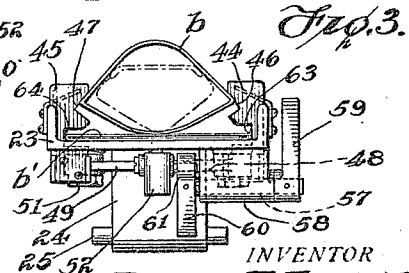


Fig. 2.

Fig. 3.



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BAG-OPENING MACHINE.

Application filed June 10, 1922. Serial No. 567,324.

To all whom it may concern:

Be it known that I, EDWARD T. ENRIGHT, a citizen of the United States, and resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Bag-Opening Machines, of which the following is a specification.

This invention relates to a bag opening machine, and more particularly to a machine for receiving, opening and delivering bags in succession to a bag filling mechanism, and has special reference to the provision of a machine of this nature capable of efficient cooperation with the bag filling mechanism irrespective of improper bag receiving activity of the machine.

The present invention has particular reference to improvements in bag opening machines of the type disclosed in the patent to Henderson and Tietz, No. 1,111,899, of September 29, 1914. As disclosed in the said patent, the bag opening machine comprises a carrier in the form of a turntable provided with a plurality of spaced bag holders movable through bag receiving, opening and delivering stations for receiving bags from a feeding means, for opening the same to be filled with a commodity, such as tobacco, and for delivering the same in opened condition to a bag filling mechanism.

In the operation of bag opening machines of this type it was necessary where unhindered activity of the machine was desired, to so feed the bags to the holders, that each holder when presented at the bag receiving station be supplied without "miss" with a bag, and that only a single bag be so supplied and positioned in the holder. When no bag is fed to the holder none is subsequently delivered therefrom and supplied to the bag filling mechanism, and to prevent the filling mechanism from improperly releasing a charge of a commodity in the absence of a bag, means must be provided for automatically stopping the machine under these conditions. Before resumption of operation of the machine is possible the missing bag must be supplied, this involving an undue loss of time. Recently a bag feeding machine has been devised as described in the copending application of Ritchie and Boykin Ser. No. 467,985, filed May 9, 1921, by means of which the bags are unmistakably fed to the bag holders substantially without "miss," the stopping of the machine due to "miss" in the feeding being thereby prevented. This feeding machine is, moreover, so constructed not only to effect uniform feeding of the bags, but to effect feeding of the bags singly, since multiple feeding of bags is also instrumental in causing the stopping of the machine, as will be explained presently. However, it oft-times occurs that two bags are fed into the holder due to a number of causes, such for example as the adhering or "sticking" together of adjacent bags. When a plurality of bags as, for example, two bags are fed to and are present in the holder, the bag opening mechanism operates improperly, neither bag being fully opened in such condition as to be removable at the delivery station, this resulting in a failure of removal of the bag from the holder and a consequent stopping of the machine. The prime desideratum of the present invention comprehends the provision of a machine in which the bag opening mechanism operates properly even though a plurality of bags are accidentally fed to a holder, and in which the bag opening mechanism cooperates effectively with the bag filling mechanism, no stoppage of the machine taking place in spite of multiple bag feeding activity.

The principal objects of the present invention may be said to include, besides the provision of an improved bag opening machine of the type referred to, the further provision of a machine of this nature in which when a plurality of bags are received by a holder only one of the bags will be operated upon by the bag opening mechanism, the other of the bags being retained in unopened or flat condition so as not to interfere with the opening of the first bag, the mechanism being so constructed as to permit of this function; and the further provision of a machine of this nature in which the unopened or improperly present bag will be expelled or ejected from the holder in the further operation of the machine.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, my invention consists in the elements and their relation one to the other, as here-

inafter particularly described and sought to be defined in the claims, reference being had to the accompanying drawings which show a preferred embodiment of my invention and in which:

Figure 1 is a front elevational view of the bag feeding machine, showing my improvements thereon,

Figure 2 is a fragmentary view of the same, showing the manner in which a foreign or stray bag is expelled from the holder,

Figure 3 is a plan view of a holder showing the manner in which a plurality of bags therein are operated upon, and

Figure 4 is a perspective view of one of the finger gripping elements of my invention constructed to accommodate a plurality of bags present in a holder.

Referring in detail to the drawings, I show a bag feeding mechanism A operative for feeding a plurality of bags successively to a bag opening machine B, the said bag opening machine being adapted for receiving a bag and advancing the same through bag opening and delivering stations, the opened bag being removed from the bag opening mechanism by a bag removing mechanism C which carries the opened bag to a filling station where the same is filled with a commodity, such as tobacco.

The bag feeding mechanism A is substantially the same as that disclosed in the copending application of Ritchie and Boykin above referred to, and comprises in part the spaced friction feed rollers 10 and 11 mounted for rotation on shafts 12 and 13, the latter journalled in the framework f, of the machine, the friction feed rollers receiving bags successively from a magazine, (not shown) and advancing the same to a pair of superposed curling rollers 14 and 15 fixed to shafts 16 and 17 and movable in opposite directions by means of the intermeshing gears 18 and 19 pinned to the said shafts, the curling rollers 14 and 15 functioning for "ironing out" a central longitudinal portion of the bag and for causing the lateral edges of the bag to be curled upwardly from the longitudinal central portion, so that the central part of the bag when received by a holder will lie flat against the rear wall of the holder, this to facilitate subsequent bag opening operation. The bags after being advanced through the curling rollers 14 and 15, fall by gravity on the chute 20 and feed therefrom into a bag holder positioned beneath the chute.

The bag opening machine comprises a carrier preferably in the form of a turntable 21 rotatable about a central post 22 hung from the framework f of the machine, and a plurality of bag holders, such as 23, 23′, and 23^2 pivotally supported on the turntable, the invention including four holders mounted circumferentially about the turntable and movable through a bag receiving station s, a bag opening station s', an inactive station located to the rear of the bag receiving station s, and a bag delivery or removal station s^2.

Each holder, such as 23, is pivotally carried by the turntable 21, a trunnion plate 24 attached to the holder being rockably mounted in suitable bearings such as 25 in the turntable, this mounting permitting the rocking of a holder about the trunnion axis in the rotation of the holder through the various operating stations. The holder is oscillated or rocked from an inclined position such as shown at the station s', where bag opening takes place, to a position less inclined to the vertical, such as shown at the bag removing station s^2, and for the purpose of rocking the holders during the rotation of the carrier or turntable, there is provided a cam plate 26 having a cam groove 27, and cooperating with this groove each holder is provided with an actuating arm 28 having at one end a cam follower 29 movable in the cam groove 27 and pivotally connected at its other end to a link 30 which in turn is pivotally attached to the trunnion plate 24 of the holder. With the provision of this means, it will be apparent that upon rotation of the turntable the cam followers 29 in following the cam groove 27 will cause the oscillation or rocking of the holders as described.

The turntable 21 is moved intermittently so that the holders are positioned successively in the various operating stations, and for accomplishing the intermittent actuation of the turntable 21 the said turntable is provided with a plurality of spaced tooth elements such as the four bolts 31 depending from the turntable 21, and for engaging these tooth elements there is provided an oscillatable arm 32 carrying a pawl element 33, the arm 32 being rotatable about the post 22 and being oscillated by means of a link 33′ to positions for successively engaging the tooth elements 31 to effect the intermittent rotation of the turntable 21 to advance the bags from the receiving station s to the bag opening station s' and from there on to the other operating station.

When a holder such as 23′ and a bag therein is advanced to the station s', a bag opening mechanism is operated for opening the bag to substantially its full capacity, and for retaining the bag in opened condition. For opening the bag there is provided the reciprocating spoon 34 pivotally mounted on an axis 35 on a cross bar 36, the said cross bar being guided by spaced guide rods 37, only one of which appears in the drawings, the cross bar 36 being provided with sleeves or bosses 38 encircling the guide rods and slidable thereon. The spoon 34 is caused to oscillate vertically into and out of co-

operation with the bag holder 23′, and for effecting the oscillating motion there is provided a link 39 pivotally connected at one end to the cross bar 36 and at its other end to a crank arm 40 fixed to a shaft 41 journalled in opposed bearings 42 in the frame *f*, the said shaft being provided with an operating gear 43 meshing with the operating gears of the feeding mechanism, (not shown). When the turntable is positioned with a bag in the holder 23′, the spoon 34 when caused to descend will first engage the inside surface of the rear wall of the bag, and will then enter between the walls of the bag, opening the same to the condition shown at the station *s′*. For the purpose of effecting a full opening of the bag, in addition to the reciprocating motion of the spoon an oscillating motion is imparted thereto about the axis 35, and to the further end of imparting to the bag a final "kick" to open the same to full capacity, the spoon 34 is provided with a cam follower 42′ movable over a cam 43′ attached to the framework of the machine.

To retain the bag in opened condition and prevent its collapsing upon return or upward movement of the spoon 34, means is provided for engaging or gripping the side edges of the bag with the front and rear walls held in spaced or bulged condition. To these ends each of the holders is provided with opposed bag gripping elements 44 and 45 provided with the spaced receiving notches 46 and 47 for receiving the side edges of a bag, such as *b*, to maintain the bag in opened condition as clearly shown in Figs. 1 and 3 of the drawings. The gripping elements 44 and 45 are moved in opposite directions, these elements being moved towards each other when a bag is opened by the spoon 34, and away from each other when the opened bag is positioned at the delivering station s^2 ready for removal from the holder, as will appear hereinafter. For operating the gripping elements 44 and 45 in the desired manner, these elements are attached to the bell crank levers 48 and 49 pivotally mounted on the rear wall of a holder, such as 23, as at 50 and 51, the levers 48 and 49 being caused to oscillate upon operation of a slide bar 52 provided with spaced pins 53 and 54 received by suitable notches or slots, such as 55 and 56, in the bell crank levers 48 and 49. It will be apparent from this construction that upon reciprocation of the slide bar 52, the bell crank levers will be caused to oscillate and the gripping elements or fingers 44 and 45 will be caused to move in opposite directions towards and away from each other.

For reciprocating the slide bar 52, each holder is provided with an operating shaft 57 journalled in a bearing 58 which may be integral with the holder, and keyed to opposite ends of the shaft 57 there are provided the actuating arms 59 and 60. Fixed to the shaft 57 there is also provided a connecting link 61 which is pivotally connected to the slide bar 52, as clearly shown in Figs. 1 and 2 of the drawings. With this construction it will be apparent that upon downward movement of the actuating arm 59, the slide bar 52 will be caused to descend for effecting the movement of the gripper fingers 44 and 45 towards each other to receive the side edges of an opened bag *b*. It will be further apparent that upon downward movement of the reversely arranged actuating lever 60, the reverse operation will take place and the gripping fingers 44 and 45 will be caused to move away from each other to release the bag *b*.

For moving the actuating arm 59 downwardly so as to cause the gripping fingers to engage an opened bag, there is provided an operating rod 62 fixed to the reciprocating boss 38, the rod 62 and the arm 59 being positioned in the same vertical plane, so that upon descent of the opening spoon 34 the rod 62 will engage the arm 59 and move the same to the desired position. Thus when the bag is opened the gripping fingers will be caused to engage the side edges thereof to retain the same in opened condition.

In the operation of this machine, it has been found that when a plurality, such as two bags are accidentally fed to the bag holder 23 and are advanced to the bag openings station *s′*, operation of the bag gripping elements or fingers 44 and 45 causes engagement of the side edges of both bags, and causes an interference with the opening of either bag, with the result that neither bag is properly opened, and with the further result that when such bags are advanced to the bag removing station s^2, neither of the bags is removed, effecting the stopping of the machine and necessitating adjustment of the bags with the consequent loss of time. To obviate this defective operation in the event of multiple bag feeding, my present invention comprehends the provision of mechanism for permitting the proper opening of one of the bags and for retaining such bag in opened condition, the mechanism being constructed so that a second bag improperly present in the holder will be accommodated without interfering with the bag opening activity of a first bag. To these ends the invention includes the provision of the bag engaging elements or fingers 44 and 45 in which in addition to the receiving notches 46 and 47 there is provided a second set of receiving notches such as 63 and 64 arranged in a plane to the rear of the plane of the notches 46 and 47, the distance between the bottoms of the said notches or cut-outs 63 and 64 being greater than the distance between the bottoms of the front set of notches

46 and 47, such that a second bag b' in the holder 23 will be fully accommodated by the notches 63 and 64 when the gripping elements 44 and 45 are caused to move towards each other, the second or stray bag b' thus remaining flat in the holder without interfering with the opening of a bag b in the holder. With the provision of this means, one of the bags is properly opened and therefore in condition to be delivered to the bag filling mechanism, stoppage of the machine as hitherto occurred being thereby obviated.

After a bag is opened the same is delivered to the station s^2, where the bag is removed from the holder by the removing mechanism C, the latter delivering the bag to the bag filling machine. The removing mechanism C comprises a rotatable and reciprocable bag entering member 65 movable into and out of cooperation with a holder such as 23^2. The bag entering member 65 upon descent moves into or enters the bag b and when the side edges of the bag are released, the bag frictionally adheres to the bag entering member, the latter carrying the adhering bag with it upon ascent of the same. For causing the release of the side edges of the bag b, the gripping elements 44 and 45 are moved to their outward positions, and to this end a plunger rod 66 reciprocable with the bag entering member 65 is provided, the said rod being arranged in the vertical plane of the actuating arm 60 heretofore referred to. As shown in Fig. 1 of the drawings, only the opened bag b is removed at the delivery station s^2, the improperly present or stray bag b' remaining in the holder 23^2.

As hereinbefore stated, a further and corelative object of the invention comprehends the provision of means for ejecting or expelling the second or stray bag b' so as to prevent any accumulation of stray bags in the holder. A bag such as b or b' when received by the holder is retained therein by the provision of the spaced bottom keepers 67 and 68 and the side keepers 69 and 70. For causing the expulsion of a stray bag b', the keepers 67 and 68 are pivotally mounted in the holder, these keepers being pinned to a shaft 71 journalled in opposed bearings 72 and 73, the shaft being provided with a laterally projecting actuating arm 74 comprising a cam follower. The keepers 67 are normally retained in the bag retaining position as shown in Fig. 1, springs 75 and 76 normally effecting this function. For expelling the stray bag b', the keepers 67 and 68 are moved to the position shown in Fig. 2 of the drawings, this being accomplished by moving the actuating arm 74, the bag b' in the holder being thereby released and expelled from the holder into a receptacle, (not shown) provided for this purpose. For the purpose of operating the actuating arm 74, there is provided a cam track 77 fixed to an angle piece 78 and pinned to the post 22 of the machine, the said cam track being positioned between the bag delivery station s^2 and the bag receiving station s, so that after an opened bag b is removed from the holder at the bag delivery station s^2, the stray bag b' will be expelled during movement of the holder from the bag delivery station s^2 to the bag receiving station s. In Fig. 2 of the drawings, the cooperative engagement between the actuating arm 74 and the cam track 77 is shown, causing the expulsion or ejection of a stray or foreign bag b'.

The operation of my improved bag opening machine will, in the main, be apparent from the above detailed description thereof. It will be further apparent that in the event of multiple feeding of bags to a bag holder, the plurality of bags in the holder will be suitably operated upon by the bag opening mechanism for effecting the full opening of one of the bags and for maintaining the other bag in the "flat," the opened bags being successfully delivered to the bag filling machine with the consequent elimination of unnecessary stopping of the machine, the improperly present bag in the holder being expelled or ejected in the further operation of the machine. By the provision of my invention, it has been found that the bag opening machine will operate substantially without being stopped from any trouble from the feeding source, an efficient cooperation between the bag opening machine and the bag feeding machine being thereby obtained.

While I have shown my device in the preferred form, it will be obvious that many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention, defined in the following claims.

I claim:

1. In a bag opening machine, a bag holder, provisions for opening a bag therein including mechanism operative for gripping the side edges of the bag for maintaining the same open, and means for permitting a second bag present in the holder to lie flat therein upon operation of the said mechanism, whereby the presence of the second bag will not interfere with the opening activity of the first bag.

2. In a bag opening machine, a bag holder, provisions for opening a bag therein, mechanism for gripping the side edges of the bag for maintaining the same in open condition, the said mechanism including means for permitting a second bag present in the holder to remain in flat condition therein upon operation of the said mechanism, whereby the presence of the second bag will not interfere with the opening activity of the first bag.

3. In a bag opening machine, a bag holder, provisions for opening a bag therein, mechanism for gripping the side edges of the bag for maintaining the same in open condition, the said mechanism comprising opposed gripper fingers having receiving notches lying in a forward plane active for receiving the side edges of a front bag when opened, and having receiving notches lying in a rearward plane active for receiving the side portions of a rear bag with the latter retained in flat condition.

4. In a bag opening machine, a bag holder, gripper fingers mounted thereon and movable in opposite directions for engaging and releasing the side edges of a bag, the gripper fingers being provided with sets of opposed notches, the distance between the bottoms of one set being greater than the distance between the bottoms of the other set, whereby upon movement of the gripper fingers towards each other one set of notches will receive an opened bag to maintain the same in open condition, and the other set of notches will receive a bag in flat condition.

5. In a bag opening machine, a turntable provided with a plurality of spaced bag holders each movable through a bag receiving station, a bag opening station, and a bag delivery station, provisions at the said bag opening station for opening a bag in the holder, mechanism operative for gripping the side edges of the bag for maintaining the same open, and means for permitting a second bag present in the holder to lie flat therein upon operation of the said mechanism, whereby the presence of the second bag will not interfere with the opening activity of the first bag.

6. In a bag opening machine, a turntable provided with a plurality of spaced bag holders each movable through a bag receiving station, a bag opening station, and a bag delivery station, provisions at the said bag opening station for opening a bag in the holder, mechanism operative for gripping the side edges of the bag for maintaining the same open, the said mechanism being constructed to permit a second bag present in the holder to lie flat therein upon operation of the said mechanism, means at the said bag delivery station for removing the opened bag from the holder, and instrumentalities for expelling the second bag from the said holder.

7. In a bag opening machine, a carrier provided with a plurality of bag holders movable through bag receiving, bag opening, and bag delivery stations, provisions for opening the bag in a holder including mechanism operative for gripping the side edges of the bag for maintaining the same open and for permitting a second bag present in the holder to remain in flat condition therein, means at the bag delivery station for removing the opened bag from the holder, and instrumentalities for expelling the second bag from the said holder.

8. In a bag opening machine, a carrier provided with a plurality of bag holders movable through bag receiving, bag opening, and bag delivery stations, provisions for opening the bag in a holder including mechanism operative for gripping the side edges of the bag for maintaining the same open and for permitting a second bag present in the holder to remain in flat condition therein, means at the bag delivery station for removing the opened bag from the holder, and instrumentalities for expelling the second bag from the said holder, the said instrumentalities being operative during movement of the carrier between the bag delivery station and the bag receiving station.

9. In a bag opening machine, a bag holder movable from a bag delivery station to a bag receiving station, and instrumentalities operative in the movement of the bag holder from the bag delivery station to the bag receiving station for expelling a bag improperly present in the holder.

10. In a bag opening machine, a bag holder, means for supporting a bag therein comprising movable keepers arranged at the bottom of the holder normally active for retaining a bag in the holder and movable to gravitationally release a bag for expulsion from the holder.

11. In a bag opening machine, in combination with a bag holder provided with movable keepers arranged at the bottom of the holder normally operative to retain the bag in the holder, of means cooperating with the said keepers for moving the same to a position to gravitationally release a bag in the said holder for expulsion of the same.

12. In a bag opening machine, in combination, a bag holder provided with movable keepers normally operative for maintaining a bag in the holder and means in the path of movement of the said holder for operating the said keepers to move the same to open position to release the bag from the holder.

13. In a bag opening machine, in combination, a bag holder provided with movable keepers normally operative for maintaining a bag in the holder and means in the path of movement of the said holder for operating the said keepers to move the same to open position to release the bag from the holder, the said keepers being provided with an actuating cam follower member and the said means comprising a cam track cooperating with the said member.

14. In a bag opening machine, a turntable provided with a plurality of bag holders movable through a plurality of operating stations including a bag receiving station and a bag delivery or removing station,

the said bag holder including means for normally retaining a bag therein, and instrumentalities located between the bag removing station and the bag receiving station for operating said means to expel a stray bag present in the said holder.

15. In a bag opening machine, in combination with a bag holder provided with provisions normally operative to retain the bag in the holder, of means cooperating with the said provisions for operating the same to expel a bag improperly present in the holder.

16. In a bag opening machine, a carrier provided with a plurality of bag holders movable through bag receiving, bag opening, and bag delivery stations, provisions for opening the bag in a holder, means at the bag delivery station for removing the opened bag from the holder and instrumentalities for expelling a stray bag present in the said holder.

17. In a bag opening machine, a bag holder movable from a bag delivery station to a bag receiving station, means at the bag delivery station for removing an open bag in the holder and instrumentalities for expelling a stray bag present in the holder.

18. In a bag opening machine, a bag holder, provisions for opening a bag therein, mechanism for gripping the side edges of the bag for maintaining the same in open condition, and means operative for permitting a second stray bag to lie flat in the holder.

Signed at Jersey City, in the county of Hudson and State of New Jersey, this 3rd day of June A. D. 1922.

EDWARD T. ENRIGHT.