Jan. 20, 1942. W. E. SHARKEY 2,270,565

DISCARDING APPARATUS FOR BAG FEEDING MECHANISM

Filed June 10, 1938 3 Sheets-Sheet 1

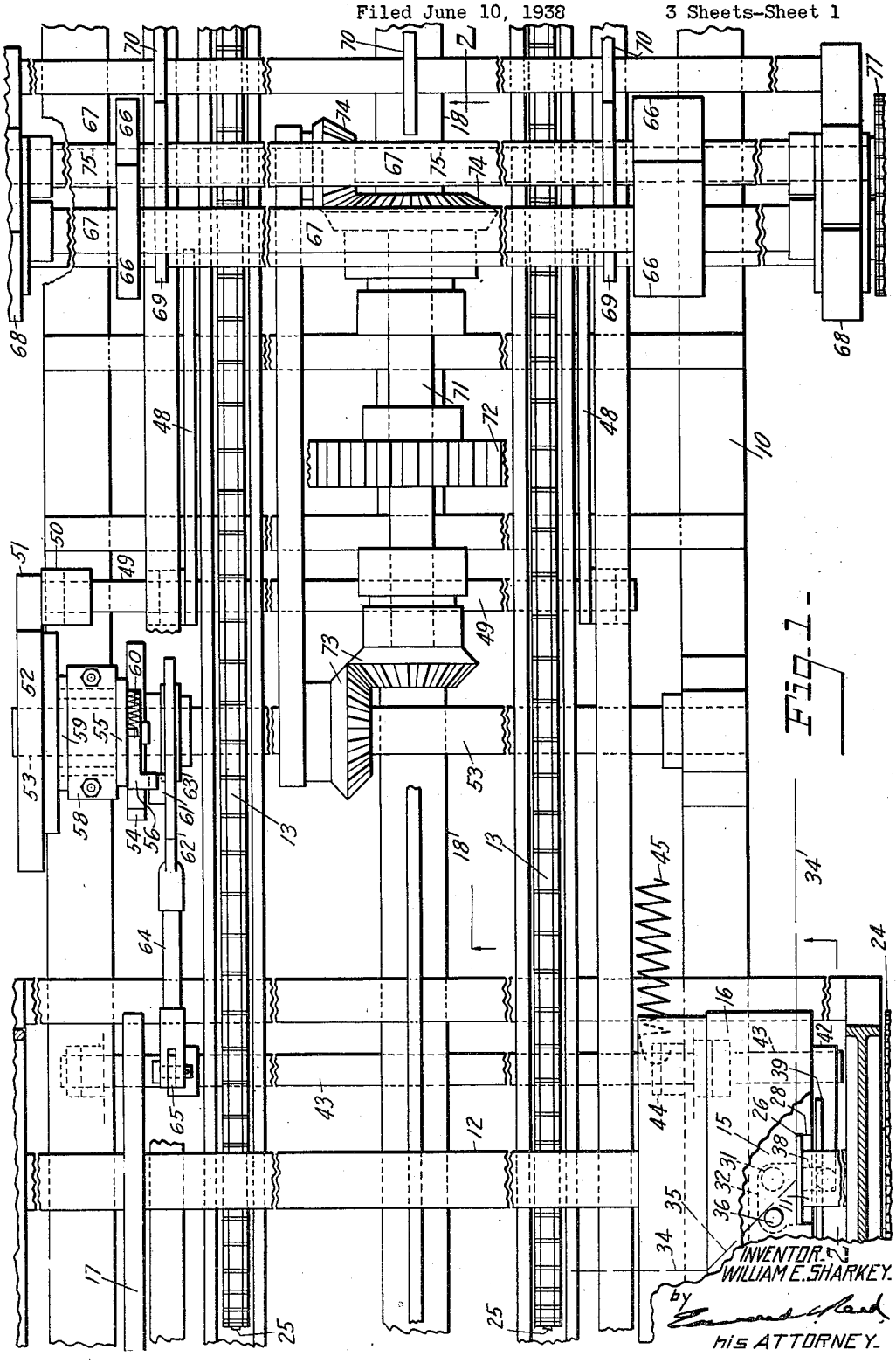


FIG. 1.

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DISCARDING APPARATUS FOR BAG FEEDING MECHANISM

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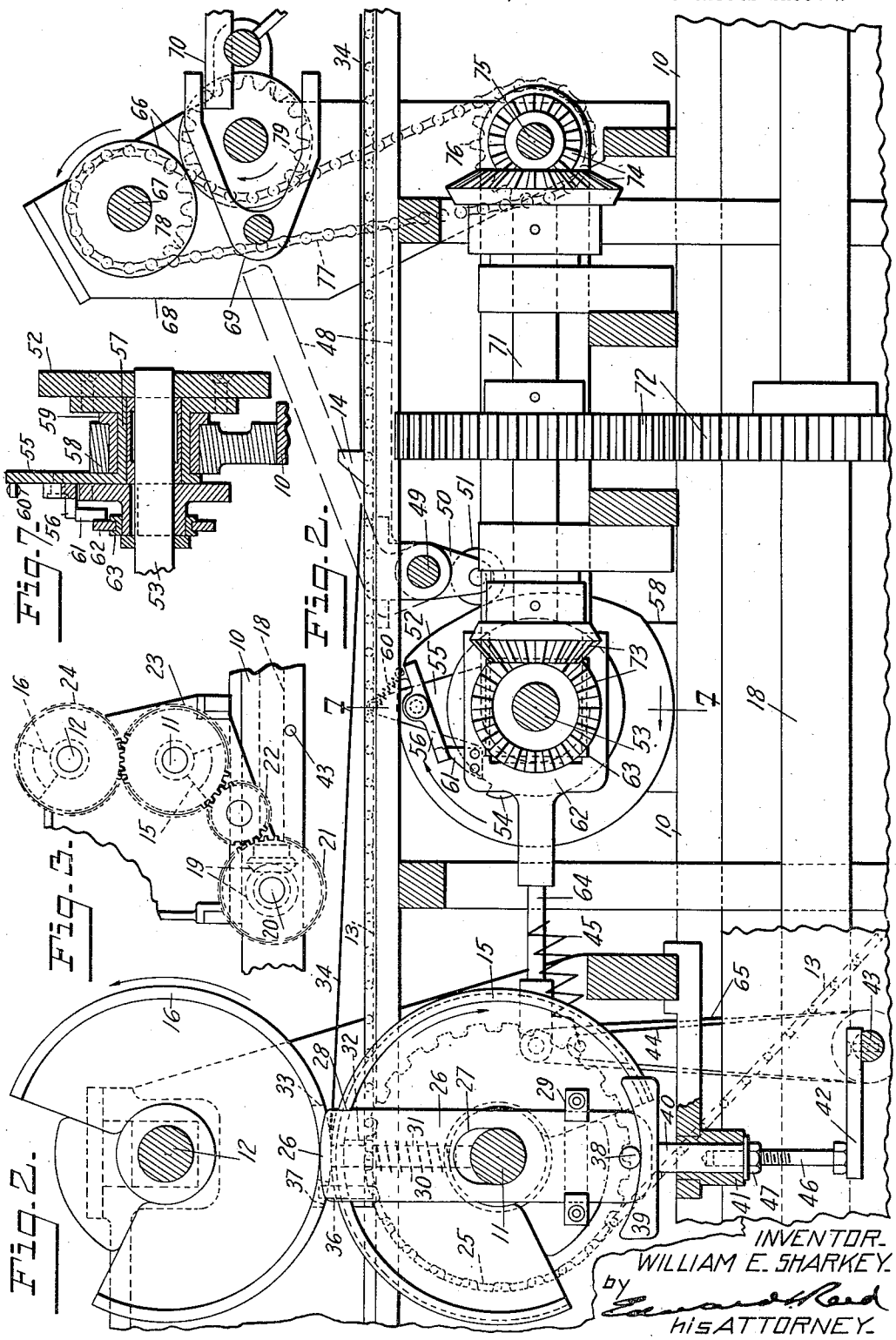


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

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DISCARDING APPARATUS FOR BAG FEEDING MECHANISM

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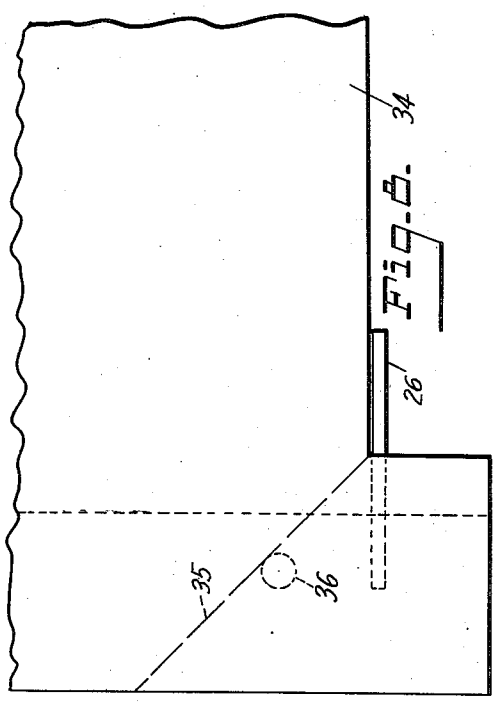


Fig. 8.

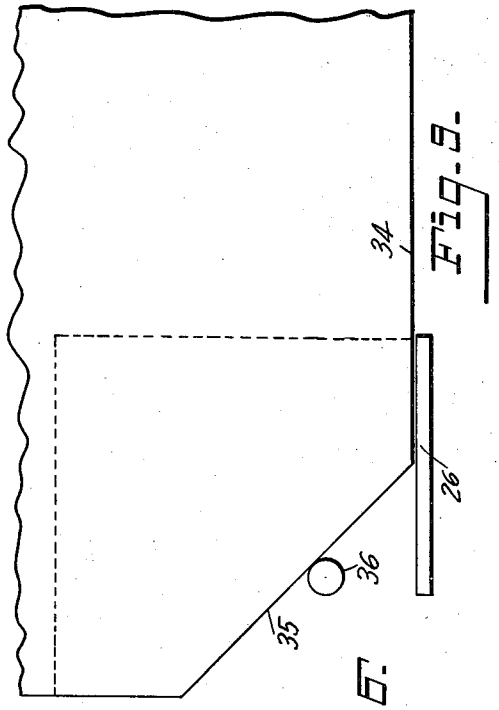


Fig. 9.

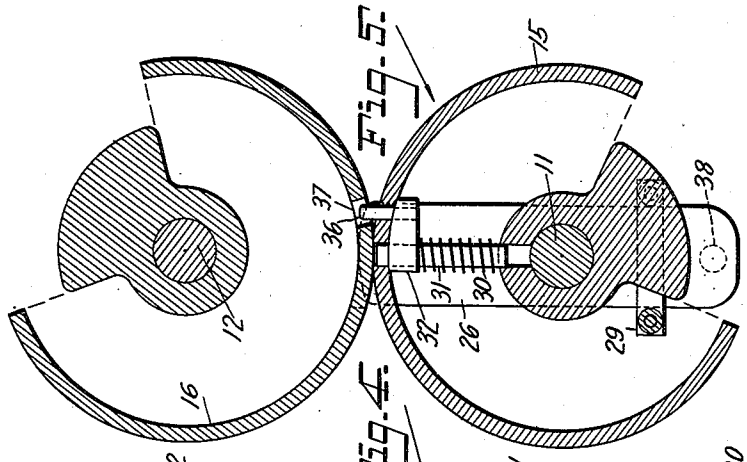


Fig. 5.

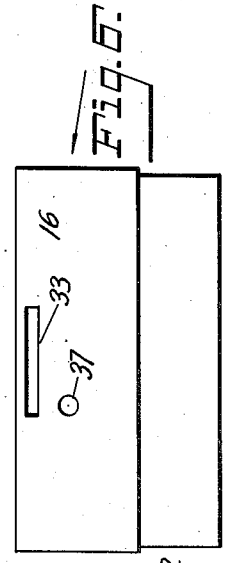


Fig. 6.

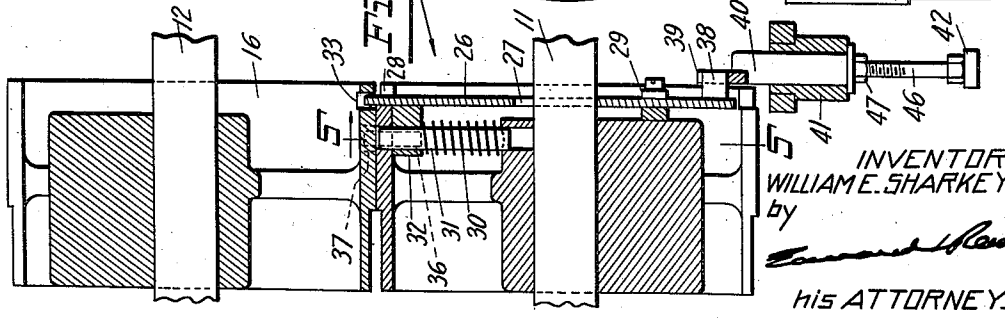


Fig. 4.

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UNITED STATES PATENT OFFICE

2,270,565

DISCARDING APPARATUS FOR BAG FEEDING MECHANISM

William E. Sharkey, Middletown, Ohio, assignor to The Raymond Bag Company, Middletown, Ohio, a corporation of Ohio

Application June 10, 1938, Serial No. 212,964

9 Claims. (Cl. 209—80)

This invention relates to an apparatus for separating improperly formed articles from a series of articles which are being advanced by a feeding mechanism, and more particularly to an apparatus for discarding bags having improperly formed valves as such bags are discharged from a valve forming machine.

A valved bag is usually formed from a tubular blank or bag section which is provided at one corner with a projecting portion which is folded or tucked in between the side walls of the bag to form a valve, the blank being thereafter stitched across both ends to completely close the bag except for the valved filling opening. Machines have been provided for mechanically tucking in the valve extension of the blank to form the valve and to then deliver the blank to the sewing machine. If the valve is improperly formed the finished bag will be defective. If the defect is discovered before the blank reaches the sewing mechanism the blank may sometimes be removed from the conveyor without stopping the machine but if the blank has entered the sewing mechanism the machine must be stopped and the bag removed. Further, a very badly formed valve, or a blank in which the valve extension has not been folded, will often displace or break the sealing tape, cause the sewing thread to break, or otherwise jam the sewing mechanism in such a manner as to cause serious delay in the operation of the machine.

It is one object of the invention to provide means for discarding bag blanks, in which the valves are not properly formed, before the blank reaches the sewing mechanism.

A further object of the invention is to provide means associated with article feeding mechanism to detect an improperly formed article and divert the same from the normal path of said articles.

A further object of the invention is to provide such a feeding mechanism with a detecting device which will be actuated by an improperly formed valve, and with means controlled by said detecting device to remove the blank having such improperly formed valve from the feeding mechanism.

A further object of the invention is to provide such an apparatus which will be simple in construction and positive in operation.

Other objects of the invention may appear as the apparatus is described in detail.

In the accompanying drawings Fig. 1 is a plan view, partly broken away, of a portion of a feeding mechanism for conveying bag blanks from a tucking mechanism to a sewing mechanism; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is a side elevation of a portion of the driving mechanism for the feeding rollers; Fig. 4 is a vertical section taken centrally through the feeding rollers with which the detecting device is associated; Fig. 5 is a section taken on the line 5—5 of Fig. 4; Fig. 6 is a bottom plan view of the upper feeding roller when the latter is in the position shown in Fig. 4; Fig. 7 is a section taken on the line 7—7 of Fig. 2; Fig. 8 is a plan view of a portion of a bag blank prior to the tucking of the valve extension; and Fig. 9 is a similar view showing the valve in its properly tucked position.

In these drawings I have illustrated one embodiment of my invention, which embodiment is especially adapted to be interposed between the valve forming mechanism and the sewing mechanism of the valve tucking machine shown in my co-pending application filed February 18, 1938, Serial No. 191,207. It will be understood, however, that the apparatus may take various forms and may be used in connection with article feeding mechanisms of various kinds, either in association with article forming mechanism or independently thereof.

In the machine of the aforementioned application the bag blank is moved rearwardly and transversely to its length into operative relation to the tucking mechanism and after the valve has been tucked the bag blank is conveyed by suitable feeding mechanism to the sewing machine. The blank with the folded valve does not constitute a finished bag until after its ends have been stitched but for convenience of description the valved blank will be herein referred to as a bag. Inasmuch as the sewing machine itself forms no part of the present invention the same has not been illustrated but I have shown the rear portion of the frame 10 of the sewing machine which, in the present instance, supports a portion of the discarding apparatus and is shown as a continuation of the frame of the tucking machine. The feeding mechanism may be of any suitable character but in the above mentioned machine it comprises two pairs of feeding-out rollers mounted on superposed shafts 11 and 12. These feeding rollers deliver the bag to a conveyor, here shown as comprising two conveyor chains 13 provided with lugs 14 to engage the rear lateral edges of the bags. One pair of feeding rollers, 15 and 16, is arranged at the valve end of the bag and the rollers are of such width that they will overlap the

entire valve structure and firmly crease the folds therein. The other pair of feeding rollers, one of which is shown at 17 in Fig. 1, are arranged near the other end of the bag and may be of narrow width.

The feeding mechanism may be actuated in any suitable manner. In the present instance the feeding rollers are driven by a longitudinal drive shaft 18 which is connected by beveled gears 19 with a transverse shaft 20 (Fig. 3) which carries a gear 21 connected through an idler 22 with a gear 23 on the shaft 11 of the lower feed roller 15 and this gear 23 meshes with a gear 24 on the shaft 12 of the upper feed roller. The rear portions of the conveyor chains are supported on sprocket wheels 25 carried by the lower shaft 11 and may be driven thereby or, if the conveyor chains are to be driven at a speed different from the speed of the feeding rollers, the sprocket wheels may be loose on the shaft and the chains driven by other means.

Associated with this feeding mechanism is a detecting device which is of such a character that it will not be affected by properly formed bag valves but will engage and be actuated by an improperly formed bag valve. Arranged beyond the detector and adjacent to the conveyor chains is a diverting device for removing a defective bag from the conveyor. This diverting device is normally inoperative and is rendered operative by means controlled by the detecting device, the arrangement and timing of the parts being such that the diverting device will act on the same bag which has actuated the detecting device.

Preferably the detecting device is associated with the feeding rollers 15 and 16 and, in the present construction, it comprises a member connected with the shaft 11 for rotation therewith and for movement transversely to that shaft. This member has a part which is yieldably held in such a position that as the shaft rotates this part of the detecting member will move across an edge of a properly formed valve without contacting the latter but will engage an improperly formed valve and be moved inwardly thereby. In the preferred construction this detecting member is in the form of a narrow plate or flat bar 26 which is provided with a slot 27 through which the shaft 11 extends. This bar 26 is mounted on the shaft adjacent to the end of the lower feed roller and, in the present instance, is located within that roller, which is provided with an opening or notch 28 through which the end portion of the bar extends and which cooperates with guides 29 carried by the roller on the opposite side of the shaft 11 to slidably support and guide the bar. The bar is held normally in its outermost or projecting position by means of a spring 30 which is here shown as coiled about a rod 31 rigidly mounted on the roller and is confined between the hub of the roller and a lug 32 rigidly secured to the bar 26. When the bar is in its fully projected position, with the lug 32 in engagement with the wall of the roller, the end of the bar will extend across the edge of a bag which is passing between the rollers. As here shown, the upper roller 16 is provided with an opening or peripheral slot 33 into which the end of the bar projects. It will be understood of course that the rollers rotate in opposite directions in unison and are so timed that the detector bar will be brought into line with the opening 33 in the upper roller while the valve is passing between the rollers, the valve being at the rear edge of the bag. If the valve is properly formed the detector bar will not engage any part thereof but will enter the opening in the upper roller. If the valve is improperly formed so that a portion of the valve projects beyond the adjacent end of the bag it will be engaged by the end of the detector bar and the latter will be forced inwardly against the action of the spring 30. The position of the detector bar with relation to the end of the bag, 34, is shown in Fig. 9. Ordinarily if the valve is improperly formed some part thereof will project beyond that edge of the bag which is adjacent to the detector bar but in some cases an improper folding of the valve might result in an improper placing of the diagonal fold 35 without causing any part of the valve to extend beyond the end of the bag. In order to detect such an improperly folded valve the detector bar is provided with a second part arranged to move across the diagonal edge 35 of the bag if the valve is properly folded but if this diagonal edge is misplaced this second part of the detector will engage the bag and the detector bar will be depressed. In the present instance this second part of the detector is in the form of a pin 36 rigidly connected with the detector bar and here shown as mounted in the lug 32. The upper feed roller 16 is provided with an opening 37 into which the pin 36 extends when the passing valve is properly formed.

Associated with the detecting device is a controlling device to be actuated by the detecting device and this controlling device in the present instance is designed to transmit movement from the detecting device to the means for initiating the operation of the bag diverting device. In the construction shown the detecting member 26 is provided, near that end thereof opposite its projecting end, with a laterally extending stud 38 which projects beyond the end of the roller 15. Mounted adjacent the path of this stud, as the roller rotates, is a vertically movable member preferably in the form of a shoe 39 having a curved upper surface and secured to a shank 40 which is slidably mounted in a bearing 41 on the fixed part of the machine. The curved or contact surface of the shoe 39 is so located with relation to the detecting member that it will not be operatively engaged by the stud 38 when the detecting member is in its normal position but when the detecting member has been actuated, by contact with a defective valve, the pin will engage the shoe and during the continued rotation of the detecting member will force the same downwardly. In the arrangement shown the shank 40 acts on a rock arm 42 secured to a shaft 43 to which is secured a second rock arm 44, the latter arm being connected to one end of a tension spring 45, the other end of which is secured to a fixed part of the apparatus. This spring normally holds the shaft 43 in such a position that the arm 42 will support the shoe 39 in its normal position but the downward movement of the shoe will rock the shaft against the tension of the spring 45. The connection between the rock arm 42 and the shank is preferably adjustable and, as here shown, a screw 46 is threaded into the shank 40 and contacts with the arm 42, a lock nut 47 being provided to retain the screw in its adjusted position.

The bag diverting device may take various forms and, in the present arrangement it comprises two arms 48 rigidly secured at their rear ends to a transverse shaft 49 and extending for-

wardly therefrom substantially parallel with the conveyor chains 13. When in their normal or lowered positions these arms lie just below the path through which the bags are moved by the conveyor but when tilted about the axis of the shaft 49 they will elevate the forward portion of a bag and divert the same from the conveyor 13 to cause the bag to be delivered to a separate point of discharge. Also secured to the shaft 49 and extending downwardly therefrom is a rock arm 50 on which is mounted a roller 51. Suitable means are provided for actuating the rock arm 50 to impart operative movement to the diverting arms 48 and this means, preferably, is normally inoperative. In the construction illustrated a cam 52 is rotatably mounted on a transverse shaft 53 and is held normally against rotation with that shaft but is adapted to be operatively connected therewith by means under the control of the detecting device to cause the cam to rotate and actuate the diverting arms 48 when a defective bag passes the feeding rollers. Rigidly secured to the shaft 53 is a driving member, here shown as a one-tooth ratchet wheel 54, which rotates constantly with that shaft. Rigidly connected with the cam 52 is an arm 55 on which is mounted a pawl 56 adapted to cooperate with the tooth of the one-tooth ratchet wheel. In the arrangement shown this arm is provided with a hub portion 57 which is rigidly secured to the cam. This hub portion is mounted in a bearing 58 on the main frame and the shaft 53 is rotatably mounted within the hub 57. A bushing 59 of friction material is preferably interposed between the outer surface of the hub 57 and the bearing 58 to normally prevent the arm and the cam from rotating with the shaft but to permit such rotation when the pawl 56 is engaged by the driven ratchet wheel. A spring 60 connected at one end with the pawl and at its other end with the arm 55 tends to move the nose of the pawl into operative relation to the ratchet wheel or driving member. The nose or operative end of the pawl comprises a transverse finger which extends laterally beyond the ratchet wheel and is normally engaged by a controlling member 61 which holds the same in an inoperative position with relation to the tooth of the ratchet wheel. This controlling member 61 is here shown as supported by a yoke 62 which is slidably mounted on a bearing block 63 rotatably mounted on the hub of the ratchet wheel. This yoke is connected by a rod 64 with an arm 65 rigidly secured to the shaft 43, which shaft is actuated by the detecting device. Thus when the detecting device is actuated by contact with an improperly formed valve the shaft 43 will be rocked about its axis against the action of the spring 45 and the controlling member 61 moved out of engagement with the pawl 56, thereby permitting the pawl to be moved by the spring 60 into the path of the tooth of the ratchet wheel. The rotation of the ratchet wheel will cause the tooth to engage the nose of the pawl and thereby impart rotation to the arm 55 and to the cam, and the cam will impart operative movement to the diverting arms 48. The parts are so located and their movements so timed that when the valve of a bag is between the feeding rollers 15 and 16 the forward edge of that bag will lie above the diverting arms 48 and as the bag is moved beyond the feeding rollers by the conveyor it will be moved upwardly over the arms 48. At the time the detecting device operates the rear edge of a preceding bag will usually be in a position above the forward ends of the arms 48 but the interval between the movement of the detecting member and the time that the cam 52 actuates the arms 48 is such that this preceding bag will have been moved clear of the arms so that it will not be affected thereby. As the cam and arm approach the end of a single rotation the cam will release the diverting arms and permit them to return by gravity to their normal position, and the pawl will engage the controlling member 61, which will have been returned to its normal position by the spring 45, and will be moved thereby out of engagement with the tooth of the ratchet wheel, thus interrupting the rotation of the cam.

The bag which is thus removed from the conveyor may be disposed of in any suitable manner but preferably it is diverted to a supplemental feeding device, here shown as comprising a pair of feeding rollers 66 carried by shafts 67 mounted in a supplemental frame 68 which projects above the frame 10. These rollers are located just beyond the ends of the diverting arms when the latter are in their elevated positions and a guide 69 directs the forward edge of the bag between these rollers. The rollers discharge the bag onto a suitable support arranged beyond the same and here shown as a table 70.

The shaft 53 and the supplemental feeding device may be driven from any suitable source of power. In the construction here shown the longitudinal shaft 71 is mounted above the main driving shaft 18 and connected thereto by spur gears 72. At its rear end this shaft 71 is connected by beveled gears 73 with the shaft 53. At its forward end the shaft 71 is connected by beveled gears 74 with a transverse shaft 75. Secured to the shaft 75 is a sprocket wheel 76 and this sprocket wheel is connected by a sprocket chain 77 with a sprocket wheel 78 on the shaft 67 of the upper feed roller 66 and the upwardly moving stretch of this sprocket chain also engages a sprocket wheel 79 on the shaft of the lower feed roller so that both feed rollers are positively driven in opposite directions.

While I have shown and described one embodiment of my invention I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

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

1. In a mechanism of the character described, means for feeding valved bags in a fixed path, a detector rotatably mounted at one side of said path and yieldable transversely to its axis of rotation, means for rotating said detector in timed relation to said feeding means to move a part thereof across the edge of a properly formed valve on a bag which is being advanced by said feeding means and to cause said part to engage a projecting portion of an improperly formed valve on such a bag and thereby actuate said detector, a normally inoperative device arranged beyond said detector and adapted to engage a bag which is being advanced by said feeding means and divert said bag from said fixed path, and means for initiating the operation of said diverting device including a controlling member movably mounted on a stationary support adjacent to said detector and so located with relation to the path of rotation of said detector that it will be engaged and actuated thereby when said detector has been actuated by the engagement of

said part thereof with an improperly formed valve.

2. In a mechanism of the character described, means for feeding valved bags in a fixed path including a pair of feed rollers having tangential contact with said bags, a detector connected with one of said rollers for rotation therewith and having a yieldable part arranged to be moved across the edge of a properly formed valve which is between said rollers and to engage and be actuated by an improperly formed valve which is between said rollers, said detector also having a part connected with said yieldable part for movement thereby when said yieldable part is actuated by an improperly formed valve, a normally inoperative device arranged beyond said detector and adapted to engage a bag moving in said path and divert the same from said path, and mechanism for initiating the operation of said diverting device including a member movably mounted on a stationary support and so arranged with relation to the path of rotation of said detector that it will be engaged and actuated by the last mentioned part of said detector while said yieldable part of said detector is in engagement with an improperly formed valve.

3. In a detecting device for a valved bag feeding mechanism, shafts extending transversely to the path of said bags above and below the same, cooperating rollers carried by said shafts, an elongate member slidably mounted on one of said rollers for radial movement with relation thereto and for rotation therewith and having a slot through which the shaft of said roller extends, a spring acting on said member to normally project the end thereof beyond the periphery of said roller, said member being so arranged that said end thereof will pass the edge of a properly formed valve which is between said rollers but will engage and be moved inwardly by an improperly formed valve which is between said rollers, said member having near the other end thereof an actuating part, and a movable device arranged to be engaged and actuated by said actuating part when the first mentioned end of said elongate member is moved inwardly.

4. In combination with the feeding mechanism of a machine for forming a valve in a bag, said feeding mechanism including feeding out rollers and a conveyor to move the bags beyond said rollers, a detecting device connected with one of said rollers and arranged to engage and be actuated by an improperly formed valve passing between said rollers, a pivoted device arranged beneath the path of the bags on said conveyor, a cam for moving said pivoted device about its axis to lift the bag from said conveyor, a toothed member, means for rotating said toothed member, a pawl connected with said cam, a pawl controlling member, means for normally retaining said pawl controlling member in a position to hold said pawl out of engagement with said toothed member, and means controlled by said detecting device to shift said pawl controlling member and move said pawl into operative relation to said toothed member.

5. In combination with the feeding mechanism of a machine for forming a valve in a bag, said feeding mechanism including feeding out rollers and a conveyor to move the bags beyond said rollers, a detecting device connected with one of said rollers and arranged to engage and be actuated by an improperly formed valve passing between said rollers, a pivoted device arranged beneath the path of the bags on said conveyor, a normally stationary member for moving said pivoted device about its axis to lift a bag from said conveyor, a constantly rotating driving member, a movable member to connect said driving member with said normally stationary member, a controlling member arranged normally in a position to render said connecting member inoperative, a device arranged to be actuated by said detecting device and operatively connected with said controlling member to shift the latter and release said connecting member, and means for actuating the released connecting member to establish an operative connection between said driving member and said stationary member.

6. In combination with the feeding mechanism of a machine for forming a valve in a bag, said feeding mechanism including feeding out rollers and a conveyor to move the bags beyond said rollers, a detecting device connected with one of said rollers and arranged to engage and be actuated by an improperly formed valve passing between said rollers, a pivoted device arranged beneath the path of the bags on said conveyor, a normally stationary member for moving said pivoted device about its axis to lift a bag from said conveyor, a constantly rotating driving member having a single tooth, a pawl connected with said stationary member, a spring tending to move said pawl into the path of the tooth of said driving member, a controlling member, spring means for retaining said controlling member in a position to hold said pawl out of the path of said tooth, means controlled by said detecting member to move said controlling member against the action of said spring means and thereby release said pawl for movement into the path of said tooth.

7. In a machine of the character described, feeding rollers, an endless conveyor to receive articles from said rollers and deliver the same to a normal point of discharge, a device movably supported beneath the path of an article on said conveyor and operable to divert an article from said conveyor into a path leading to a different point of discharge, a continuously operating actuating device normally disconnected from said diverting device, means for operatively connecting said actuating device with said diverting device including a member supported independently of and adjacent to one of said rollers, a detecting device connected with said roller for rotation therewith and for movement with relation thereto, means for yieldably supporting said detecting device in a position in which it will be engaged and actuated by an improperly formed article passing between said rollers but will not be actuated by a properly formed article, said detecting device having a part arranged to operatively engage said member of said connecting means when said detecting device is actuated by an improperly formed article.

8. In a mechanism of the character described, means for feeding valved bags in a fixed path including a pair of feed rollers having tangential contact with said bags, a yieldable detector rotatably mounted adjacent one end of one of said rollers and just beyond the valved edge of a bag moving in said path, means for rotating said detector in timed relation to said feeding means to move a part thereof across the edge of a properly formed valve and to cause the same to engage and to be actuated by a projecting portion of an improperly formed valve while said valve is gripped by said rollers, the valve engaging edge

of said detector being of a length substantially equal to the length of the edge of said valve, a normally inoperative device beyond said detector to divert bags from said fixed path, and means to initiate the operation of said diverting device including a movable member so located with relation to the path of rotation of said detector that it will be engaged and actuated by said detector when the latter is actuated by an improperly formed valve.

9. A feeding-out device for a bag valve tucking machine comprising driven rollers engaging the bag and feeding it with the valved edge in a given line tangential to said rollers, driving mechanism for said rollers, a detector on one of said rollers comprising a movable radially extending spring pressed finger located in a plane just beyond the path of the valved edge of the bag, a recess in the other of said rollers to receive said finger normally, whereby the presence of a projection from the valved edge of the bag will prevent the finger entering said recess and thereby actuate the finger to cause it to retract from its normal spring extended position, a conveyor arranged to receive the bags from the rollers, a diverting device for diverting a bag from the conveyor, normally inoperative means for actuating said diverting device, and means for operatively connecting said actuating means with said driving mechanism including a movable member arranged to be engaged and actuated by said finger upon each movement of said finger by a defective valve, said detector finger and said recess having a length peripherally of the rollers which is at least equal to the length of the tucked in valve forming portion of said bag edge.

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