March 14, 1933. W. E. SHARKEY 1,901,062

COUNTING AND BUNCHING DEVICE

Filed Nov. 24, 1930 3 Sheets-Sheet 1

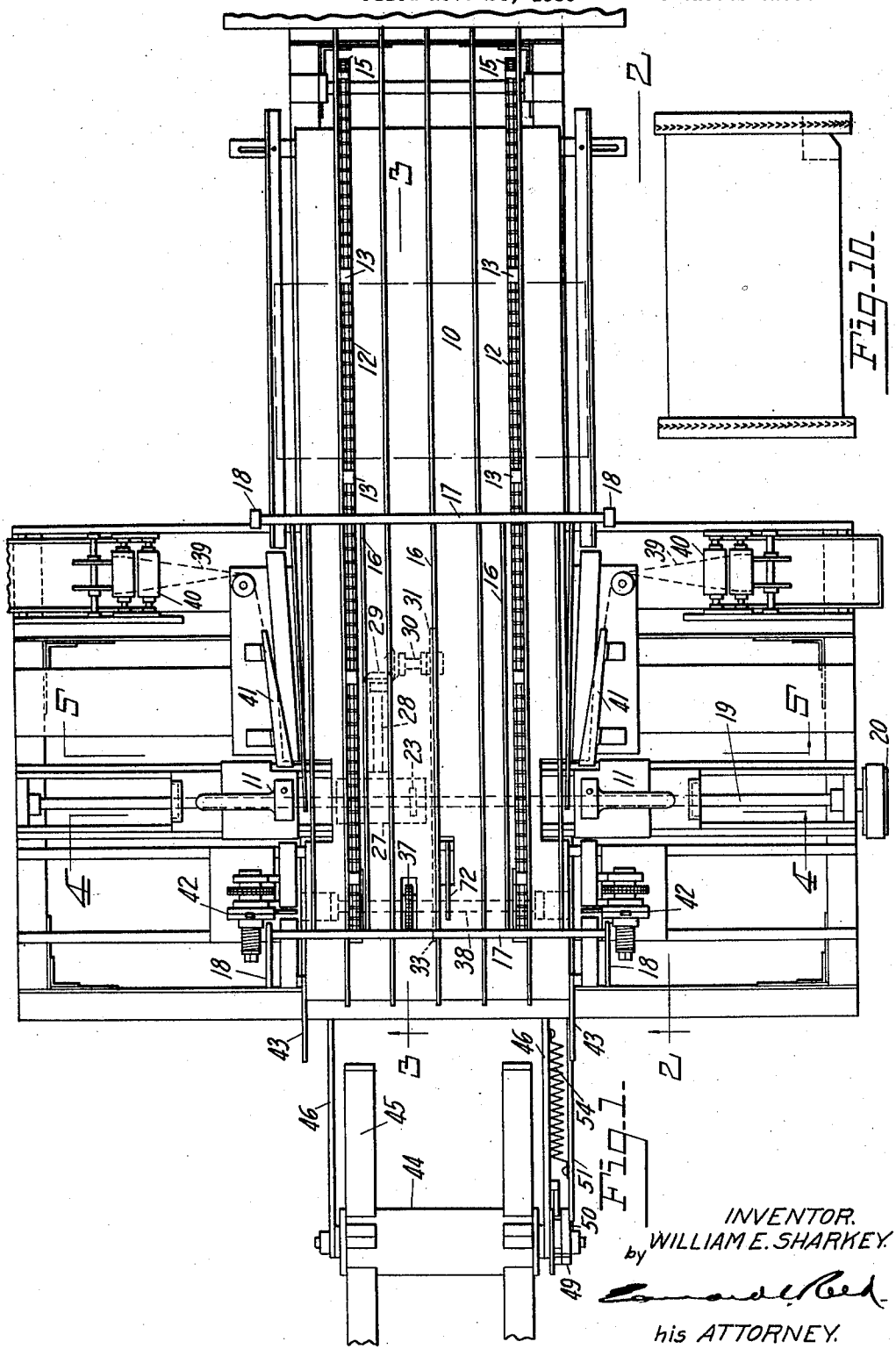


Fig. 10.

Fig. 1.

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COUNTING AND BUNCHING DEVICE

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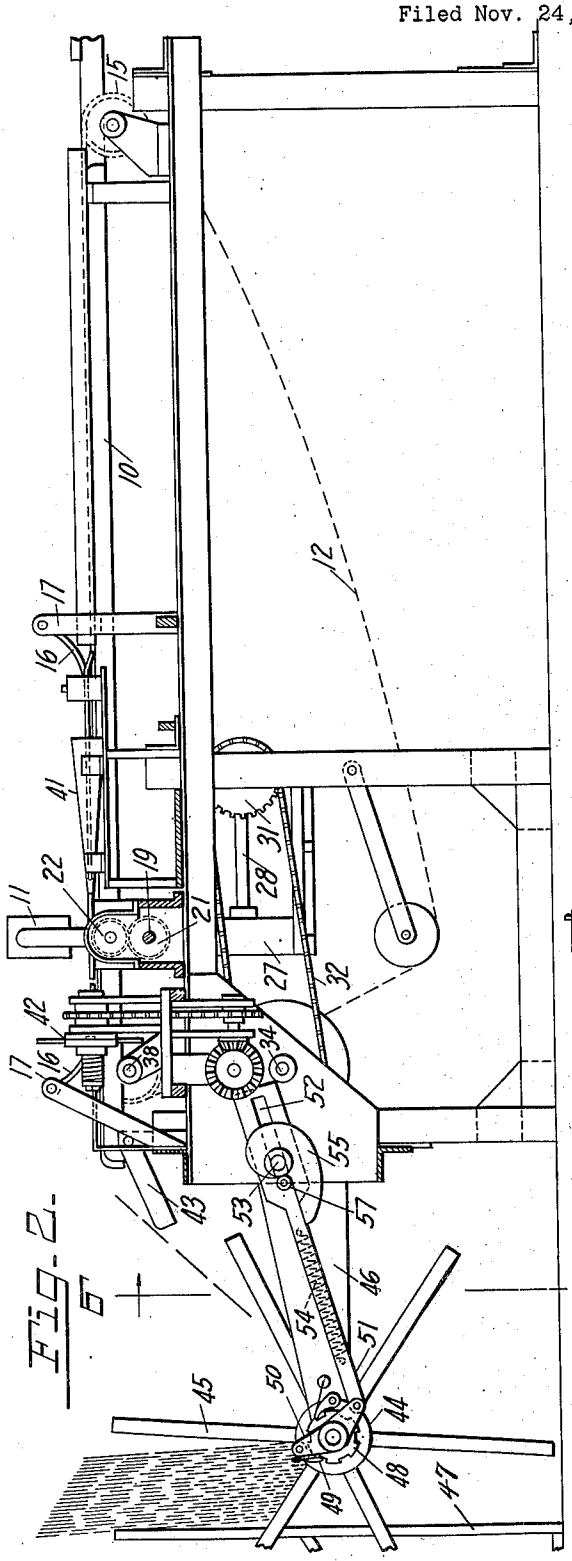


FIG. 2.

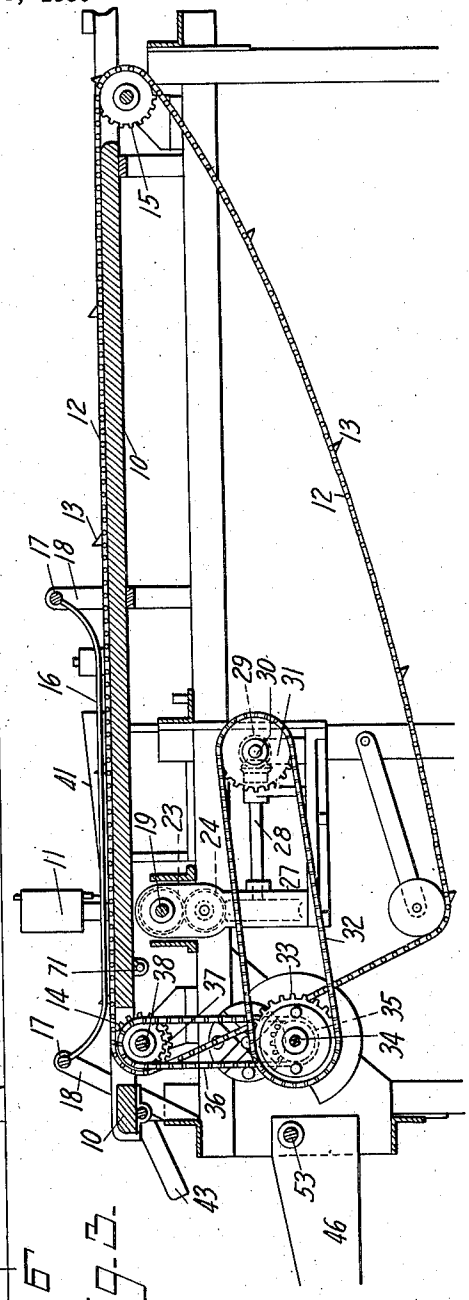


FIG. 3.

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COUNTING AND BUNCHING DEVICE

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Fig. 4.

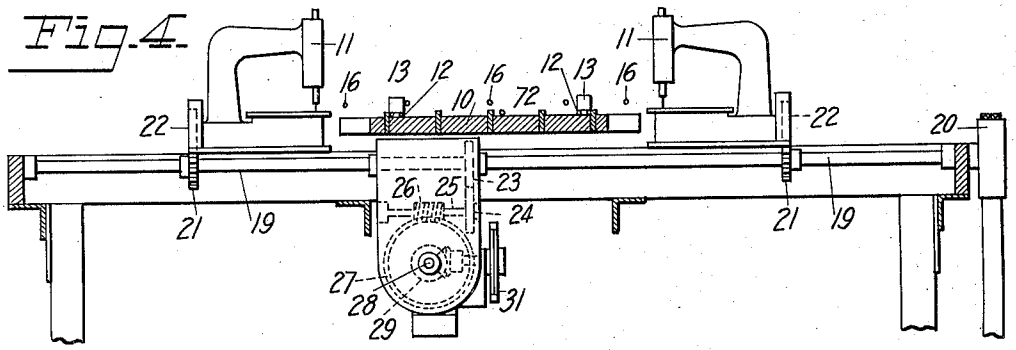


Fig. 5.

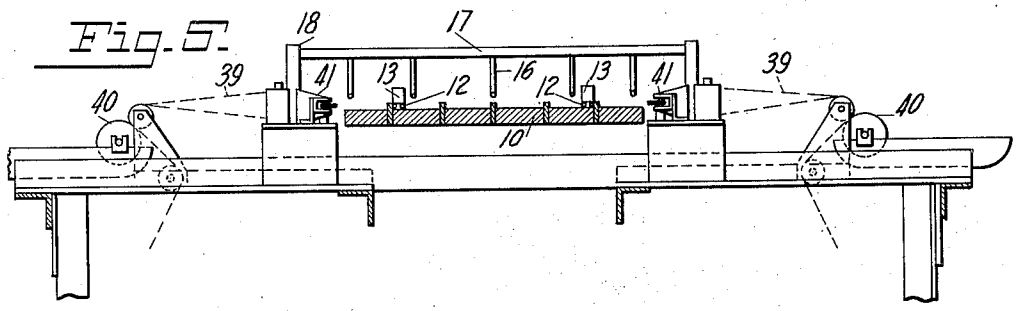
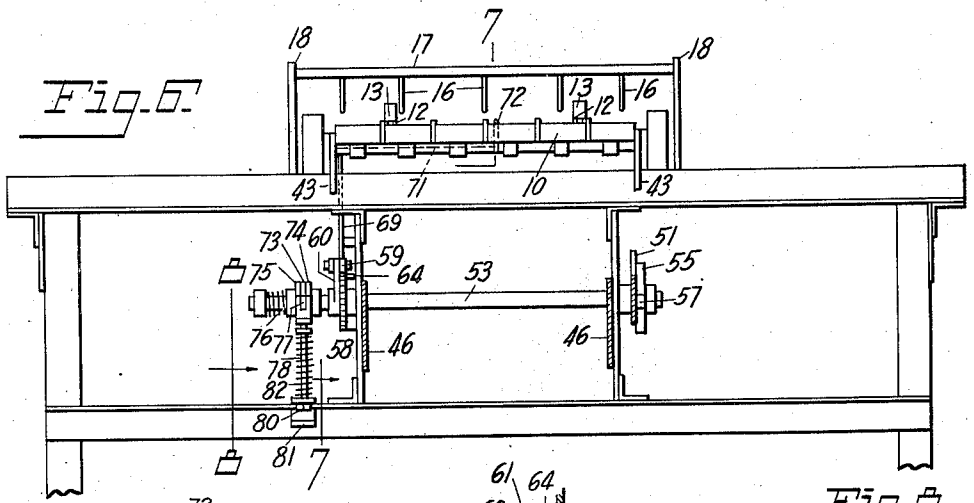


Fig. 6.



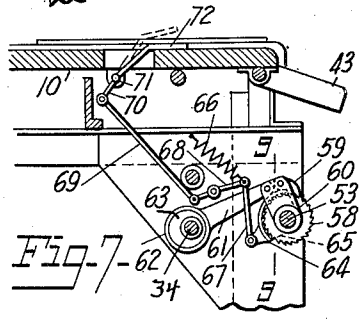


Fig. 7.

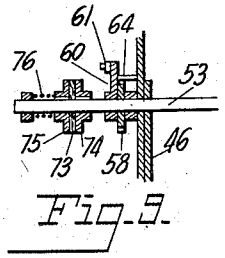
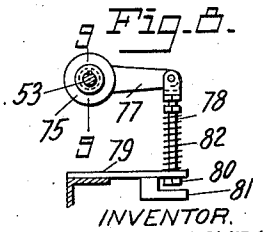


Fig. 8.



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Patented Mar. 14, 1933 1,901,062

UNITED STATES PATENT OFFICE

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COUNTING AND BUNCHING DEVICE

Application filed November 24, 1930. Serial No. 497,834.

This invention relates to a counting and bunching device and is designed more particularly for use in connection with bag sewing machines.

One object of the invention is to provide a device which will operate automatically to cause the bags, or other articles, delivered from the machine to be accumulated in bunches and each bunch removed when a predetermined number of bags have been delivered thereto.

A further object of the invention is to provide such a device which will deliver to each bunch the correct number of bags irrespective of whether or not the bags are delivered uniformly to the sewing machine.

A further object of the invention is to provide such a device which will be simple in its construction and operation and which may be applied to sewing machines as now designed without substantial modification thereof.

Other objects of the invention will appear as the device is described in detail.

In the accompanying drawings Fig. 1 is a plan view of a bag sewing machine showing my invention applied thereto; Fig. 2 is a side elevation of such a machine; Fig. 3 is a longitudinal section taken on the line 3—3 of Fig. 1; Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1; Fig. 5 is a section taken on the line 5—5 of Fig. 1; Fig. 6 is a section taken on the line 6—6 of Fig. 2; Fig. 7 is a detail view of the bag controlled means for controlling the operation of the counting device; Fig. 8 is a side elevation of the device for preventing overthrow; Fig. 9 is a section view of the device of Fig. 8; and Fig. 10 is a plan view of one of the bags.

In these drawings I have illustrated one embodiment of my invention and have shown the same as applied to a bag sewing machine of a known type. It will be understood, however, that this particular embodiment has been chosen for the purpose of illustration only and that the invention may take various forms and may be used in connection with machines and articles of various kinds.

In the manufacture of paper bags, of the type to which the present machine relates, a web, or webs, of paper is folded into tubular form, cut in bag length sections, the longitudinal edges of the web pasted together, a valve formed at one end of the bag, and the bag then sewed across both ends to close the same, with the exception of the valve. Usually a binding strip is placed about each end of the bag section and stitched to the same at the same time that the end of the bag section is sewed. The sewing machine here illustrated is adapted to simultaneously sew both ends of a tubular bag section and it comprises a table 10 having mounted at each side thereof a sewing head 11, these sewing heads being spaced apart such a distance that they will act upon the respective ends of the bag sections. The bags are delivered to the sewing heads by a suitable conveyor which is here shown as comprising two endless conveyor chains 12 provided at equally spaced points with projections or lugs 13 to engage the bags. These lugs are spaced apart a distance slightly greater than the width of the bag so that there will be a narrow space between adjacent bags as they are advanced to the sewing heads. The conveyor chains pass about sprocket wheels 14 and 15 arranged at the respective ends of the table and the sprocket wheels 14 at the delivery end of the table are positively driven, as hereinafter described, to drive the conveyor. The bags are held firmly against the table as they are moved past the sewing heads by pressure bars 16, the ends of which are curved upwardly and secured to transverse rods 17 carried by standards 18. A main driving shaft 19 extends transversely to the table and may be driven in any suitable manner, as by a belt pulley 20. Gears 21 secured to the shaft 19 mesh with the driving gears 22 of the respective sewing machine heads. Intermediate the gears 21 a gear 23 is rigidly secured to the shaft 19 and meshes with a gear 24 on a short shaft 25 to which is secured a worm 26. The worm 26 meshes with a worm wheel 27, secured to a rearwardly extending shaft 28, the rear end of which is connected by beveled gearing 29 to a shaft 30 which carries a sprocket wheel 31. The sprocket wheel 31 is connected by a chain 32 with a sprocket wheel 33 secured to a trans-

verse shaft 34 arranged near the discharge end of the machine. The sprocket wheel 35 on the shaft 34 is connected by a chain 36 with a sprocket wheel 37 on the shaft 38 on which are mounted the driving sprockets 14 for the conveyor chains.

As the bags are fed forwardly a binding strip is folded about the ends thereof before they are delivered to the sewing heads. This binding strip is in the form of a continuous web 39 which is carried about a pasting device 40 which applies paste to one side thereof and is then carried through a folding device 41 which folds the same longitudinally with the pasted side inward and applies the folded strip about the adjacent ends of the bag, the bag with the binding strips on the ends thereof being then delivered to the sewing heads. The binding strips and stitching are continuous and as the bags leave the sewing heads they are connected one to the other by these strips and stitching, and means, such as cutters 42, are provided for severing the binding strip and stitching between adjacent bags, but this cutting mechanism forms the subject matter of a separate application for patent and need not be here shown or described in detail. After the bags have passed the sewing heads and have been severed one from the other they are discharged over a chute, here shown as a pair of inclined arms 43.

Arranged beyond the discharge end of the machine is a bag receiving device which has a plurality of sections movable successively into a position to receive bags from the chute 43 and means are provided for actuating this bag receiving device to withdraw the accumulated bunch of bags when a predetermined number of bags has been delivered thereto, thus accumulating the bags in counted bunches, each containing the same number of bags. In the present construction the bag receiving device is rotatable about a horizontal axis and comprises a hub portion 44 having a plurality of pairs of radial arms 45 spaced equal distances about the same and forming a circumferential series of compartments. Preferably the bag receiving device is connected with and supported by the main frame of the machine and, as here shown, it is carried by a pair of arms 46 rigidly mounted on the machine frame. When the bag receiving device is stationary one of the sections or compartments thereof will be arranged in line with the chute 43 and the bags as discharged from the sewing machine will be delivered onto that section and will accumulate thereon until a predetermined number of bags have been delivered thereto. As soon as this is accomplished rotary movement is imparted to the bag receiving device sufficient to move that section in which the bags have accumulated out of line with the chute 43 and to move another section of the device into line with the chute. In the present instance, I have arranged at the rear side of the bag receiving device, and between the arms 45, a standard 47 which tends to move the bags to an upright position when the device is rotated to withdraw the same, thus supporting the bags in a position which permits the bunch to be readily removed as a whole. The means for operating the bag receiving device intermittently as the bags accumulate thereon is operated in timed relation to the movement of the conveyor and is of such a character that when a predetermined number of bags, say for example twenty-five, have been moved past the sewing heads and delivered to the bag receiving device operative movement will be imparted to the latter to withdraw the accumulated bunch of bags. The device may be operated in various ways but, as here shown, a ratchet wheel 48 is rigidly connected with the hub 44 and is actuated by a pawl 49 carried by one end of a lever 50 pivotally mounted at the axis of the bag receiving device. The other end of the lever 50 is pivotally connected to one end of a pitman 51, the opposite end of which is slotted, as shown at 52, to receive the shaft 53, journaled on the main frame of the machine and forming a support for this end of the pitman. A spring 54 is connected at one end with the pitman and at the other end with one of the supporting arms 46 and serves to move the pitman in a direction to impart operative movement to the pawl 49 and thereby advance the bag receiving device. Rigidly secured to the shaft 53 is a cam 55 which acts on a stud or roller 57 carried by the pitman to move the latter against the action of the spring 54 and retract the pawl. When the high point of the cam passes the stud 57 the spring will quickly actuate the pitman and cause the pawl to rotate the bag receiving device.

Rigidly secured to the shaft 53, preferably on that side of the machine opposite the cam 55, is a ratchet wheel 58 which is actuated by a pawl 59 carried by an arm 60 pivotally mounted on the shaft 53 at one side of the ratchet wheel. Pivotally connected with the pawl arm 60 is a pitman 61 having at one end thereof an eccentric strap 62 which encircles an eccentric 63 rigidly secured to the shaft 34 which forms part of the means for driving the conveyor, thus causing the pawl, and consequently the cam, to be actuated in timed relation to the movement of the conveyor. Each rotation of the shaft 34 will cause one reciprocation to be imparted to the pawl 59 which will advance the ratchet wheel and the cam one step. In the present instance, the ratchet wheel has twenty-five teeth and is advanced a distance of one tooth upon each operation of the pawl and the connection between the shaft 34 and the conveyor causes the latter to move a distance

equal to one bag upon each rotation of the shaft. Therefore, when the conveyor has delivered twenty-five bags the ratchet wheel and the cam will have made one complete rotation, the high point of the cam will have been moved past the stud 57 on the pitman 51 and the latter will be actuated by the spring 54 to impart movement to the bag receiving device and cause that device to withdraw the accumulated bunch of bags and to present another compartment or section in bag receiving position. It will be understood that the distance that the conveyor is moved upon each rotation of the shaft 34 is equal to the length of the binding strips, which extend slightly beyond each side of the body of the bag, the bags being spaced short distances apart.

To prevent an inaccurate count in the event the bags on the conveyor are spaced apart an abnormal distance, as when there is no bag present on one or more sections of the conveyor, means are provided for interrupting the operation of the cam and preventing the latter from being advanced until another bag is delivered to the sewing heads. This is preferably accomplished by moving the pawl 59 out of engagement with the ratchet wheel 58. For this purpose a trip device or shield 64 is mounted on an arm 65 pivotally mounted on the shaft 53 and this trip device is adapted to be moved into engagement with the pawl and interposed between the same and the ratchet wheel, thus permitting the free reciprocation of the pawl but preventing the same from engaging the teeth of the ratchet wheel. A spring 66 acts on the arm 65 in a direction to move the trip arm into engagement with the pawl and this movement is prevented so long as the spacing of the bags on the conveyor is uniform. In the present arrangement, the arm 65 is connected by a link 67 with one end of a lever 68, the other end of which is connected by a link 69 with an arm 70 secured to a transverse shaft 71. A controlling arm 72 is secured to the shaft 71 near the middle of the table and projects above the table in such a position that it will be engaged by the bags which are being advanced by the conveyor and held in a position which will prevent the operation of the trip device by its spring. The pressure bars 16 prevent the bags from being moved upwardly by the action of the spring on the controlling arm 72. The length of the controlling arm is such that it will bridge the normal spaces between adjacent bags but should this space be abnormally long, due to the omission or misplacing of a bag, the arm will be moved upwardly by the spring and the tripping device moved into engagement with the pawl, thereby rendering the latter inoperative and holding the same out of engagement with the ratchet wheel until the conveyor has moved another bag into engagement with the controlling arm 72.

To prevent the overthrow of the ratchet wheel and cam by the action of the pawl 59 I have provided a friction device against the action of which the ratchet wheel is rotated. This device comprises a disk 73 loosely mounted on the shaft 53 between a stationary disk 74 and a disk 75 slidably mounted on the shaft and held against rotation relatively thereto and acted on by a spring 76 which presses it into firm engagement with the intermediate disk 73 and causes the latter to be frictionally held between the two disks, 74 and 75. The intermediate disk is provided with an arm 77 having pivotally connected therewith a rod 78 which extends through an opening in a bracket 79 carried by the frame of the machine. A head 80 on the rod limits the upward movement thereof and a lip 81 on the bracket limits the downward movement of the rod but permits it to have a slight movement. The frictional resistance to the rotation of the shaft 53 is not sufficient to interfere with the rotation thereof when power is applied thereto but as soon as the power thrust is interrupted the movement of the ratchet wheel will be instantly stopped. The power thrust will move the arm 77 downwardly against the action of a spring 82 and as soon as the power thrust is relieved the spring will return the shaft and ratchet wheel to their normal positions, thus permitting the pawl to properly position itself on the ratchet wheel. This friction device also prevents reverse movement being imparted to the cam and ratchet wheel by the action of the spring pressed pitman on the face of the cam.

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. The combination with an endless conveyor having means for simultaneously advancing a plurality of articles one behind the other, and driving mechanism for said conveyor, of a device having a plurality of sections movable successively into a position to receive said articles from said conveyor, operating mechanism to impart intermittent movement to said receiving device, means for connecting said operating mechanism with the driving mechanism for said conveyor, means for controlling said connection comprising a movable part, a controlling member mounted adjacent to the path of said articles and connected with said movable part and arranged to be engaged and actuated by said articles as they are advanced by said conveyor to actuate said movable part to cause said connection to be established and

to maintain said connection so long as there is an article in engagement with said controlling member, and means for actuating said movable part to interrupt said connection when there is no article in engagement with said controlling member.

2. The combination with an endless conveyor having means for simultaneously advancing a plurality of articles one behind the other, and driving mechanism for said conveyor, of a device having a plurality of sections movable successively into a position to receive said articles from said conveyor, operating mechanism to impart intermittent movement to said receiving device, means for normally connecting said operating mechanism with the driving mechanism of said conveyor, and means for interrupting said connection comprising a movable part, a controlling member mounted adjacent to the path of said articles, connected with said movable part and arranged to be engaged by said articles as they are advanced by said conveyor and to be held thereby in a position to prevent the movement of said movable part in a direction to interrupt said connection, and means controlled by said controlling member to move said movable part in a direction to interrupt said connection when there is no article in engagement with said controlling member.

3. The combination with an endless conveyor having means for simultaneously advancing a plurality of articles one behind the other, and driving mechanism for said conveyor, of a device having a plurality of sections movable successively into a position to receive said articles from said conveyor, operating mechanism to impart intermittent movement to said receiving device, means for normally connecting said operating mechanism with the driving mechanism of said conveyor, means for interrupting said connection comprising a movable part, a spring tending to move said part in a direction to interrupt said connection, and a controlling member movably mounted below the operative stretch of said conveyor, connected with said movable part and arranged to be engaged by said articles as they are advanced by said conveyor and to be held thereby in a position to hold said movable part against movement by said spring.

4. The combination with an endless conveyor having means for simultaneously advancing a plurality of articles one behind the other, and driving mechanism for said conveyor, of a device having a plurality of sections movable successively into a position to receive said articles from said conveyor, operating mechanism to impart intermittent movement to said receiving device, a ratchet wheel connected with said operating mechanism, a pawl engaging said ratchet wheel to impart movement to said operating mechanism, means driven by said driving mechanism for actuating said pawl, a trip device to move said pawl out of engagement with said ratchet wheel, means to actuate said device, and a controlling member mounted adjacent to the path of said articles, connected with said trip device and arranged to be engaged by said articles as they are advanced by said conveyor and to be held thereby in a position to prevent the movement of said trip device by said means so long as there is an article in engagement with said controlling member.

5. The combination with a conveyor having means for advancing a series of articles in spaced relation to a point of discharge, an article receiving device having a plurality of sections movable successively into a position to receive said articles from said conveyor, means for actuating said receiving device when a predetermined number of articles have been delivered to one of said sections, said means comprising a part operated in timed relation to said conveyor, an article controlled mechanism to interrupt the operation of said part comprising means to move said part to an inoperative position, and a member arranged to be engaged and controlled by said articles as they are advanced by said conveyor and acting on the last mentioned means to prevent the same from moving said part to an inoperative position when said articles are in proper spaced relation one to the other, and to permit said last mentioned means to move said part to an inoperative position when there is an excessive space between said articles.

6. The combination with a conveyor having means for advancing a series of articles in spaced relation to a point of discharge, an article receiving device having a plurality of sections movable successively into a position to receive said articles from said conveyor, means for actuating said receiving device when a predetermined number of articles have been delivered to one of said sections, said means comprising a part operated in timed relation to said conveyor, a device to interrupt the operation of said part, yieldable means tending to move said interrupting device to an operative position in which it will prevent the operation of said part, and a controllng member operatively connected with said interrupting device and arranged to be engaged by said articles as they are advanced by said conveyor and to be held thereby in a position to retain said interrupting device in an operative position against the action of said yieldable means, said controlling member being adapted to bridge the normal space between successive articles and to be released when there is an abnormal space between adjacent articles and thereby permit said yieldable means to move said interrupting device to its operative position.

7. The combination with a conveyor having means for advancing a series of articles in spaced relation to a point of discharge, of an article receiving device having a plurality of sections movable successively into a position to receive articles from said conveyor, operating mechanism for imparting intermittent movement to said receiving device, means for actuating said operating mechanism including a part connected therewith and a second part operated in timed relation to said conveyor and supported normally in operative relation to the first mentioned part, and a controlling device for said second part held normally in an inoperative position by engagement with said articles as they are advanced by said conveyor and having means for moving said second part out of operative relation to the first mentioned part when there is an excessive space between adjacent articles advanced by said conveyor.

8. The combination with a conveyor having means for advancing a series of articles in spaced relation to a point of discharge, of an article receiving device having a plurality of sections movable successively into a position to receive articles from said conveyor, operating mechanism for imparting intermittent movement to said receiving device, means for actuating said operating mechanism including a part connected therewith and a second part operated in timed relation to said conveyor and supported normally in operative engagement with the first mentioned part, a controlling device for said second part comprising a trip member adapted to move said second part out of engagement with said first mentioned part, a controlling member arranged to be engaged and actuated by said articles as they are advanced by said conveyor to move said trip member to and hold the same in an inoperative position, and means for moving said trip member into operative engagement with said second part when there is no article in engagement with said controlling member.

9. The combination with a conveyor having means for advancing a series of articles in spaced relation to a point of discharge, of an article receiving device having a plurality of sections movable successively into a position to receive articles from said conveyor, operating mechanism for imparting intermittent movement to said receiving device, a ratchet wheel connected with said operating mechanism, a pawl supported normally in engagement with said ratchet wheel, means for actuating said pawl in timed relation to said conveyor, a trip member for said pawl, a spring acting on said trip member to cause the same to move said pawl out of engagement with said ratchet wheel, and a controlling member arranged to be engaged and actuated by said articles as they are advanced by said conveyor to move said trip member against the action of said spring and hold the same in an inoperative position so long as there is an article in engagement with said controlling member.

10. The combination with a conveyor having means for advancing a series of articles successively to a point of discharge, an article receiving device having a plurality of sections movable successively into a position to receive articles from said conveyor, a pitman connected with said receiving device, a spring acting on said pitman to cause it to impart movement to said receiving device, a cam to move said pitman against the action of said spring and then release the same, means for actuating said cam in timed relation with said conveyor, means to interrupt the operation of said cam comprising a movable part, means to actuate said movable part, a controlling member connected with said movable part and arranged to be engaged and actuated by said articles as they are advanced by said conveyor to move said movable part to an inoperative position and retain the same in that position as long as there is an article in engagement with said controlling member.

11. The combination with a conveyor having means for advancing a series of articles successively to a point of discharge, an article receiving device having a plurality of sections movable successively into a position to receive articles from said conveyor, a pitman connected with said receiving device, a spring acting on said pitman to cause it to impart movement to said receiving device, a cam to move said pitman against the action of said spring and then release the same, means for actuating said cam in timed relation with said conveyor comprising a ratchet wheel connected with said cam, a pawl engaging said ratchet wheel and operated in timed relation to said conveyor, means for moving said pawl out of engagement with said ratchet wheel, and a controlling member mounted adjacent to the path of said articles, connected with said pawl moving means and arranged to be engaged by said articles as they are advanced by said conveyor and to be held thereby in a position to prevent said means from moving said pawl out of engagement with said ratchet wheel.

In testimony whereof, I affix my signature hereto.

WILLIAM E. SHARKEY.