

Nov. 6, 1934.

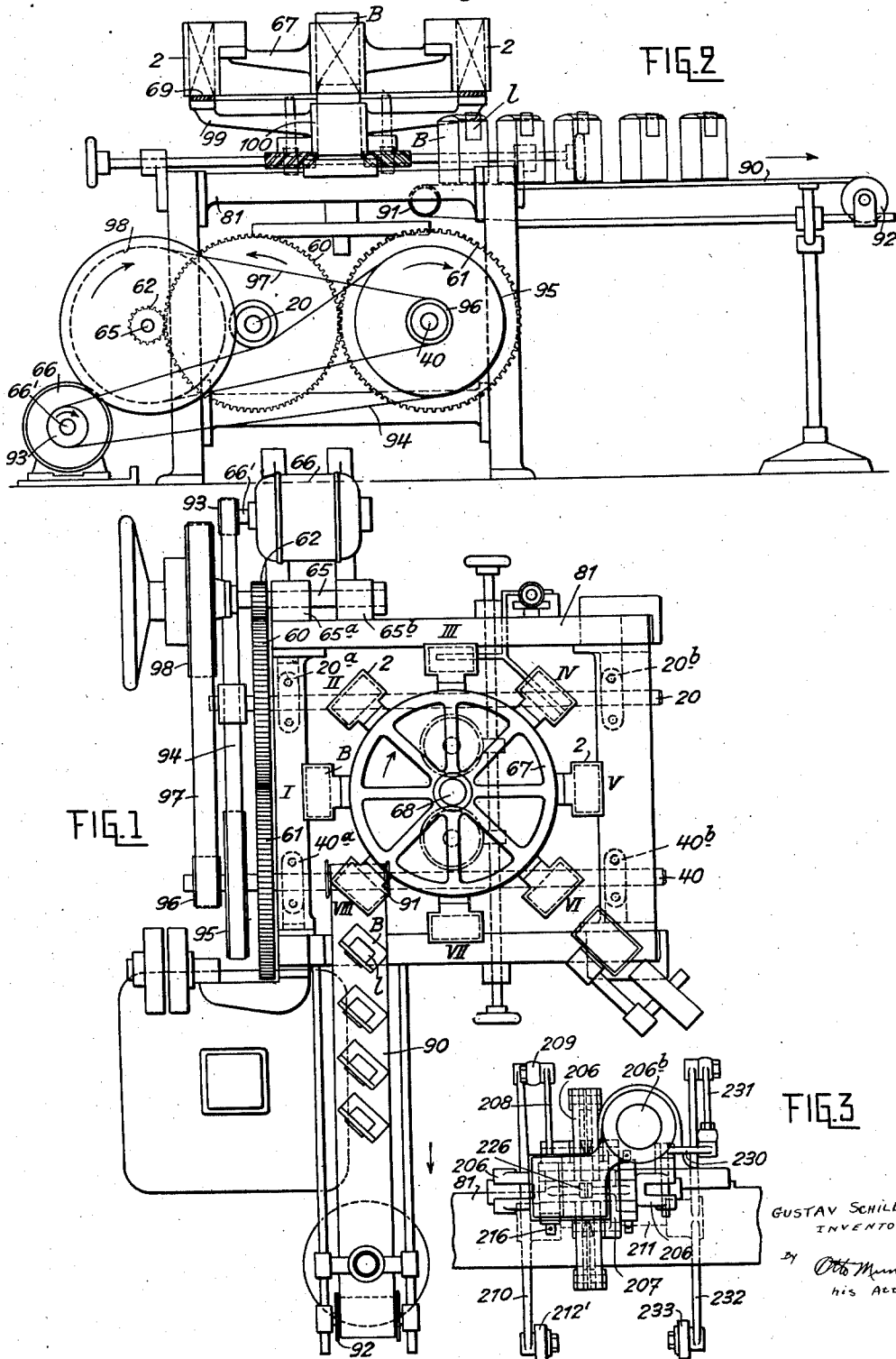
G. SCHILBACH

1,979,496

DEVICE FOR CLOSING FILLED BAGS

Filed Aug. 26, 1933

5 Sheets-Sheet 1



Nov. 6, 1934.

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1,979,496

DEVICE FOR CLOSING FILLED BAGS

Filed Aug. 26, 1933

5 Sheets-Sheet 2

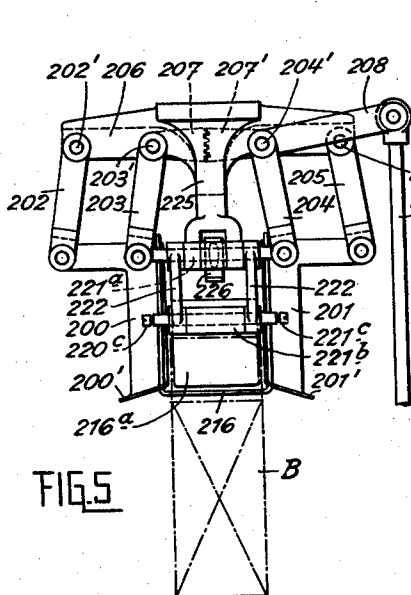


FIG. 5

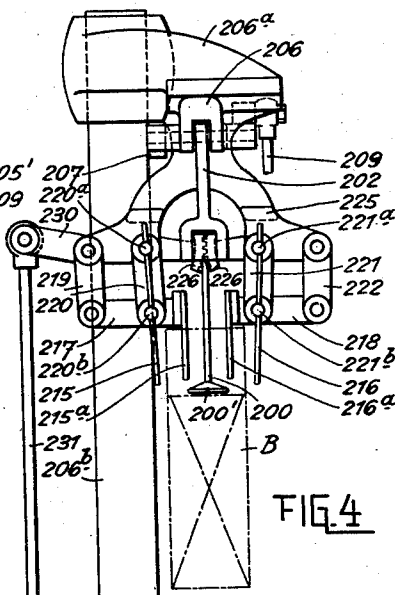


FIG. 4

FIG. 5^a

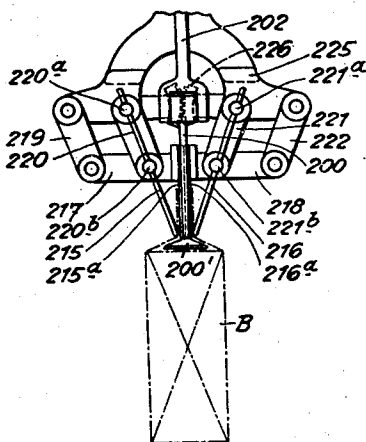


FIG. 5^b

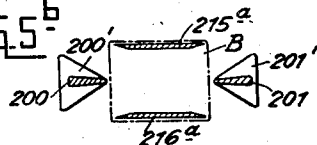
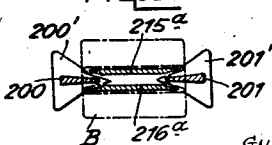


FIG. 5^c



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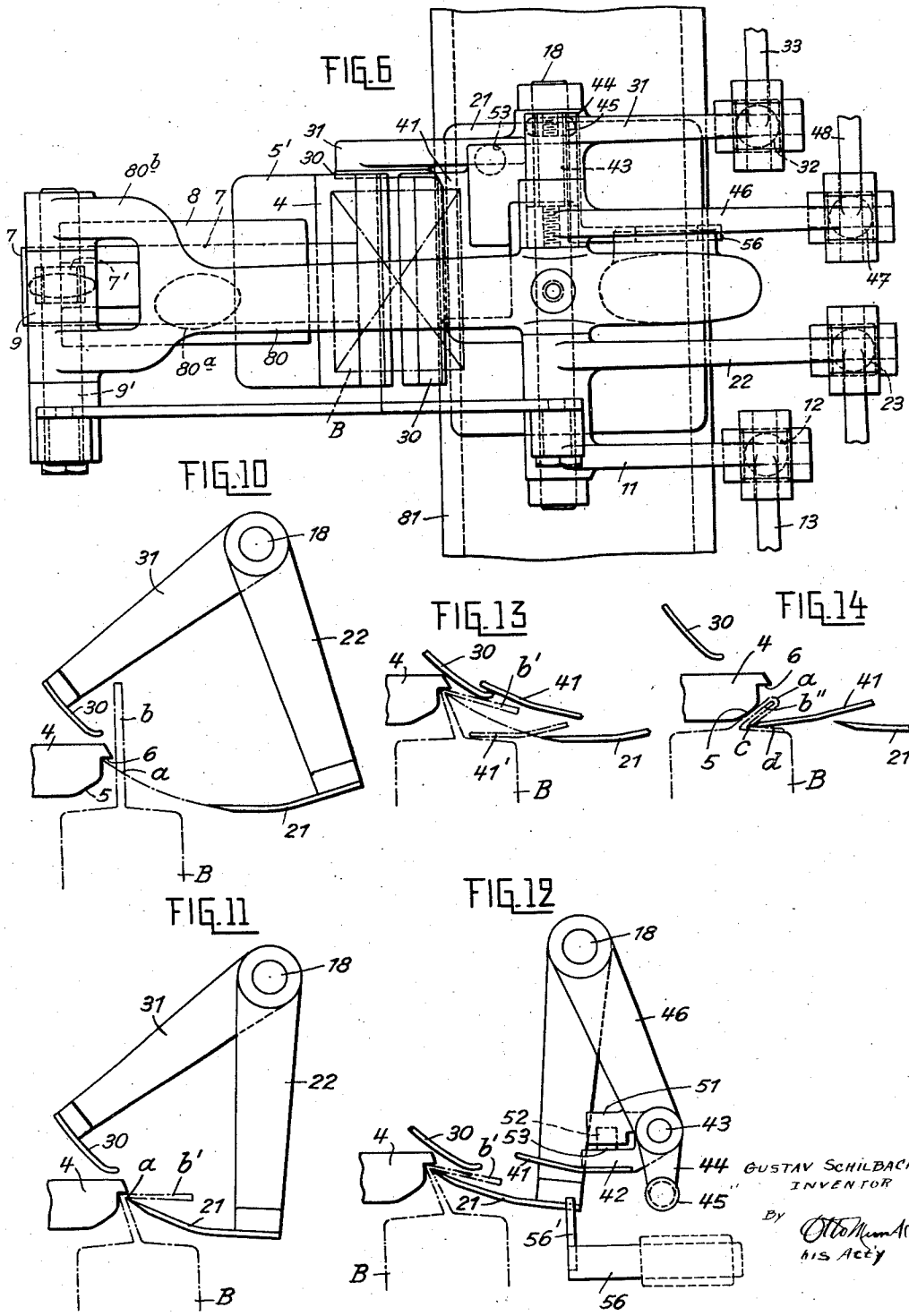
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DEVICE FOR CLOSING FILLED BAGS

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5 Sheets-Sheet 3



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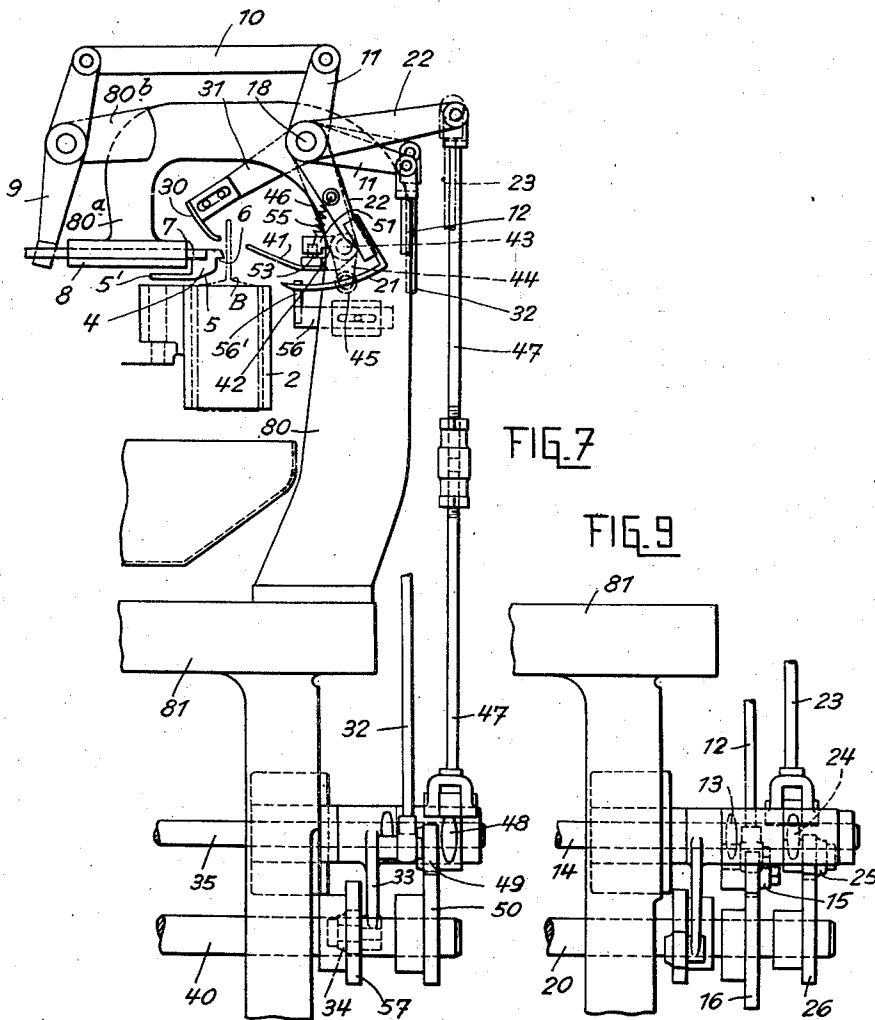
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DEVICE FOR CLOSING FILLED BAGS

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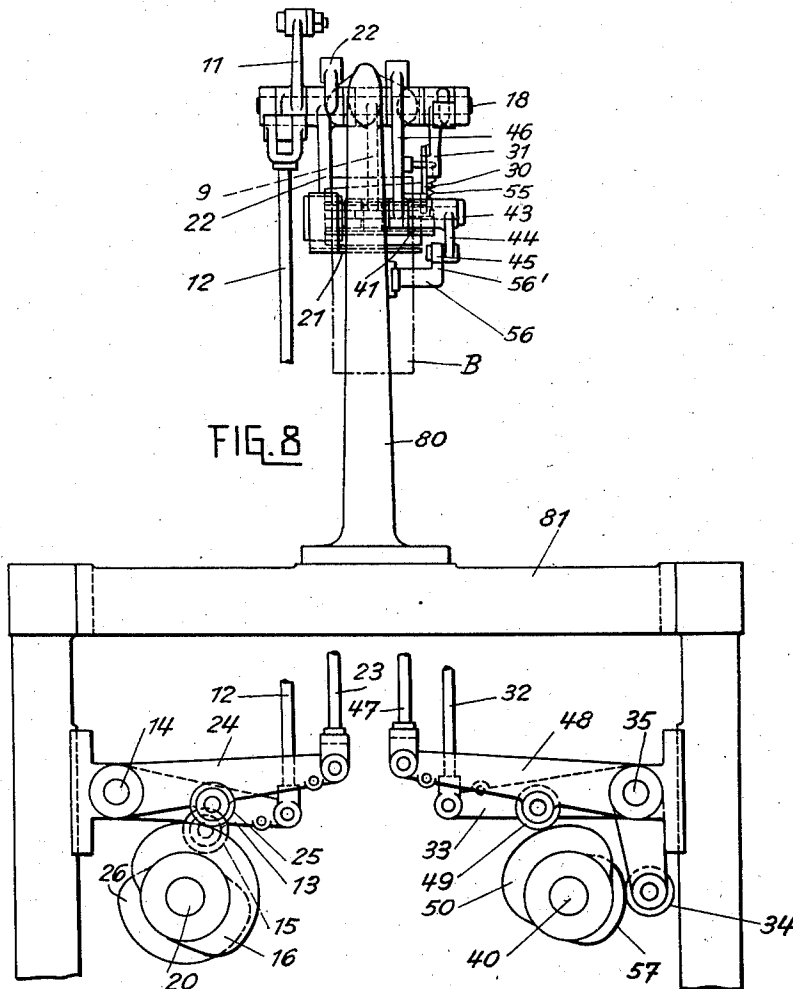
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DEVICE FOR CLOSING FILLED BAGS

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

1,979,496

DEVICE FOR CLOSING FILLED BAGS

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Application August 26, 1933, Serial No. 686,955
In Germany August 26, 1932

9 Claims. (Cl. 93—6)

My invention relates to devices for closing filled bags of paper or similar material, e. g. folded or other bags. The object of my invention consists in the provision of a device of this class, so designed that a durable and tight closure is obtained by reliable and simple means.

With this end in view, one feature of my invention consists in providing means which are so constructed and disposed that by their operation the upper end of the empty portion of the bag projecting beyond the filled portion thereof, after having been folded up flat, is bent off laterally near its lower third whereupon the bent-off portion is again bent-in at the bottom edge of the lower upstanding portion and is thus caused to bear at an angle partly against the said portion of the empty end and partly against the top surface of the filled part of the bag. The vertical leg of the angular portion so formed is pressed against the top surface of the bag proper over the portion previously applied to the said top surface.

Other objects and features of my invention will be clear from the following specification.

The novel device according to my invention is shown, by way of example, in the accompanying drawings by an embodiment thereof applied to a packing machine, in which

Fig. 1 diagrammatically shows a top plan view of the general arrangement of the said packing machine;

Fig. 2 diagrammatically shows the same machine in elevation, as seen from the left in Fig. 1;

Fig. 3 on an enlarged scale shows in detail the mechanism provided on station III of the machine for folding up flatly the empty top portion of the filled bag, this figure being a top plan view;

Fig. 4 is an elevation of this mechanism;

Fig. 5 is an elevation of this mechanism as seen from the right in Fig. 4, and in the inoperative positions of the parts;

Fig. 5^a corresponds to Fig. 5, but shows the parts in their operative positions;

Figs. 5^b and 5^c show the folding members of the mechanism illustrated in Figs. 4 and 5, in a horizontal section taken above the filled portion of the bag, in two different positions;

Fig. 6 on an enlarged scale shows the details of the mechanism provided on station V of the machine, for closing the flattened empty end of the bag, this figure being a top plan view;

Fig. 7 is a side-elevation of this mechanism;

Fig. 8 is a front elevation of the same mechanism as seen from the right in Fig. 7;

Fig. 9 shows a part of the driving gear as seen from the left in Fig. 8, and

Figs. 10-14 show the folding members and operations at the several operative stages of the closing process.

In the present case, the machine is driven by an electric motor 66 which is suitably fastened to the floor. The pulley 93 keyed to the motor shaft 66', drives by means of a belt 94, a disc 95 the hub of which is rotatably mounted on a shaft 40 which in turn is mounted in suitable bearings 40^a and 40^b of the machine frame 81. The hub of the disc 95 carries a pulley 96 which drives through a belt 97 a disc 98 keyed to the main driving shaft 65 of the machine. This shaft is suitably mounted in bearings 65^a and 65^b of the machine frame 81, so that through the agency of the belt gear 94, 97 described the main shaft 65 is driven by the said electric motor 66. This shaft 65 further carries a pinion 62 in mesh with a toothed wheel 60 which is keyed to the driving shaft 20 mounted in suitable bearings 20^a and 20^b of the machine frame 81, and so transmits the drive from shaft 65 to this shaft 20. Moreover, the toothed wheel 60 is in mesh with and rotates a toothed wheel 61 keyed to the shaft 40 already referred to.

The bags B to be closed are placed in and advanced by box-like or similar receptacles 2 which are fastened to a suitable conveyor such as a wheel 67. This wheel is keyed to a vertical shaft 68 mounted in suitable bearings of the machine frame 81 and rotated step by step in well known manner, not shown, by the driving shaft 65 through suitable gearing comprising the usual Malthese wheel so that the feeding receptacles 2 are one after another moved towards the stations I, II-VIII of the machine. Within the feeding receptacles 2 which are open at the bottom, the bags are supported by a rim 69 which is carried by arms 99 fastened to a stationary hub-like support 100 mounted on the machine frame. This conveyor wheel and its drive do not form the subject matter of the present invention and are well known to those skilled in the art so that they need not be further described and represented in the drawings.

At station I of the machine, the filled but not yet closed bag B is in a suitable and well-known way put into the particular feeding receptacle 2 brought to the said station at that moment, and subsequently this bag is by the intermittent

rotation of the conveyor wheel 67 successively brought to the several stations II, III etc. of the machine.

Station II is not used.

5 As soon as the bag arrives at station III, the portion of the bag projecting beyond its contents is folded up flat. This may be done in any suitable manner, for instance by compressing this empty portion on two opposite sides and at the same time compressing it flat on the 10 two other sides. The mechanism intended for this operation and arranged at station III is shown by Figs. 3 to 5 of the accompanying drawings. This mechanism comprises a pair of folding 15 knives 200 and 201 swinging in and at their lower ends, according to Figs. 5, 5^b and 5^c, provided with folder plates 200' and 201' of a triangular or ploughshare-like shape for a purpose to be explained later-on. At their top ends, 20 the folding knives are bent into angles and pivoted to the fork-end links 202, 203, 204 and 205 the free ends of which are provided at pins 202', 203', 204', and 205' to the support 206. By means of the bracket 206^a, the support 206 is 25 secured to a column 206^b which is in turn fastened to the machine frame 81. The links 202 to 205 referred to act as a parallelogram guide. On the pins 203' and 204' are fastened levers with toothed segments 207 and 207' meshing 30 with each other. The pin 204' carries a driving crank 208 pivoted to the connecting rod 209 which, according to Fig. 3, is at its bottom end attached to the lever 210. This lever is revoluble about the fulcrum pin 211 which is mounted 35 in the eye 212 forming part of a bracket secured to the machine frame 81. The roller 212' carried by the other end of the lever 210 is subject to the action of a suitable eccentric keyed to the driving shaft 20.

40 At right angles to the folding knives 200 and 201 there are disposed plates 215^a and 216^a adapted to swing inwards and fastened to the carriers 217, 218 which in turn are attached to the pairs of links 219, 220 and 221, 222. At 45 their top ends, the pairs of links are pivoted to the carrier 225 which is mounted on the bracket 206^a. The pairs of links 220, 221 are coupled by the toothed segments 226 keyed to their fulcrum pins. A driving crank 230 is attached to the connecting rod 231 which at its 50 bottom end is pivoted to the lever 232, Fig. 3. The same is revoluble on the axle 211 and carries the roller 233 acted upon by a suitable eccentric mounted on the shaft 20. In the present case, 55 wires 215 and 216 bent into yokes are provided, and the legs thereof are adjustably fastened by means of screws 220^c and 221^c in the pierced outside ends of the fulcrum pins 220^a, 220^b and 221^a, 221^b of the links 220, 221. As soon as the 60 bag arrives at station III it is, by means of a suitable contrivance lifted into the working range of the folding mechanism just described. Lifting contrivances of this class are generally known as to their design and construction so 65 that a more detailed description or representation can be dispensed with. Such lifting contrivances comprise a vertically reciprocating pushrod the top end of which is provided with a supporting plate having approximately the dimensions of the bottom of the bag. In order 70 that the bag be lifted, the pushrod with the supporting plate connected thereto is raised by a suitable mechanism through a suitable recess of the above mentioned supporting rim 69 so that the bag is also raised within its feeding

receptacle. Such a lifting contrivance has been described and shown in United States Patent No. 1,843,449, dated February 2, 1932 and discloses also the mechanism just described for 80 flattening the top end of the bag. While the bag is being lifted the several tools occupy the positions shown by Figs. 4 and 5 where the upper ends of the sides of the bag are allowed to enter the spaces between the wire yokes 215, 216 and the plates 215^a, 216^a. Then the folding 85 knives 200, 201 are moved inwards so as to fold in the adjacent bag ends.

At the same time the wire yokes 215 and 216 are swung inwards as shown in Fig. 5^a in order to press the adjacent walls of the bag inwards sharply against the folding knives 200, 201 and to fold them in. Owing to the cooperation of the folding knives with the internal plates 215^a and 216^a, this will result in the outside edges of the folds being rather sharp. This having been 90 accomplished, the folding knives 200, 201 will be again swung outwards while the folding plates 215^a, 216^a continue exerting a pressure on the folded bag portion. In this way the whole upper and empty portion of the bag is compressed so as to lie flat. The top bag portion 95 may also be flattened by any other suitable mechanism.

At station IV a suitable and known mechanism may be used, if desired, to repress the flattened portion, such a mechanism being described and illustrated in the aforesaid United States Patent No. 1,843,449. 105

After arriving at station V, the bag B is closed by the mechanism shown by Figs. 6 to 8. In the embodiment shown by way of example, this mechanism is provided with a block-like or 110 similarly shaped folding member 4 the bottom portion of which is chamfered at 5, this member 4 being fastened to a slide 7 reciprocable in a guide 8 and provided at its front end with an angularly shaped or similar recess 6 whose horizontal projection extends approximately at a right angle. The guide 8 is fastened to the arm 80^a of a standard 80 which is mounted on 115 the machine frame 81. Within a slot 7' of the free end of the slide 7 extends the bottom end of a two-armed lever 9 swingable about pin 9' in the fork-shaped arm 80^b of the standard 80, and by a connecting rod 10 connected to a bell 120 crank lever 11 which is pivotally mounted on a bolt 18 fastened to the standard 80. To the other end of the said lever 11 is pivoted a rod 12 which is in turn pivoted to a lever 13. The latter is mounted on an axle 14 fastened to the machine frame and is with a roller 15 subject to the action of a spring (not shown) pressed in a well-known manner against a cam 16 keyed to the shaft 20 and imparting the reciprocating motion to the slide 7 with its folding block 4 125 through the mechanism described.

A folding plate 21 is fastened to a bell crank lever 22 swingable about the bolt 18. To the free end of this lever 22 is pivoted a rod 23 the free bottom end of which is connected to the lever 24 swingably mounted on the axle 14. Subject to the action of a spring (not shown), this lever 24 is caused to bear with a roller 25 against a cam 26 keyed to the shaft 20 so that through the mechanism described a rocking 135 movement is imparted to the folding plate 21 about axle 18.

Another folder 30 also constructed as a folding plate is fastened to a bell crank lever 31 swingable about the axle 18, and at the free 140 145 150

end of which is pivoted the rod 32 the lower end of which is pivoted to a bell crank lever 33. The latter is swingable about an axle 35 mounted on the machine frame, and is subject to a spring (not shown), which in a well-known way bears with a roller 34 against a cam 57 keyed to the driving shaft 40 and imparts a rocking movement to folder 30 about the axle 18 through the mechanism described.

A last folding plate 41 is fastened to an arm 42 swingable about a pin 43 and connected to another arm 44 which carries a roller 45. The pin 43 is mounted in a bell crank lever 46 swingably mounted on the axle 18 and at the free end of which is pivoted a rod 47. This rod is at its bottom end pivoted to a lever 48 revolvably mounted on an axle 35 and subject to the action of a spring (not shown) pressed with a roller 49 in a known manner against a cam 50 keyed to the shaft 40 so that the bell crank lever 46 receives a rocking movement about the axle 18. The lever 46 is provided also with a projection 51 pierced by a blind hole 52 into which penetrates a buffer 53 made of a suitable elastic or yielding material such as India rubber, and fastened to the arm 42. A tension spring 55 connecting the arm 42 to the lever 46 tends to keep the said arm 42 in the position shown by Figs. 7 and 12. The bent-up end 56' of a rail 56 mounted on the standard 80 extends into the path of the said roller 45.

The modus operandi of the device described will be clear from Figs. 10 to 14 and is as follows:—

As soon as the bag B arrives at the closing mechanism arranged at station V, its upstanding and previously flattened portion b is opposite the folding block 4, Fig. 10. At first, the folding slide 21 will be swung upwards so that it produces the first folding bend in the flattened end of the bag approximately at the lower third thereof as at a and is caused to enter into the angle 6 of the recess formed in the folding block 4, Fig. 11. The portion b' of the flattened portion b of the bag B is, as far as it projects beyond the folding slide 21, bent off approximately at a right angle, as is obvious from Fig. 11. Thereupon the folding slide 30 will be swung out from the opposite side and bring the free end b' into the position shown by Fig. 12. The two slides 21 and 30 will remain in this position until the slide 41 swings into its position shown in Fig. 13. The slide 41 will keep the projecting portion b' of the bag in the position into which it had been previously brought by the slide 30 while this slide 30 performs its return stroke and the slide 21 leaves the bend made in order to swing backwards. After this the slide 41 is caused to move into its lower position 41' shown in dotted lines in Fig. 13, so that it depresses the end b' and at the same time prepares another bend as at c (Fig. 14) in the said end b', and finally a further sharp bend is produced at this point so that the free end portion d is left bent off at an angle and bearing against the filled body of the bag B. The downward movement of the slide 41 is produced in such a manner that, while the arm 46 continues swinging inwards, the roller 45 strikes the stop angle 56' and is stopped by the same. Thus the arm 42 and with it the folder slide 41 are moved by the arm 44 downwards against the action of the spring 55. After the angular folding operation is accomplished at c as shown in Fig. 14, the folding block 4 is pushed in a horizontal plane

towards the folded portion of the bag B, so as to strike with its chamfered portion 5 the top leg b'' of the angle which is then guided downward by the said chamfered portion 5 and eventually pressed against the bag proper by a plate 5' forming an extension of the chamfered portion 5, Fig. 7. While the folding block 4 is advancing, the slide 41 is withdrawn from the folded portion as soon as the chamfered portion 5 has sufficiently pressed the folds in their definite position.

The closure may be kept permanently in this position in any known way, for instance by a label or another suitable strip l or the like pasted on it. The mechanism intended for this operation is provided at station VI. As mechanisms of this kind used for pasting labels are generally known and do not form the subject matter of the present invention, it is not specifically described and shown here.

At station VIII the completely closed bag is removed from the conveyor wheel. The mechanism used to this end is not the subject matter of this invention and is known by those skilled in the art so that it need not be described or shown.

The finished bags are conveyed in a manner generally known, by an endless conveyor belt 90 running over two pulleys 91 and 92, pulley 91 being driven by the shaft 40 in any well known manner.

It is obvious that various changes may be made in the device shown and described as an embodiment of the present invention, without departing from the spirit of the invention and the scope of the claims.

What I claim is:

1. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, an angularly recessed abutment and a folding member co-operating with the same laterally to bend off the flattened end of the bag at a point near its lower third by folding, means to cause the bent-off end to bear at an angle partly against the upstanding third at the bottom thereof and partly against the top surface of the filled portion of the bag, and means to press the upstanding portion over the portion bearing against the top surface of the filled portion of the bag.

2. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, means laterally to bend off the flattened end of the bag at a point near its lower third, means comprising a folding member to seize the bent off end from above and fold it at an angle partly against the upstanding third at the bottom thereof and partly against the top surface of the filled portion of the bag, and means to press the upstanding portion over the portion bearing against the top surface of the filled portion of the bag.

3. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, means laterally to bend off the flattened end of the bag at a point near its lower third, means comprising a folding member to seize the bent off end from above and to fold it at an angle partly against the upstanding third at the bottom thereof and partly against the top surface of the filled portion of the bag, a second folding member, means for operating said second folding member to move it above the laterally bent-off top portion of the empty bag end and to keep

the said portion in this position until the first mentioned folding member has been moved over the same, and means to press the upstanding portion over the portion bearing against the top surface of the filled portion of the bag.

4. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, an angularly recessed abutment, a folding member cooperating with the same laterally to bend off the upper end of the flattened portion of the bag by folding, means comprising a second folding member to seize the upper bent off end and to fold it at an angle partly against the upstanding lower end portion at the bottom thereof and partly against the top surface of the filled portion of the bag, and means to press the upstanding portion over the other portion bearing against the top surface of the filled portion of the bag.

5. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, an angularly recessed abutment, a folding member cooperating with the same laterally to bend off the upper portion of the flattened end of the bag by folding, means comprising a second folding member to seize the bent off end and to fold it at an angle partly against the upstanding lower portion of the bag end at a point near the bottom thereof and partly against the top surface of the filled portion of the bag, a third folding member, means for moving the third folding member in a direction opposite to that of the first named folding member into a position above the laterally bent off top portion of the bag end to keep the said portion in this position until the first named folding member has been withdrawn and the second folding member has been moved above this end, and means to press the upstanding portion over the other portion against the top surface of the filled portion of the bag.

6. In a device for closing filled bags, means to fold up flat the empty end portion of the bag projecting beyond the filled portion thereof, an angularly recessed abutment, a folding member cooperating with the same laterally to bend off the upper part of the flattened end portion of the bag, a second folding member to fold the laterally bent off end at the bottom of the upstanding lower portion of the flattened end to bear at an angle partly against the said lower portion and partly against the top surface of the filled portion of the bag, and a third folding member to press the upstanding portion over the other portion bearing against the top surface of the filled portion of the bag.

7. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, an angularly

recessed abutment, a folding member, means for moving said folding member into the angular recess of said abutment laterally to bend off the top portion of the flattened end of the bag, a second folding member to seize the bent-off end from above and angularly to fold the same so as to bear partly against the upstanding bottom portion of the end of the bag and partly against the top surface of the filled portion thereof, a third folding member, means for moving the third folding member in a direction opposite to that of the first named folding member above the laterally bent-off top portion of the end of the bag to keep the said portion in this position until the first named folding member has been withdrawn and the second folding member has been moved over this end, and means to press the upstanding portion of the angularly folded end of the bag against the top surface of the filled portion of the bag.

8. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, means laterally to bend off the upper part of the flattened end of the bag, means to fold the bent-off end to bear at an angle at the bottom of the upstanding lower part of the flattened end partly against this part and partly against the top surface of the filled portion of the bag, means to press the upstanding portion of the angular fold over the other portion against the top surface of the filled portion of the bag, said last mentioned means comprising a folding member, means for moving said folding member first to advance approximately parallel to the laterally bent-off end of the bag and over a portion of the same and subsequently to swing into the apex line of the angle formed by the upstanding portion of the end of the bag and the top surface of the filled portion thereof.

9. In a device for closing filled bags, means to fold up flat the empty end of the bag projecting beyond the filled portion thereof, an angularly recessed abutment, a folding member cooperating with the same laterally to bend off the upper portion of the flattened end of the bag by folding, means to fold the bent-off end to bear at an angle at the bottom of the upstanding lower portion of the flattened end partly against the under portion and partly against the top surface of the filled portion of the bag, and means to press the upstanding portion of the angular fold so formed over the other portion bearing against the top surface of the filled portion of the bag, the last named means comprising a folding member, means to move it from the side over the top surface of the filled portion of the bag, and an angularly recessed abutment cooperating with the end of said folding member.

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