Sept. 9, 1958 H. N. BROYLES ET AL 2,850,857

PACKING APPARATUS

Filed Oct. 18, 1954 2 Sheets-Sheet 1

Fig. 1

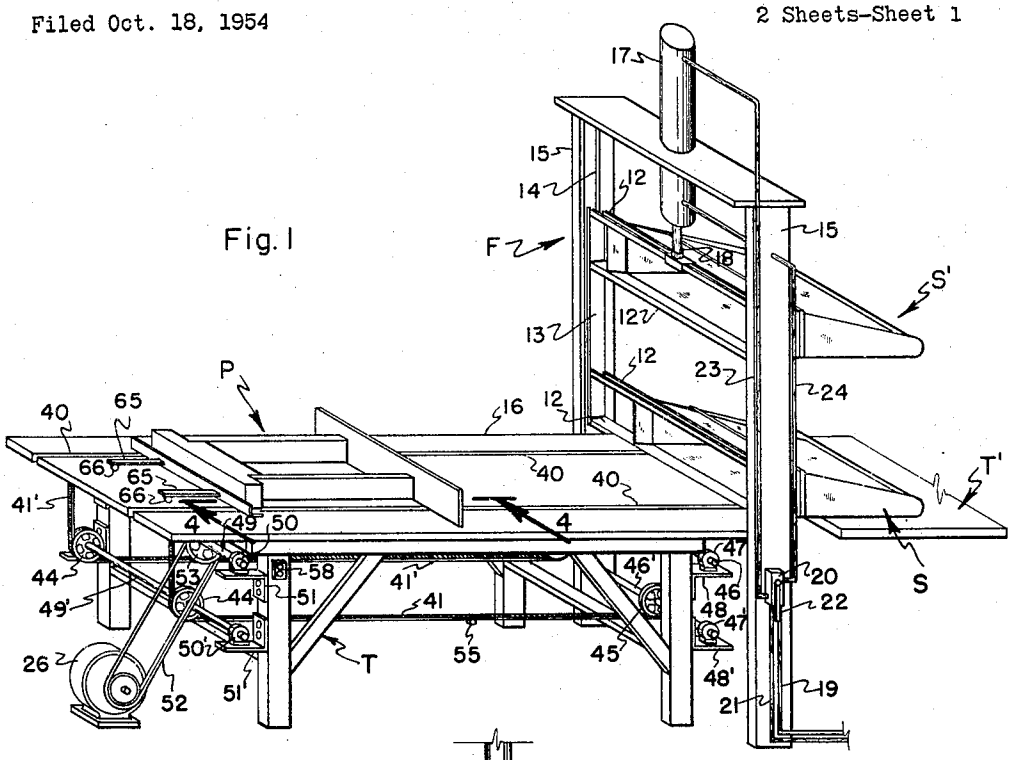
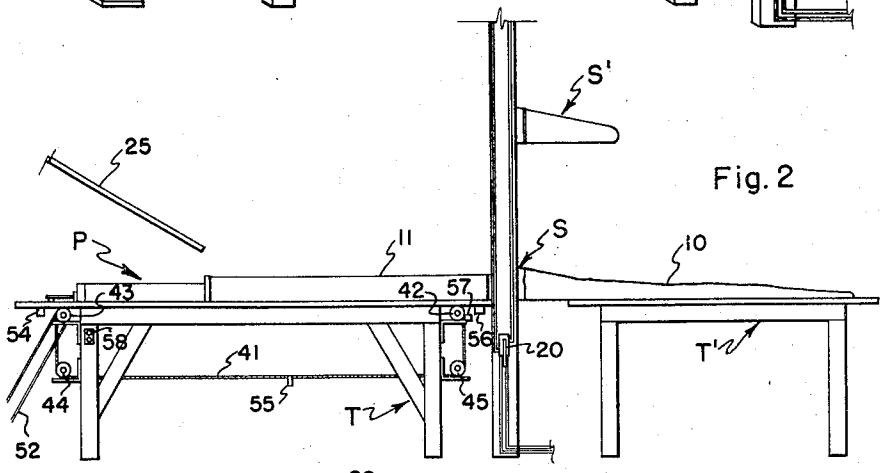


Fig. 2



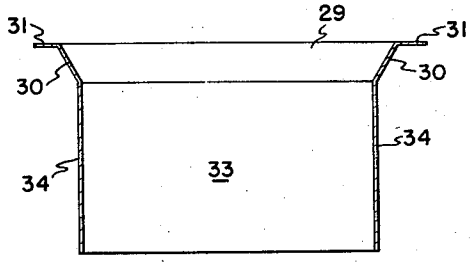


Fig. 8

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PACKING APPARATUS

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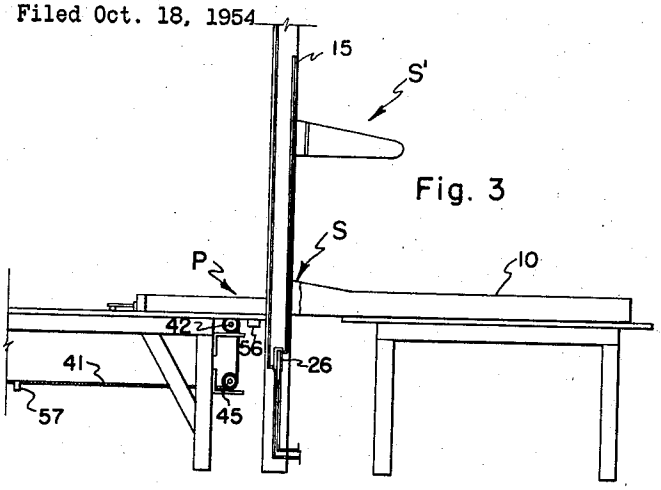


Fig. 3

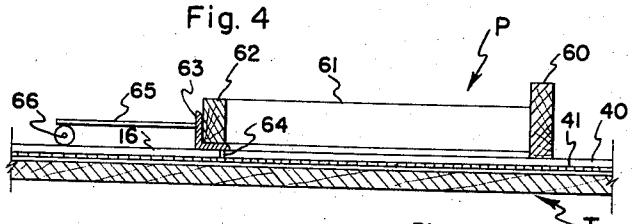


Fig. 4

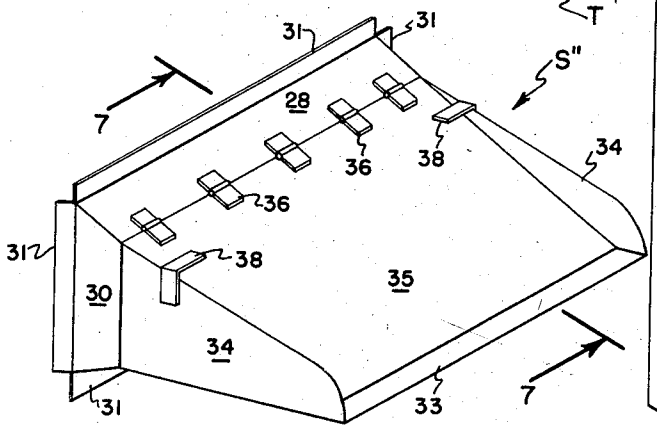


Fig. 6

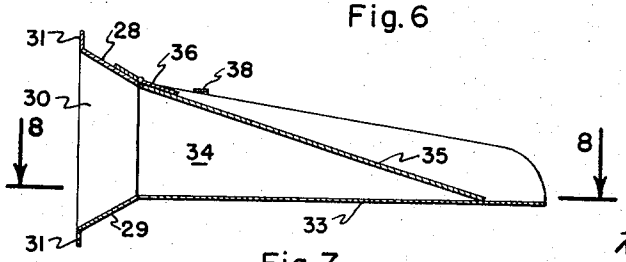


Fig. 7

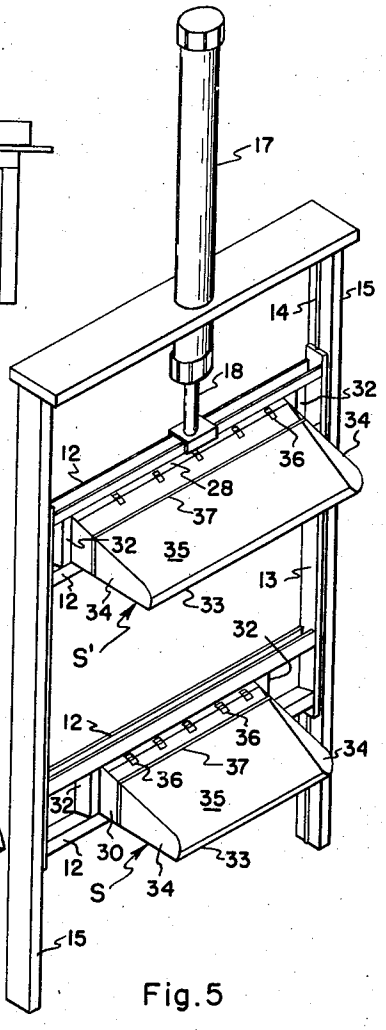


Fig. 5

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2,850,857

PACKING APPARATUS

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Application October 18, 1954, Serial No. 462,784

16 Claims. (Cl. 53—124)

This invention relates to packing apparatus, and more particularly to apparatus for packing a compressible article, such as a mattress, into a bag or container therefor, such as made of paper.

For shipping and storage purposes, primarily to maintain the surface thereof clean, but also for convenience in handling and stacking during storage, mattresses are conventionally packed in paper bags. Usually the bags are slightly smaller than the mattress in uncompressed condition, so that the mattress is in at least slightly compressed condition while in the bag and therefore the mattress will maintain its shape and also will form a slightly smaller package. Also, the mattress will not tend to slip around in the bag, nor will loose and protruding portions of the bag, which may become damaged and torn, tend to be produced. Other compressible articles, similar to mattresses, such as cushions, sofa seats and the like, may be similarly packaged. To compress a mattress while simultaneously placing it in a bag by hand is a time consuming and extensive operation, since the bags conventionally used are sufficiently strong to contain the mattress in compressed condition after the mattress has been compressed therein, but the previously open end of the bag and sometimes other portions of the bag tend to split while the mattress is placed therein by hand. As will be evident, a split bag means that the time consumed in attempting to place the mattress in the bag, up until the time the bag splits, is completely wasted. Also, if a mattress is run between rollers or other compressing means and guided into a bag, the tendency for the mattress to split the bag, not only at the time it enters but also thereafter, produces an undue waste of labor and material. Mattresses also come in different sizes and apparatus for packing mattresses in bags must therefore be adapted to accommodate such different sizes.

Among the objects of this invention are to provide a novel apparatus for packing compressible articles, such as mattresses, into bags or containers; to provide such apparatus which will conveniently place the mattress or the like in the bag without undue tendency to tear or otherwise damage the bag; to provide such apparatus which pemits bags of minimum strength, which are therefore less expensive, to be utilized; to provide such apparatus which will accommodate differences in sizes of the mattresses; to provide such apparatus which may be made substantially automatic in operation; to provide such apparatus which has moving parts, but in which the mattress is protected from being damaged or soiled by such moving parts; to provide such apparatus which operates effectively and efficiently, yet requires a minimum of time for its operations; to provide such apparatus which will pack consecutive mattresses or the like in bags with a comparative minimum of time and effort; to provide such apparatus which may exist in more than one form; and to provide such apparatus which may be manufactured comparatively economically.

Additional objects and the novel features of this invention will become apparent from the description which

follows, taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of mattress packing apparatus constructed in accordance with this invention, taken from a position at one side and rearwardly of the same;

Fig. 2 is a side elevation of the apparatus of Fig. 1, with a mattress entering a bag;

Fig. 3 is a fragmentary side elevation, otherwise similar to Fig. 2, with the mattress in the bag;

Fig. 4 is a fragmentary enlarged vertical section, taken longitudinally through a pusher forming a part of the apparatus along line 4—4 of Fig. 1;

Fig. 5 is a slightly enlarged, perspective view of a spout or guide assembly forming a part of the apparatus of Fig. 1, the view being taken from a position at one side and forwardly thereof;

Fig. 6 is an enlarged perspective view of a guiding spout forming an alternative embodiment of a spout which forms a part of the apparatus of Fig. 1;

Fig. 7 is a vertical section, taken along line 7—7 of Fig. 6; and

Fig. 8 is a horizontal section, taken along line 8—8 of Fig. 7.

As illustrated in Fig. 1, apparatus for packing mattresses or the like into bags, constructed in accordance with this invention, may comprise a table T or other structure providing a surface onto which a mattress may be placed for packing into a bag; a pusher P which is moved forwardly to push the mattress into the bag and then rearwardly to permit the next mattress to be placed on the table T; one or more guide spouts, such as spouts S and S′, which may be mounted on a framework F for movement into position with respect to the top of table T; and an auxiliary table T′ or other structure providing a surface on which a bag **10**, as in Fig. 2, may be placed, and a mattress **11** may be pushed into the bag by the pusher P.

The spouts S and S′ are similar in construction, but differ in dimensions, so as to accommodate mattresses of different sizes, such as double bed size and twin bed or three-quarter bed size. Thus, the spouts S and S′ may be mounted one above the other on transverse bars **12**, such as channels, which extends between slides **13**, with one slide **13** at each side, in turn movable upwardly and downwardly along guide **14**, mounted inside uprights **15** of framework F. In the position shown, spout S is aligned with the top **16** of table T and the spouts may be moved to and from a position in which spout S′ is aligned with the top **16** of table T by a hydraulic cylinder **17**, having a piston rod **18** attached to the uppermost bar **12**. Hydraulic fluid under suitable pressure is supplied by a pump through a pressure line **19** leading to a three-way valve **20**, from which an exhaust fluid line **21** leads back to the hydraulic pressure apparatus, such as a supply tank for the pump, the tank, pump and associated parts being conventional and therefore not shown. By turning handle **22** of three-way valve **20** to one position, fluid is supplied through a pipe **23** to the upper end of cylinder **17**, thereby moving the spouts S and S′ downwardly until spout S′ is in alignment with top **16** of table T, whereupon valve handle **22** may be moved back to the neutral position shown, thus locking piston rod **18** in such position. During downward movement of piston rod **18**, fluid in cylinder **17** beneath its piston exhausts through pipe **24** to valve **20** and then through exhaust line **21**. To move the spouts S and S′ back to the position shown in Fig. 1, valve handle **22** is shifted in the opposite direction, whereupon fluid from pressure line **19** will be supplied through pipe **24** to the lower end of cylinder **17** and fluid will exhaust through pipe **23** to valve **20** and line **21**, the piston rod **18** there-

upon being raised and moving the spouts S and S' along with it. Again, when the position shown is reached, the valve handle **22** may be moved back to neutral position, thus locking the piston rod **18** and the spouts S and S' with it, in the positions shown. As will be evident, the position of the spouts S and S' is reversed only when a change to a different size of mattress is to be made.

The pusher P, as in Fig. 2, normally occupies a position beneath the lower end of a chute **25** down which the mattress may move for feeding to the apparatus, a suitable gate (not shown) conveniently being provided at a suitable point along the chute **25** so that the gate may be opened to permit each mattress **11** in turn to slide down the chute and onto the table T, preparatory to pushing the mattress **11** into bag **10**. The pusher P is moved by a reversible motor **26**, forwardly from the position of Fig. 2 to the position of Fig. 3, to push the mattress **11** into the bag **10**, at which time the motor **26** is reversed to move the pusher P back to the position of Fig. 2, whereupon another mattress may be slid into position and another bag **11** placed over the spout S or S', as the case may be, and the next mattress then pushed into the bag therefor.

As in Figs. 5, 7 and 8, the spouts S and S', as well as the alternative spout S'' of Fig. 6, are provided with a throat or entrance section and a delivery section, the throat section having a downwardly inclined top **28**, an upwardly inclined bottom **29** and converging sides **30**, which may be provided with flanges **31**, as in Figs. 6–8, for attachment to bars **12** and auxiliary bars **32** of Fig. 5. This throat section compresses the mattress before it enters the bag **10**, the open end of which is placed over the delivery end of the chute, which has a flat bottom **33**, vertical sides **34** and a top **35** attached, as by hinges **36**, to the top **28** of the throat section. The top edge of each side **34** of the spout deliverey section is preferably inclined downwardly and rounded off at the end, to facilitate placing the open end of the bag **10** thereover. If only a throat section and a discharge section having a hinged top were utilized, when the mattress enters the bag **10**, the hinged top **35** would be pushed upwardly by the force of the mattress attempting to resume its uncompressed condition and would split the bag at its front end.

In accordance with this invention, the spout is provided with means which restrict the pivotal movement of the hinged top **35** to a position preferably not more than substantially parallel to the bottom **33**, so that the mattress will still be compressed until it leaves the end of the top **35**. However, by this time the end of the mattress is well into bag **10** and the bag therefore is prevented from being split, since the open front end is the weak point of the bag and the bag is sufficiently strong several inches back from the open end to withstand the expanding force of the mattress. Such means may comprise a strap **37** which extends around the delivery end of the spout S or S' a point adjacent the hinges **36**. Or, as in the alternative spout S'', illustrated in Fig. 6, such restraining means may comprise a pair of angles **38**, each attached to one of the sides **34** of the delivery portion of the chute, preferably adjacent hinges **36**. It will be evident, of course, that other restraining means, differing in construction but adapted to perform the same function, may be utilized.

As in Figs. 1 and 4, the top **16** of table T is provided with a pair of laterally spaced, longitudinally extending channels **40** in which chains **41** and **41'** move to shift the pusher P between the positions of Fig. 2 and Fig. 3. As will be evident from Fig. 4, the channels **40** are preferably sufficiently deep that neither of the chains **41** or **41'** will contact the mattress which is placed on the top **16** of the table T, thereby preventing damage or soiling of the same, as by grease or oil. Each chain **41** and **41'** may pass around a series of sprockets, such as a front upper sprocket **42** at the front end of table T, a rear upper sprocket **43** at the rear of table T, a rear lower sprocket **44** disposed beneath sprocket **43** and a front lower sprocket **45** disposed beneath sprocket **42**. Front upper sprockets **42** may be mounted on a shaft **46**, in turn mounted in bearings **47** supported by brackets **48**, while front lower sprockets **44** may be mounted on a shaft **46'** in turn mounted in bearings **47'** supported by brackets **48'**, with brackets **48** and **48'** being suitably mounted on table T or supported in any other suitable manner. Similarly, upper rear sprockets **43** may be mounted on a shaft **49** and lower rear sprockets **44** may be mounted on a shaft **49'**, the respective shafts being mounted in bearings **50** and **50'**, in turn supported by brackets **51** and **51'**, which are mounted on table T or supported in any other suitable manner. A belt **52** may connect motor **26** with a pulley **53** on shaft **49**, or the motor may be connected by belt or directly connected to any of the sprocket shafts. A limit switch **54** may be mounted on the underside of top **16** of table T, at the rear, as in Fig. 2, and a stop **55** mounted on chain **41**, to engage limit switch **54** and reverse motor **26** when the pusher P reaches its farthest forward position, as in Fig. 3. Similarly, a limit switch **56** may be mounted on the underside of top **16** of table T, at the front, and a stop **57** mounted in a suitable position on chain **41**, as in Figs. 2 and 3, to stop the motor **26** when the pusher P has been moved rearwardly to the position of Figs. 1 and 3. The motor **26** may be started forwardly by hand, as by a push button switch **58** of Figs. 1 and 2, which may also include a push button for manually stopping the motor at any desired point. Also, the electrical connections for the motor **26** are preferably such that when limit switch **54** is actuated, the motor will automatically reverse and when the limit switch **56** is actuated, the motor will automatically stop, but when started again will move the pusher P forwardly. It will be understood, of course, that limit switches **54** and **56** may be placed in any other suitable position and also may be actuated in any other suitable manner, while a single reversing switch may be utilized, actuated by a an appropriately placed stop.

As illustrated in Figs. 1 and 4, the pusher P may comprise a front bar **60** which extends transversely and is adapted to engage the rear end of the mattress, as in Fig. 3, and the bottom of which rides along the surface of top **16** of table T. A pair of arms **61** attached at their front ends to bar **60** extend rearwardly therefrom and are attached at their rear ends to a transverse rear block **62**, front bar **60**, arms **61** and rear block **62** conveniently being made of wood, while an angle **63** may be attached to the rear lower corner of block **62**, so as to extend outwardly therefrom for attachment of a bar **64** to each of the chains **41**. The movement of chains **41** and **41'** thereby is transmitted to pusher P through bars **64**. In addition, a pair of brackets **65** may extend rearwardly from angle **63**, in spaced lateral relation, while a roller **66** may be attached adjacent the rear end thereof to the underside of each bracket **65**. As will be evident from Fig. 4, rollers **66** support the pusher P above the surface of top **16** of table T, so that only the rollers **66** and the underside of front bar **60** engage the surface thereof. This not only reduces the force required to move pusher P forwardly and rearwardly, but also causes the front bar **60** to be pulled downwardly toward the top **16**, thereby insuring that the pusher will not tend to ride up over any mattress while it is being pushed into the bag. Of course, the tractive force of chains **41** and **41'** also tends to pull the pusher P down against the surface of the top **16**.

For operation of the apparatus, the open end of a bag **10** is placed over the delivery end of a spout S, S' or S'', with the edge of the open end of the bag being upon or slightly over the restraining means, such as the strap **37** or the angles **38**. When the mattress starts into the bag, the front end of the bag is preferably held against the sides **34** of the delivery end of the chute, or against the strap **37** or one of the angles **38**, until the end of

the mattress has passed beyond the end of top 35. By this time, the top 35 will have moved upwardly against the bag and sufficient force will be exterted by the end of the top 35 pushed upwardly against the bag to hold the bag in position, while the mattress is pushed the remaining distance into the bag. Of course, the restraining means prevents the front end of the bag from splitting, as described previously. As soon as a mattress has been pushed into its bag, the bag 10 with the matress 11 therein may be moved longitudinally along the table T', until the open end of the bag clears the spout, whereupon the open end of the bag may be closed and sealed in a suitable manner, as by folding over the open end thereof and sealing with an adhesive strip. Then the mattress encased in the bag may be shifted off the table T' to a conveyor, piled on a truck for movement to shipping or storage, or otherwise disposed of. Then, the next bag 10 is placed on the table T' with its open end over the spout in the manner described, while the next mattress is delivered down inclined chute 25 onto the table T, the pusher P in the meantime having been returned to the position of Fig. 1. The motor 26 may then be started again to move the pusher P forwardly and push the next mattress into the bag. These operations may be carried out quickly, since the next mattress may be moved onto the table T while the bag in which the previous mattress is encased is being sealed and moved off the table T'.

From the foregoing, it will be evident that the apparatus of this invention fulfills to a marked degree the requirements and objects hereinbefore set forth. Thus, the apparatus quickly and readily moves a compressible article, such as a mattress, into a bag without tearing or otherwise damaging the bag. Also, since the weak portion of the bag, i. e., the open front end, is prevented from splitting by the novel spout of this invention, bags of minimum strength may be utilized, thus reducing the cost of packing. Furthermore, since the removal and sealing of a bag containing a mattress may be carried out simultaneously with the movement of the next mattress into position to be placed in its bag, a large number of mattresses may be packaged in succession with rapidity and ease. It will be understood, of course, that a different spout may be provided for each size of mattress or article to be packaged, the restraining means for a pivoted top of a spout, which constitutes an important feature of this invention, may be utilized with other types of spouts.

While a specific embodiment of this invention has been illustrated and described with particularity and certain variations therein indicated, it will be understood that other embodiments may exist and that other variations may be made, all without departing from the spirit and scope of this invention.

What is claimed is:

1. In apparatus for packing a compressible article into a bag, a spout having a converging entrance and provided with a delivery section having a flat bottom, vertical sides and a top pivoted at the rear edge thereof which compresses said article as it moves through said spout; said sides of said delivery section being arcuate at the outer ends and sloping downwardly to said outer ends; and means for restraining pivotal movement of said top to a position not more than substantially parallel to said bottom.

2. In apparatus for packing a compressible article into a bag, means providing a horizontal flat surface along which said article may be moved longitudinally; a pusher movable longitudinally along said surface; means for moving said pusher; a spout for guiding said article into a bag and having a converging throat section and a delivery section over which a bag may be placed and having a normally fixed bottom and sides and a movable top; means for limiting movement of said top of said delivery section; and means for limiting movement of said pusher into said spout.

3. In apparatus for packing a compressible article into a bag, as defined in claim 2, wherein said means for moving said pusher includes a chain or the like; and said means for limiting movement of said pusher includes a limit switch and a stop movable with said chain.

4. In apparatus for packing a compressible article into a bag, means providing a horizontal flat surface along which said article may be moved longitudinally; a pusher movable longitudinally along said surface; means for moving said pusher, including chains attached to said pusher, said flat surface having longitudinal channels for said chains deeper than the vertical thickness of said chains; and means for guiding said article into a bag.

5. In apparatus for packing a compressible article into a bag, means providing a horizontal flat surface along which said article may be moved longitudinally; a pusher movable longitudinally along said surface and having a front bar movable along said surface for engaging the rear of said article and rearwardly disposed rollers for engaging said surface; means for moving said pusher; and means for guiding said article into a bag.

6. In apparatus for packing a compressible article into a bag, as defined in claim 5, wherein said means for moving said pusher includes chains attached to said pusher and said flat surface has longitudinal channels for said chains deeper than the vertical thickness of said chains.

7. In apparatus for packing a compressible article into a bag, as defined in claim 6, wherein said pusher is provided with intermediate members extending over said channels and connected to said chains, the pull of said chains thereby tending to hold said pusher against said surface.

8. In apparatus for packing a compressible article into a bag, means providing a horizontal flat surface along which said article may be moved longitudinally; a pusher movable longitudinally along said surface; means for moving said pusher; alternative guiding means for guiding articles of different sizes into a bag; and means for supporting said guiding means and for moving said guiding means alternatively into operative position with respect to said pusher at the end of said surface.

9. In apparatus for packing a compressible article into a bag, as defined in claim 8, wherein said supporting means for said guides is disposed in upright position at said end of said surface; said guides are mounted in vertically spaced relation for upward and downward movement on said supporting means; and said means for moving said guides includes a hydraulic cylinder on said supporting means and a hydraulic valve and piping for supplying hydraulic fluid to said cylinder and controlling the same.

10. Apparatus for pushing a series of compressible articles into bags, comprising a first support having a horizontal top forming a first surface along which said article may be moved longitudinally; a chute terminating above the rear end of said support and down which said articles may be fed in succession onto said surface; a pair of spaced vertical supports at the front end of said table; a slide movable upwardly and downwardly on each vertical support; a plurality of guide spouts having different sizes and mounted in spaced vertical relation between said guides, each said spout having a throat section provided with forwardly converging sides and a forwardly converging bottom and top, a delivery section having a flat horizontal bottom, vertical sides arcuate at the forward ends and upper edges sloping toward the forward end, a top extending between said sides and pivoted to the top of said throat section, and means for restraining pivotal movement of said top to a position not more than substantially parallel to said bottom; a double acting hydraulic cylinder mounted between the upper end of said vertical supports and having a piston rod connected to said guides; hydraulic piping leading to opposite ends

of said cylinder and a control valve therefor; a second support having a horizontal top forming a second surface, forwardly of said chutes, for supporting a bag and a mattress pushed into said bag, the open end of said bag being inserted over the delivery end of a chute positioned by said hydraulic cylinder in horizontal alignment with said first surface; and a pusher movable longitudinally of said first surface and disposed beneath said chute while an article is fed onto said first surface, said pusher including a front bar extending transversely of said surface and adapted to engage the rear of said article.

11. In apparatus for packing a compressible article into a bag, as defined in claim 10, wherein said restraining means comprises a strap extending between the sides of said delivery section of each chute.

12. In apparatus for packing a compressible article into a bag, as defined in claim 10, wherein said restraining means comprises an angle attached to each side of said delivery section of each chute with a leg thereof extending inwardly and over said pivoted top of said delivery section.

13. In apparatus for packing a compressible article into a bag, means providing a horizontal flat surface along which said article may be moved longitudinally; a pusher movable longitudinally along said surface and provided with a front member adapted to engage the rear of said article; means for moving said pusher, including chains attached to said pusher, said pusher having an intermediate member extending laterally to each side and connected with each said chain by a downwardly extending member; and means for guiding said article into a bag.

14. Apparatus for packing a compressible article into a bag, as defined in claim 10, wherein said pusher includes a pair of arms extending rearwardly from said front bar to a transversely extending member, a pair of brackets extending rearwardly from said transverse member and each provided at its rear end with a roller engaging said first surface, wherein said apparatus includes at least one shaft extending transversely beneath said first surface and mounted on said first support; a pair of spaced sprockets on each said shaft; reversible electrically controlled means for driving one of said shafts in either direction; a pair of endless chains extending longitudinally in laterally spaced relation and engaging the respective sprockets, said first surface having a channel for each chain deeper than the vertical thickness of said chain and in which an upper run of each chain moves; a bar attaching each chain to said transversely extending member of said pusher at opposite sides thereof; a first limit switch mounted adjacent the rear end of said first support for reversing said drive means when said front bar of said pusher has moved said article into said bag; a stop on one said chain for actuating said first limit switch; a second limit switch mounted on said first support adjacent the front end thereof for stopping said drive means when said pusher has returned to a position beneath said chute; a stop on one said chain for actuating said second limit switch; and a switch for manually starting said drive means and also manually stopping the same at any desired position of said pusher.

15. In apparatus for packing a compressible article into a bag, a spout having a converging entrance and provided with a flat bottom, sides and a pivoted top which compresses said article as it moves through said spout into said big; and a strap extending between the sides of said spout for restraining pivotal movement of said top to a position not more than substantially parallel to said bottom.

16. In apparatus for packing a compressible article into a bag, a spout having a converging entrance and provided with a flat bottom, sides and a pivoted top which compresses said article as it moves through said spout into said bag; and members attached to said sides and extending inwardly therefrom, for restraining pivotal movement of said top to a position not more than substantially parallel to said bottom.

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