Jan. 16, 1923. 1,442,727

W. MacGOWAN.
MACHINE FOR SEALING BOXES.
FILED DEC. 18, 1919. 4 SHEETS-SHEET 1

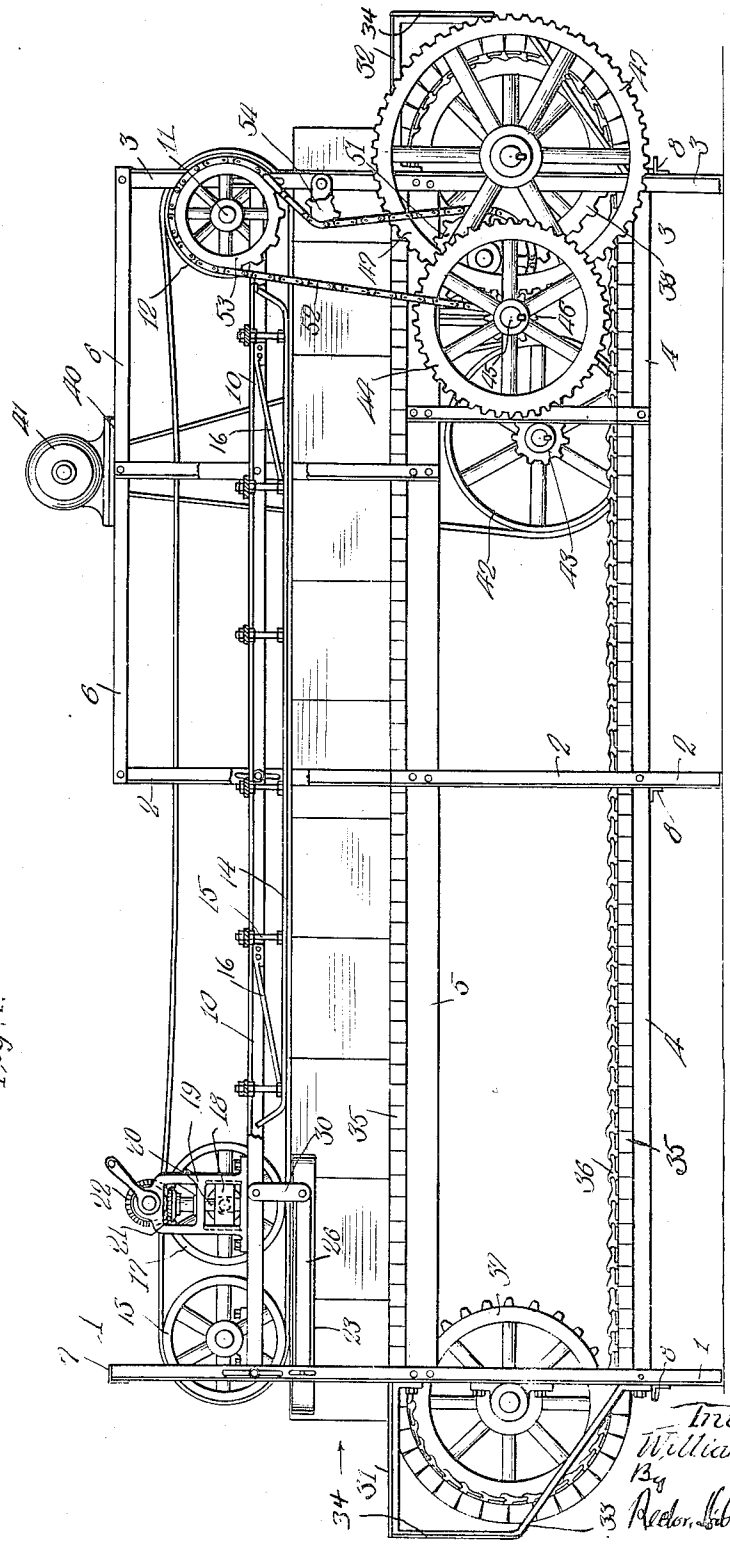


Fig. 1.

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4 SHEETS-SHEET 2

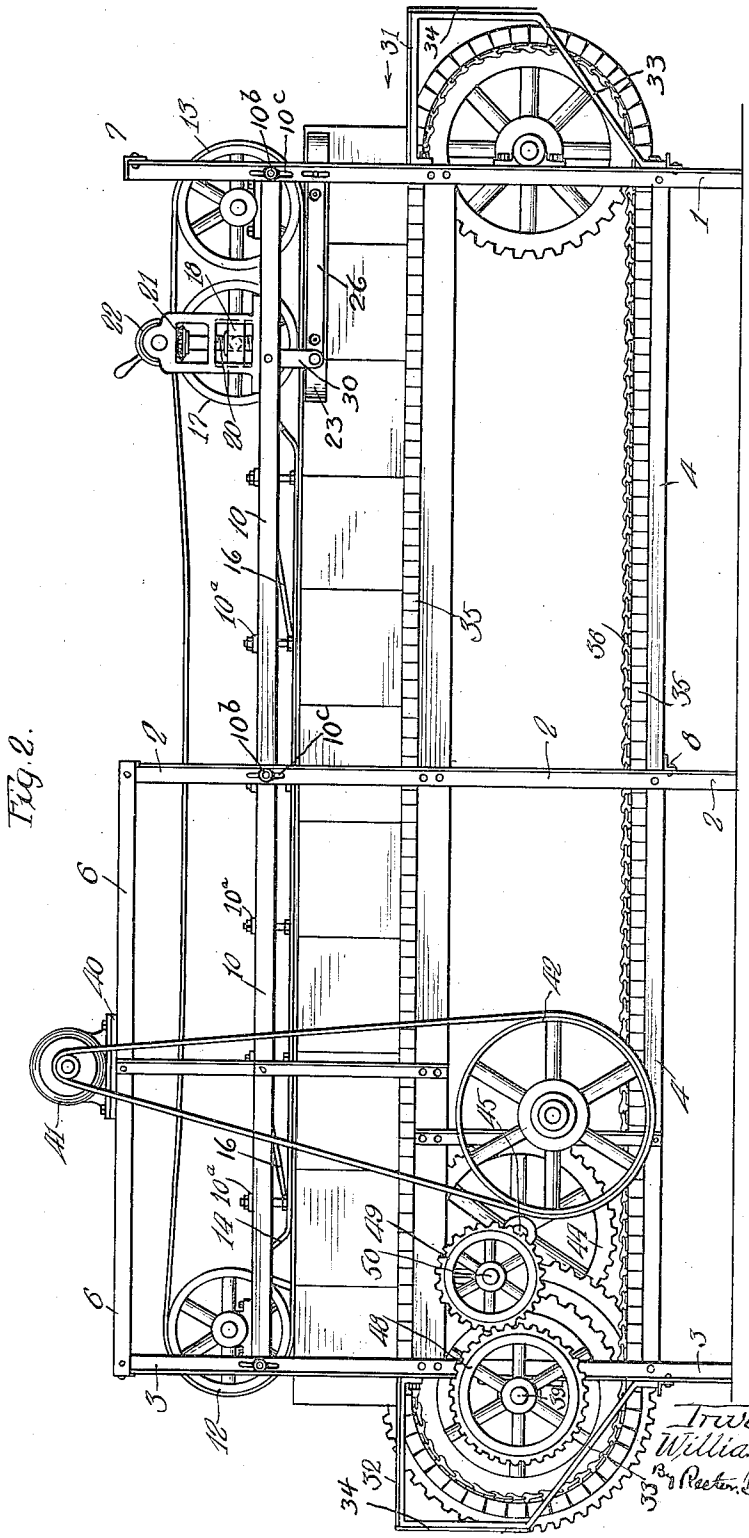


Fig. 2.

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4 SHEETS-SHEET 3

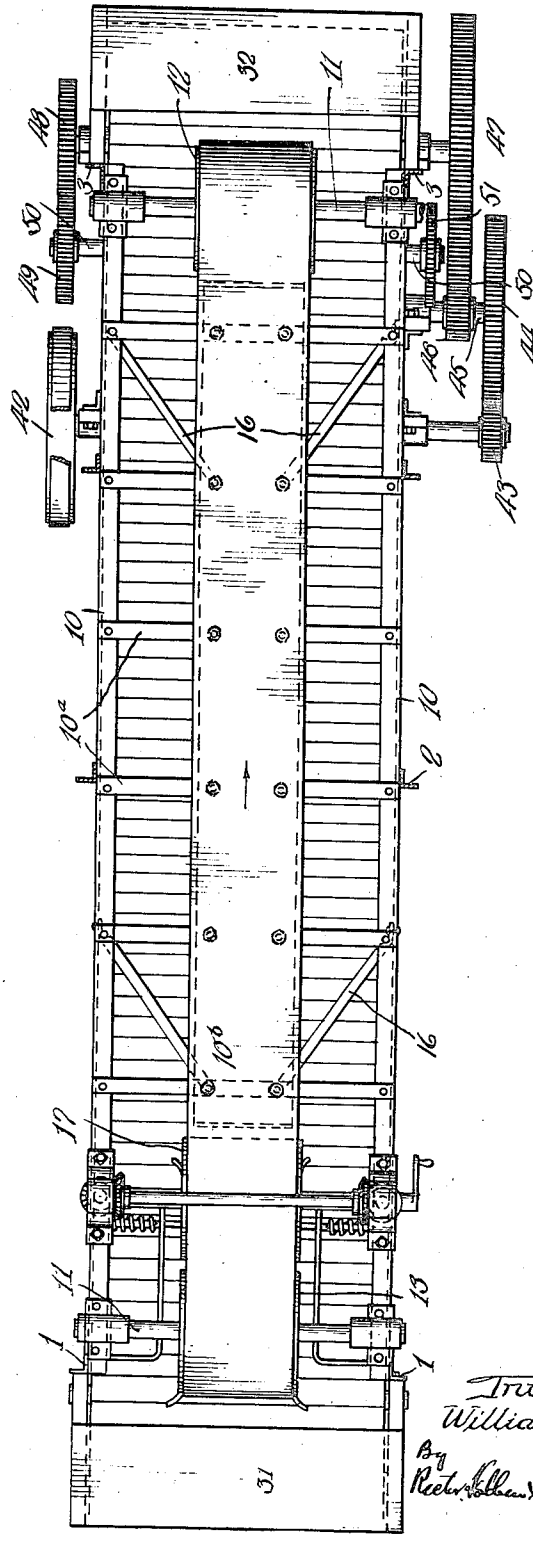


Fig. 3.

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4 SHEETS-SHEET 4

Fig. 4.

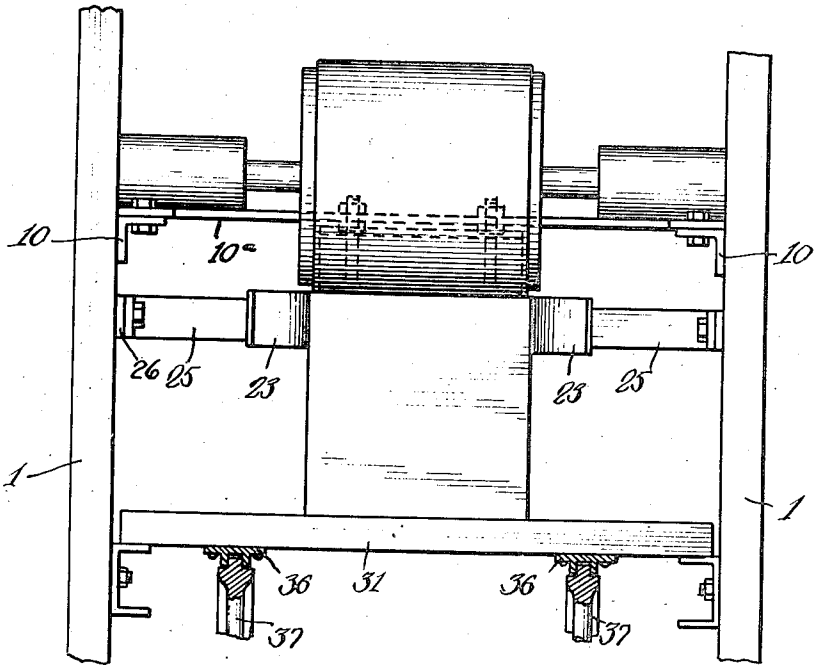
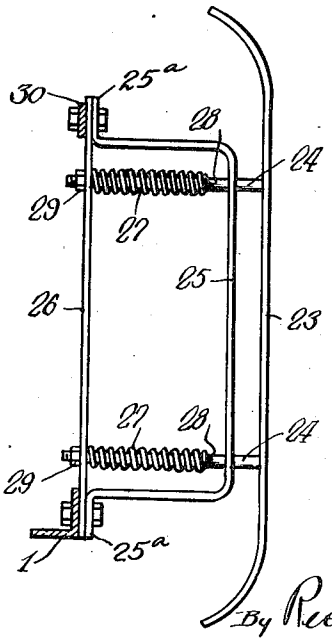


Fig. 5.



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Patented Jan. 16, 1923. 1,442,727

UNITED STATES PATENT OFFICE.

WILLIAM MacGOWAN, OF OAK PARK, ILLINOIS, ASSIGNOR TO CHICAGO MILL AND LUMBER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MACHINE FOR SEALING BOXES.

Application filed December 18, 1919. Serial No. 345,791.

To all whom it may concern:

Be it known that I, WILLIAM MacGOWAN, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Sealing Boxes, of which the following is a specification.

My invention relates to a machine adapted to seal the cover flaps of paper board containers such as are now largely used for packing and shipping a great variety of commodities, and has for its object the provision of a reliable and efficient machine which in a continuous manner will confine the closure flaps of such boxes after the cement by which they are united has been applied until a firm union has been effected, the boxes being fed into one end of the machine in a continuous row and being removed at the other. With this object in view I have designed and invented the machine hereinafter described and which is shown in the accompanying drawings, and my invention consists in the organization, arrangement and combination of cooperating parts which I have devised for the purposes in view, the essential elements of my invention being more particularly pointed out in the appended claims. It will be understood, however, that while the particular embodiment of my invention illustrated and described constitutes a practical and preferred form of my invention, variations and modifications of the same are possible, as by the substitution of equivalent elements for those described, and changes in the form and proportions of parts, without departing from the substance of my invention or the scope of my claims.

In the drawings, Figure 1 is an elevation of the right-hand side of the machine; Fig. 2 is a similar elevation of the left-hand side; Fig. 3 is a top plan view; Fig. 4 is an elevation of the upper part of the front end of the machine; and Fig. 5 is a top view of one of a pair of spring guide bars used at the front end of the machine for centering the boxes as they enter it.

The same reference characters indicate the same parts in all the figures of the drawing.

Before proceeding to a description of the construction of my machine, it may be explained that the boxes upon which my machine is designed to operate are usually constructed of paper board, either solid board or the cellular corrugated paper board now in extensive use for such purposes, and that the upper edges of the box body are provided with two pairs of cover flaps adapted to be folded down and cemented together, the lower pair being first folded down from opposite sides upon the contents of the box and a coat of suitable paste or cement applied to their upper surface, and the top pair, attached to the other two sides of the box, being then folded down towards each other across the first pair of flaps. In the use of my present machine, the cover flaps of the filled boxes may be conveniently folded down and the cement applied by hand, and the boxes then fed into the machine by an attendant, although my invention may also be used in connection with any suitable apparatus for accomplishing the folding and applying the cement.

The frame of my machine may be constructed in any desired manner of members suitably arranged to support the movable members and other cooperating parts. In the present instance the frame members are formed of angle iron or channel iron and comprise three pairs of vertical standards,—front standards 1—1, intermediate standards 2—2, and rear standards 3—3,—connected by a pair of lower side bars 4—4 and a pair of intermediate side bars 5—5, both pairs extending from the front standards to the rear standards, and also by a pair of top side bars 6—6 extending from the intermediate to the rear standards, all rigidly bolted or riveted together. The tops of the standards are similarly secured together by upper cross bars 7, and adjacent the lower side bars 4—4 the standards are connected by lower cross bars 8.

The general construction and arrangement of the principal parts of my new machine may briefly be explained before describing it in detail. From a feed table at the front end of the machine the boxes are fed in uninterrupted succession between a pair of guide bars onto the top of an endless traveling table and underneath the lower reach of a belt which travels around an idler drum at the front end of the machine and a driving drum at the rear end. The endless table and the belt are driven through suitable driving connections at the same rate of linear speed and carry the boxes under compression

from the front to the rear end of the machine, where they are delivered upon a delivery table from which they are removed by an attendant.

The belt which bears upon the closure flaps of the boxes, together with the drums which support it and the shoe which contacts its lower reach, and also the spring guide bars for centering the boxes, are all carried by a frame which is vertically adjustable in the framework of the machine, in order that they may be raised and lowered as a unit in adjusting the machine to operate upon boxes of different sizes. This frame in the present instance comprises side rails 10—10 connected by a series of cross slats 10^a, see Fig. 3. To provide for the vertical adjustment mentioned the rails 10 are connected to the vertical standards by means of bolts 10^b engaging vertical slots 10^c formed in the parallel inner flanges of such standards.

Journaled in opposite boxes secured to the rear ends of the side rails 10 of this adjustable frame is mounted a shaft 11 to which is secured the driving drum or rear pulley 12, and the front reach of the belt extends around a front, idler pulley 13, similarly mounted at the front end of the frame.—Figs. 1, 2, and 3. The shoe 14, which is curved upwardly at its opposite ends, is supported by bolts 15, the heads of which are fixed to the shoe and the threaded stems of which are secured to the cross-slats 10^a by nuts arranged on said stems on opposite sides of the slats. Diagonally arranged tie-bars 16 secured to the side rails 10 and also to the shoe 14 are used to hold the latter against the drag of boxes passing through the machine. Immediately to the rear of the front pulley 13 is arranged a pressure pulley 17 mounted upon a shaft which is journaled in vertically adjustable boxes 18 carried by the side rails 10. To enable the boxes 18 to be raised or lowered in unison they are slidingly mounted in brackets 19 secured to the rails 10 and are formed wth screw threaded sockets engaged by screw bolts 20 rotatably mounted in said brackets, and the upper ends of said bolts are equipped with bevel pinions 21 meshing with bevel pinions 22 fast to a shaft journaled in the brackets and provided with an operating crank.

The adjustment of the front pulley is such that its bottom stands slightly above the plane of the shoe 14 and slightly above the top surface of the cover flaps as the boxes are fed into the machine, and the adjustment of the pressure pulley 17 is such that its bottom lies nearly or quite in the plane of the shoe. By adjustment of this latter pulley the amount of pressure required to produce the most perfect results can be quickly regulated with precision.

The guide bars 23 used to center the boxes as they are fed into the machine each have an intermediate straight portion yieldingly supported adjacent the plane of the belt in contact with the sides of the boxes being operated upon adjacent their opposite upper edges, and outwardly flared end portions, see Figs. 3, 4, and 5. The spring mounting consists of a pair of guide stems 24 secured to the outer side of each guide bar and passing slidingly through a pair of separated supporting bars 25 and 26 rigidly connected with stationary parts of the machine, a pair of compression springs 27 interposed respectively between the outer supporting bar and two cross pins 28 fixed respectively to the two stems being used to yieldingly press the guide bar inwardly, and stop nuts 29 upon the outer ends of the two stems being used to limit the inward movement of the guide bar beyond a fixed point. The pairs of associated supporting bars 25 and 26 in the present instance are respectively supported at their rear ends by short bracket strips 30 bolted to the opposite side rails 10, 10, and at their front ends are bolted directly to the vertical standards 1, 1, and the supporting bars 25 are bent outwardly at each end to form U-shaped members, and secured by right angled-base lugs 25^a to the bars 26. The feed table 31 and delivery table 32, the upper surfaces of which lie in the same plane as the top of the traveling table or conveyor next to be described, may be of any desired construction. In the present instance the table 31 is supported by a pair of brackets 33, one at each side of the machine, and is provided with a depending guard or shield 34 to cover the ends of the conveyor, and the table 32 is similarly supported, and provided with a similar shield.

The traveling conveyor table, upon which the boxes are supported while passing thru the machine consists of an endless belt of wooden bars 35 flexibly connected together by means of pivotally interlocked sprocket members 36, two such members being secured to each bar, one adjacent each end thereof in the manner illustrated in the drawings. The ends of the bars 35 slidingly rest upon and are supported by the horizontal top flanges of the intermediate side bars 5—5 of the machine frame. The two sprocket chains thus formed by the interlocking sprocket members are engaged at the front end of the machine by a pair of sprocket wheels 37 mounted to rotate on a shaft journaled in bearings secured to the front standards 1—1, and at the rear end of the machine are engaged by sprocket wheels 38 mounted on a shaft 39 which is journaled in bearings secured to the rear standards 3—3 and is power driven through connections now to be described.

Upon a platform 40 secured to the top cross bars 6—6 of the machine is mounted

an electric motor 41, of any suitable construction, which in the present instance is used to drive both the traveling table or conveyor and the belt, although any other suitable source of power may of course be employed. The motor shaft is connected by a belt with the pulley 42, mounted upon a shaft which also carries, at the opposite and right hand side of the machine a small gear wheel 43 arranged to mesh with a larger gear wheel 44 secured to a shaft 45 journaled in the machine frame. This shaft 45 also carries a small gear wheel 46 arranged to mesh with a large gear wheel 47 fast upon the shaft 39 before mentioned, the connections intermediate the motor shaft and this shaft 39 serving to transmit power to the latter at a greatly reduced speed.

Fixed to the shaft 39, at the left hand side of the machine, is a gear wheel 48 arranged to mesh with a gear wheel 49 secured to a cross shaft 50 which is equipped at the opposite side of the machine with a sprocket wheel 51 engaged by a sprocket chain 52 which also engages a sprocket wheel 53 secured to the shaft 11 before mentioned and to which the driving pulley 12 for driving the belt is secured. A small take-up idler sprocket wheel 54 is employed which is adjustable to take up slack in the chain 52 throughout the range of vertical adjustment of the frame which carries the belt and the pulley 12.

The operation of my novel sealing machine will be readily understood from the description thus far given. The boxes are readily introduced between the two guide bars on opposite sides of the machine, and between the traveling conveyor table and the belt passing around the front pulley, which it will be remembered is slightly elevated above the plane of the pressure pulley. The guide bars, bearing at the sides of the box against the bases of the opposite cover flaps, press them inwardly against each other, and as the boxes pass rearwardly they are subjected by the pressure roll to the right degree of pressure to force the cementing material into the contacting faces of the cover flaps. Subsequently, as they continue onward through the machine, the boxes are subjected to an unyielding, unvarying pressure between the traveling table beneath and the belt, backed by the stationary shoe, above them, and the cover flaps are firmly cemented together by the time they pass out onto the delivery table.

The speed at which the machine may be operated is to some extent dependent upon the character of cementing material used, and the character of the board of which the boxes are constructed. It has been found that with a machine constructed as above described and about sixteen feet in length, good results are obtained when silicate of soda paste of a density testing about 42° Baumé is employed to cement box closures made of ordinary jute-faced paper board, and when the boxes are passed through the machine in about four minutes time.

I claim:

1. In a machine for sealing the closure flaps of boxes, a traveling conveyor table arranged to sustain the boxes and convey them longitudinally through the machine, a belt arranged to travel at the same linear speed as the table and having its bottom reach arranged to bear upon the tops of the folded flaps, and a backing shoe having a lower plane face arranged to hold said belt down against said flaps with unvarying pressure.

2. In a machine for sealing the closure flaps of boxes and having a conveyor table arranged to sustain boxes passing longitudinally through the machine and pressure means thereabove arranged to bear upon the folded flaps, guide means for centering the boxes between said table and pressure means comprising a pair of guide bars each provided with guide stems, separated supporting members orificed to slidingly receive said stem, and springs cooperating with said stems and with stationary parts of the machine to yieldingly urge said bars towards each other.

3. In a machine for sealing the closure flaps of boxes and having a conveyor table arranged to sustain boxes passing longitudinally through the machine and pressure means thereabove arranged to bear upon the folded flaps, guide means for centering the boxes between said table and pressure means comprising a pair of guide bars each provided with guide stems, separated supporting members orificed to slidingly receive said stems, and coiled springs surrounding said stems and cooperating therewith and with one supporting member to yieldingly urge said bars toward each other.

4. In a machine for sealing the closure flaps of boxes and having a conveyor table arranged to sustain boxes passing longitudinally through the machine and pressure means thereabove arranged to bear upon the folded flaps, guide means for centering the boxes between said table and pressure means comprising a pair of guide bars each provided with guide stems, inner and outer supporting members orificed to slidingly receive said stems, and coiled compression springs cooperating with said stems and said outer supporting member to yieldingly urge said stems and connected guide bar inwardly, said stems being equipped with stop means arranged to limit their inward movement.

5. In a machine for sealing the closure flaps of boxes and having a conveyor table arranged to sustain boxes passing longitudi-

nally through the machine and pressure means thereabove arranged to bear upon the folded flaps, guide means for centering the boxes between said table and pressure means comprising a pair of guide bars each provided with guide stems, inner and outer supporting members orificed to slidingly receive said stems and coiled compression springs cooperating with said stems and said outer supporting member to yieldingly urge said stems and connected guide bar inwardly, the outer ends of said stems being equipped with stop members arranged to cooperate with said outer supporting member.

6. In a machine of the character described and having horizontal bearing flanges at its opposite sides, a traveling conveyor table comprising an endless belt of flexibly-connected bars arranged to slidingly bear on said flanges, and means for driving said belt.

7. In a machine of the character described and having horizontal bearing flanges at its opposite sides, a traveling conveyor table comprising a series of bars, a pair of sprocket members secured to each bar one adjacent each end thereof, said sprocket members being hingedly connected to form a pair of endless sprocket chains and sprocket wheels engaging said sprocket chains, the ends of said bars being arranged to slidingly bear on said flanges.

8. In a machine for sealing the closure flaps of boxes and having horizontal bearing flanges at its opposite sides, an endless belt of flexibly-connected bars having its top reach arranged to slidably bear in said flanges, a belt above said first-mentioned belt having its lower reach arranged to bear upon the tops of the folded flaps, a backing shoe having a lower plane face arranged to hold said lower reach down against said flaps with unvarying pressure, and means for driving said two belts at the same linear speed.

9. In a machine for sealing the closure flaps of boxes, a traveling conveyor table arranged to support the boxes and convey them longitudinally through the machine, front and rear pulleys above said table arranged one at each end of the machine, a belt engaging said pulleys and having its bottom reach arranged to bear upon the tops of the folded flaps, and backing means arranged to hold said belt down against said flaps, the bottom of said front pulley being arranged above the plane of said backing means.

10. In a machine for sealing the closure flaps of boxes, a traveling conveyor table arranged to support the boxes and convey them longitudinally through the machine, front and rear pulleys above said table arranged one at each end of the machine, a belt engaging said pulleys and having its bottom reach arranged to bear upon the tops of the folded flaps, a backing shoe arranged to hold said belt down against said flaps, the bottom of said front pulley being arranged above the plane of said backing shoe.

11. In a machine for sealing the closure flaps of boxes, a traveling conveyor table arranged to support the boxes and convey them longitudinally through the machine, front and rear pulleys above said table arranged one at each end of the machine, a belt engaging said pulleys and having its bottom reach arranged to bear upon the tops of the folded flaps, backing means arranged to hold said belt down against said flaps, and adjustable means for applying pressure upon the top of said belt adjacent said front pulley and intermediate such pulley and said backing means.

12. In a machine for sealing the closure flaps of boxes, a traveling conveyor table arranged to support the boxes and convey them longitudinally through the machine, front and rear pulleys above said table arranged one at each end of the machine, a belt engaging said pulleys and having its bottom reach arranged to bear upon the tops of the folded flaps, backing means arranged to hold said belt down against said flaps, and a pressure pulley for applying pressure upon the bottom reach of said belt adjacent said front pulley and intermediate such pulley and said backing means, said pressure pulley being vertically adjustable.

13. In a machine for sealing the closure flaps of boxes, a traveling conveyor table arranged to support the boxes and convey them longitudinally through the machine, front and rear pulleys above said table arranged one at each end of the machine, a belt engaging said pulleys and having its bottom reach arranged to bear upon the tops of the folded flaps, backing means arranged to hold said belt down against said flaps, and a pressure pulley for applying pressure upon the bottom reach of said belt adjacent said front pulley and intermediate such pulley and said backing means, the bottom of said front pulley being arranged above the plane of said backing means and the bottom of said pressure pulley being arranged substantially in the plane of such backing means.

14. In a machine for sealing the closure flaps of boxes, a traveling conveyor table, arranged to support the boxes and movable in the stationary frame of the machine to convey them in a fixed path longitudinally through the machine, a longitudinally-extending vertically-adjustable frame mounted in said stationary frame above said table, front and rear pulleys mounted in said adjustable frame at opposite ends thereof, a belt engaging said pulleys and having its bottom reach arranged to bear upon the

tops of the folded flaps, and a backing shoe having a lower plane face carried by said adjustable frame and arranged to hold said belt down against said flaps with unvarying pressure.

15. In a machine for sealing the closure flaps of boxes., a traveling conveyor table, arranged to support the boxes and movable in the stationary frame of the machine to convey them in a fixed path longitudinally through the machine, a longitudinally extending vertically-adjustablee frame mounted in said stationary frame above said table, front and rear pulleys mounted in said adjustable frame at opposite ends thereof, a belt engaging said pulleys and having its bottom reach arranged to bear upon the tops of the folded flaps, a backing shoe carried by said adjustable frame and arranged to hold said belt down against said flaps, and a pressure pulley also mounted in said adjustable frame for applying pressure upon the bottom reach of said belt adjacent said front pulley and intermediate such pulley and said backing shoe.

WILLIAM MacGOWAN.