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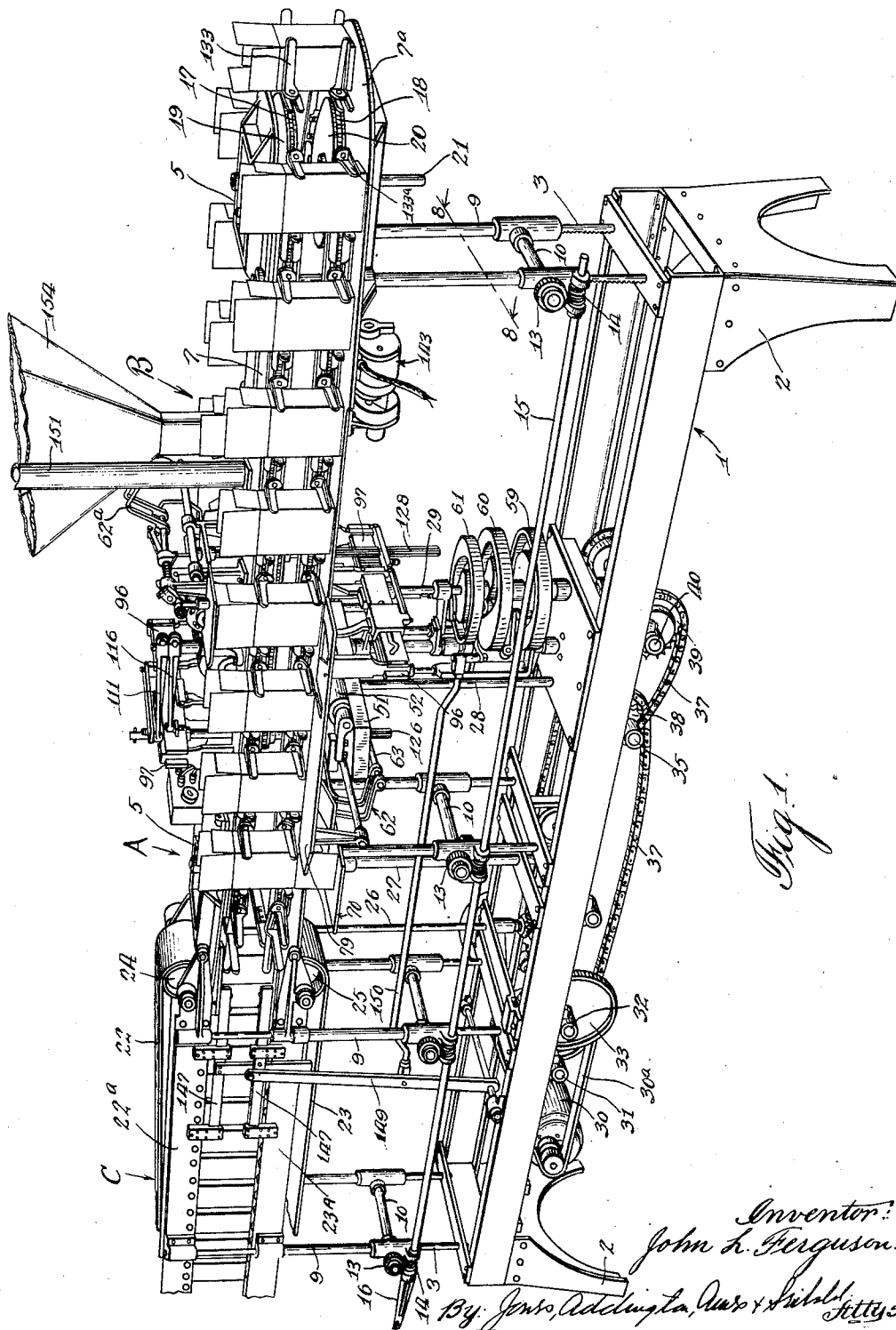
J. L. FERGUSON

2,136,901

CARTON SEALING MACHINE

Filed Jan. 20, 1936

13 Sheets-Sheet 1



Nov. 15, 1938.

J. L. FERGUSON

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CARTON SEALING MACHINE

Filed Jan. 20, 1936

13 Sheets-Sheet 2

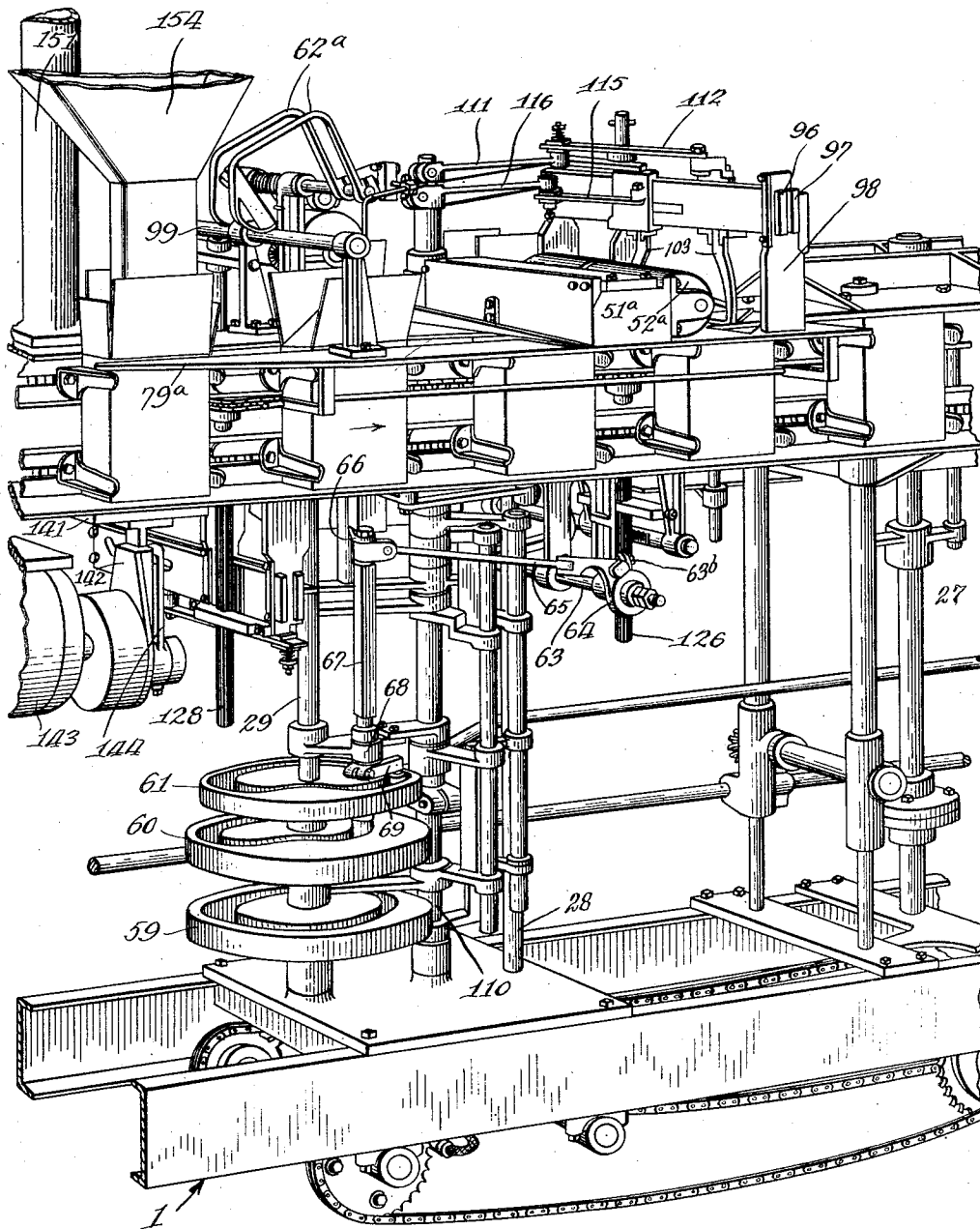


Fig. 2.

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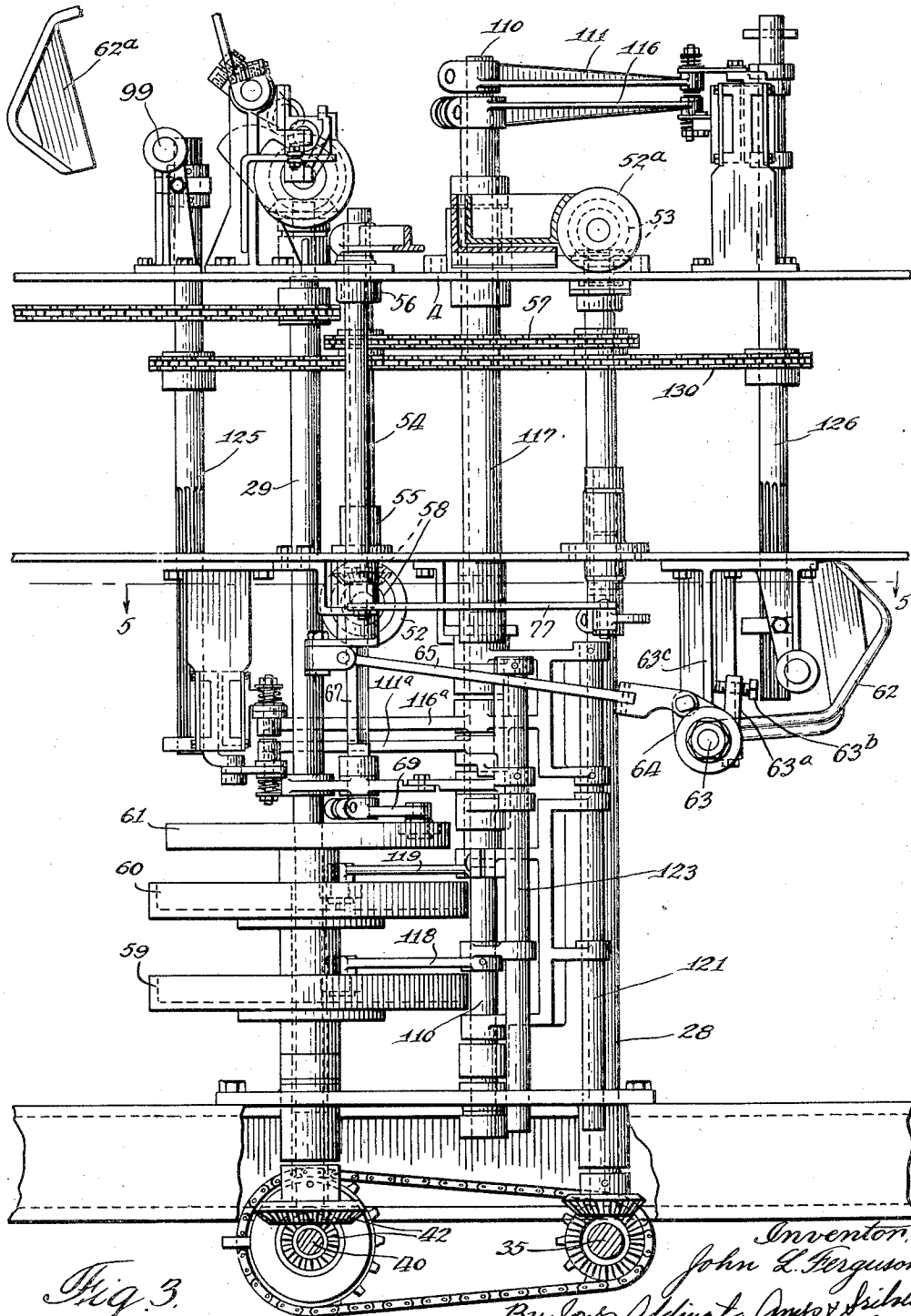
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CARTON SEALING MACHINE

Filed Jan. 20, 1936

13 Sheets-Sheet 3



Inventor:
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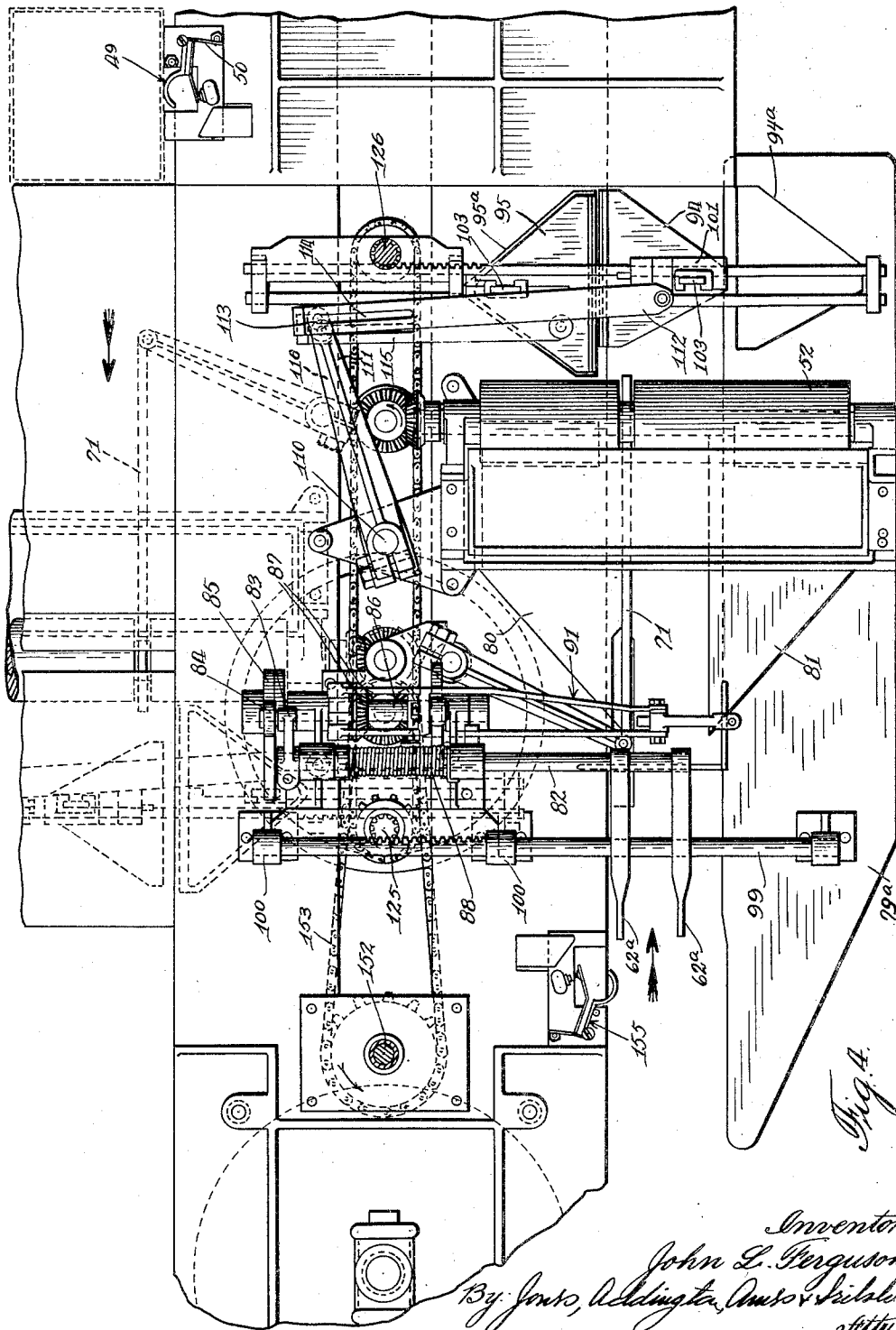
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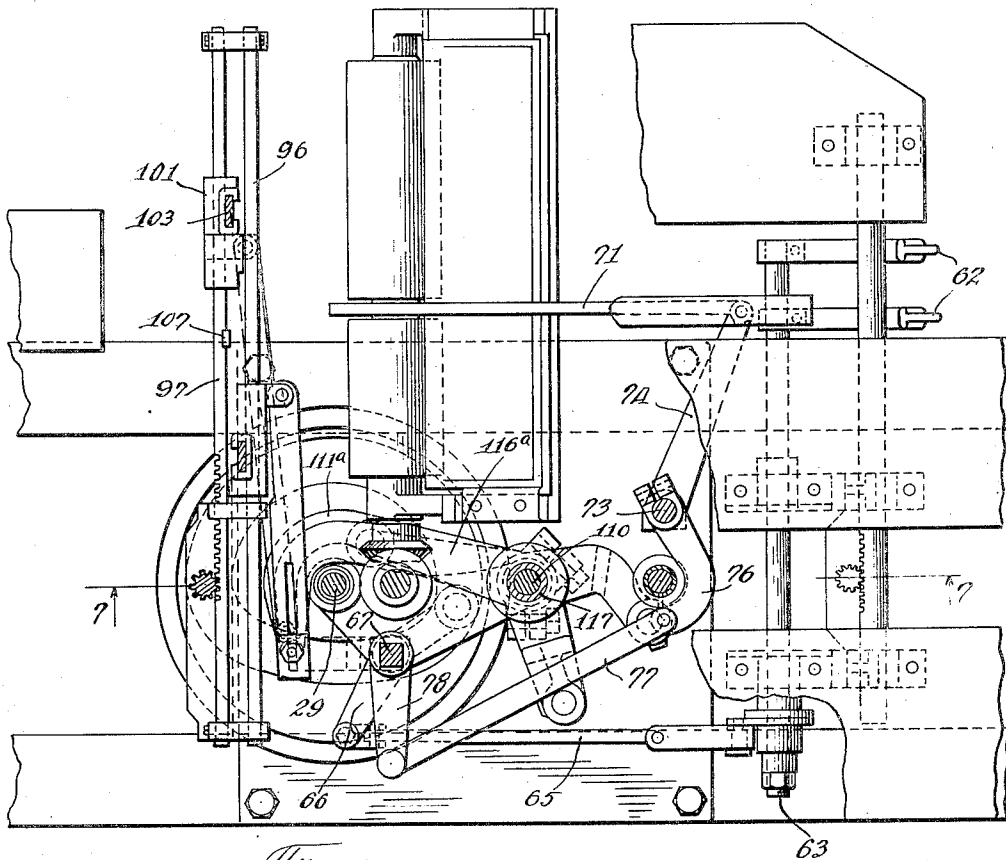


Fig. 5.

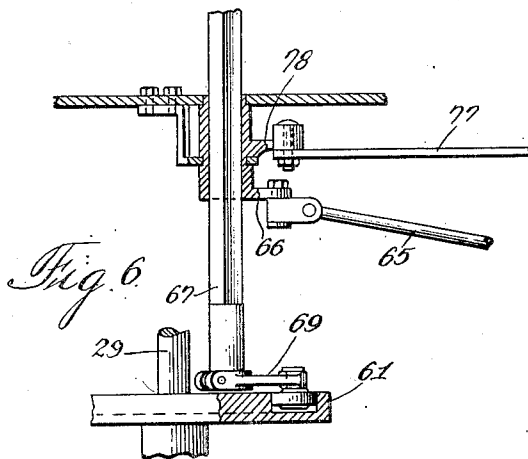


Fig. 6.

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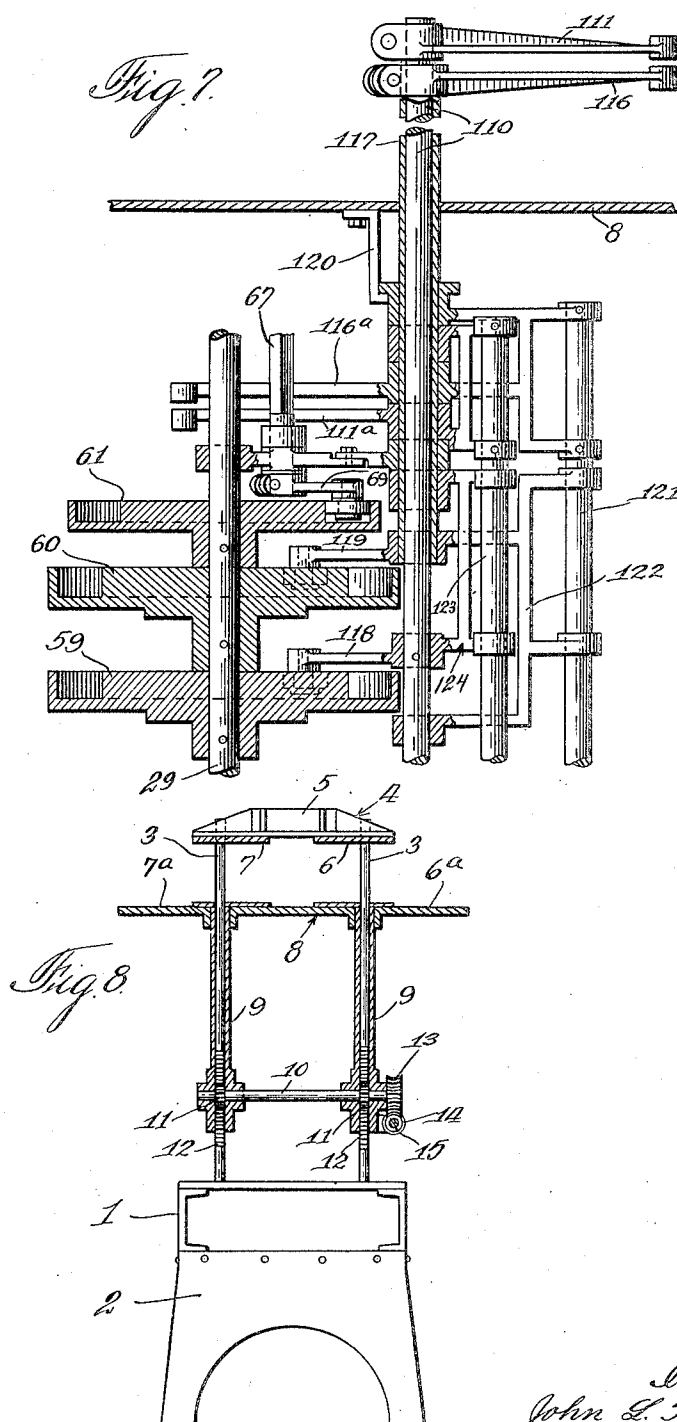
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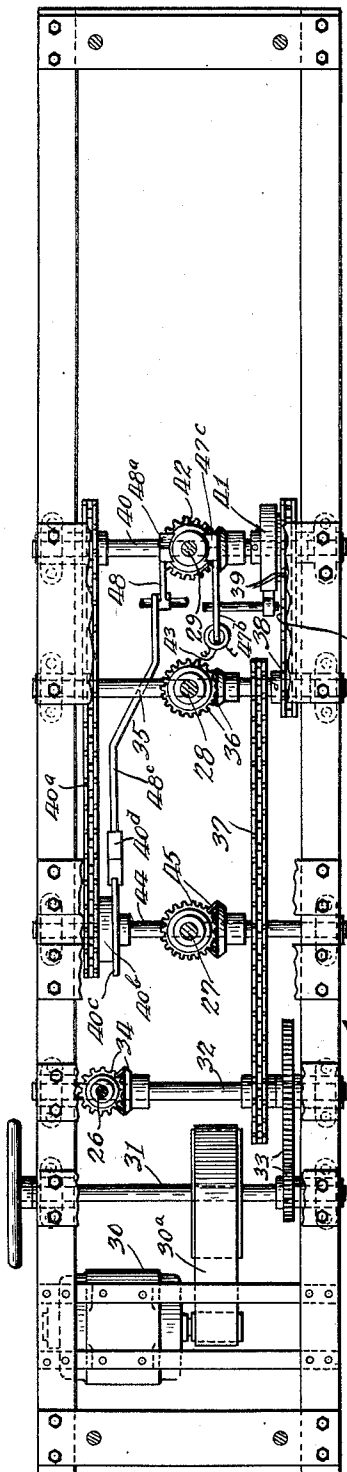


Fig. 9.

Fig. 10.

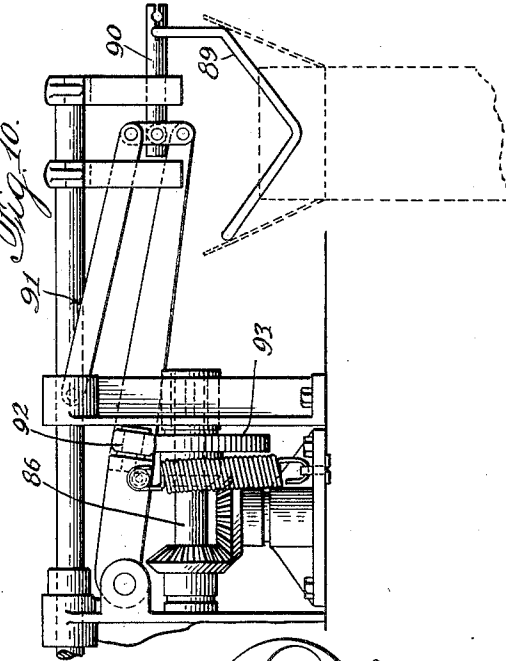
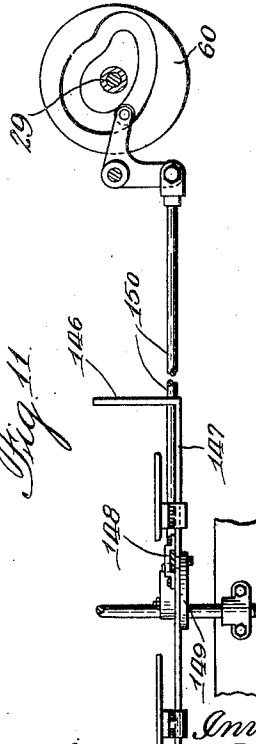


Fig. 11.



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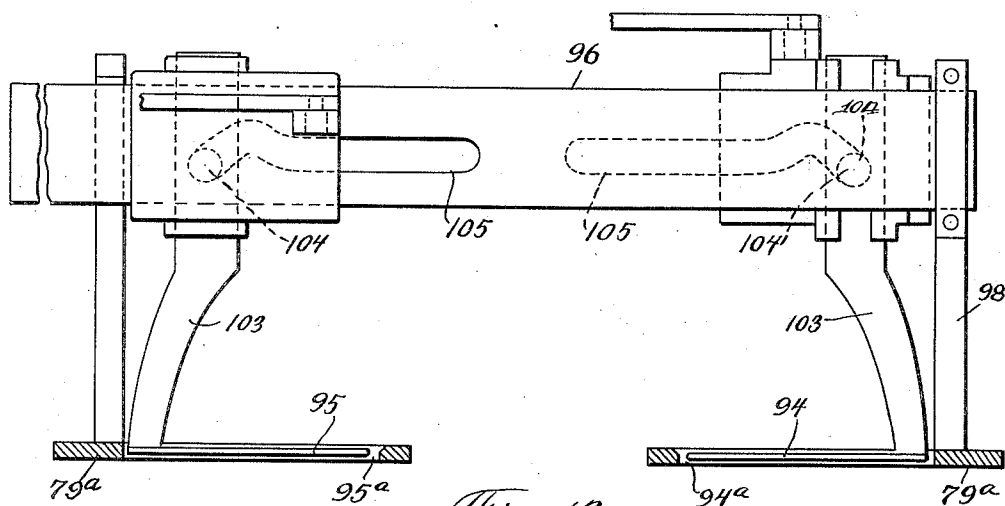


Fig. 12.

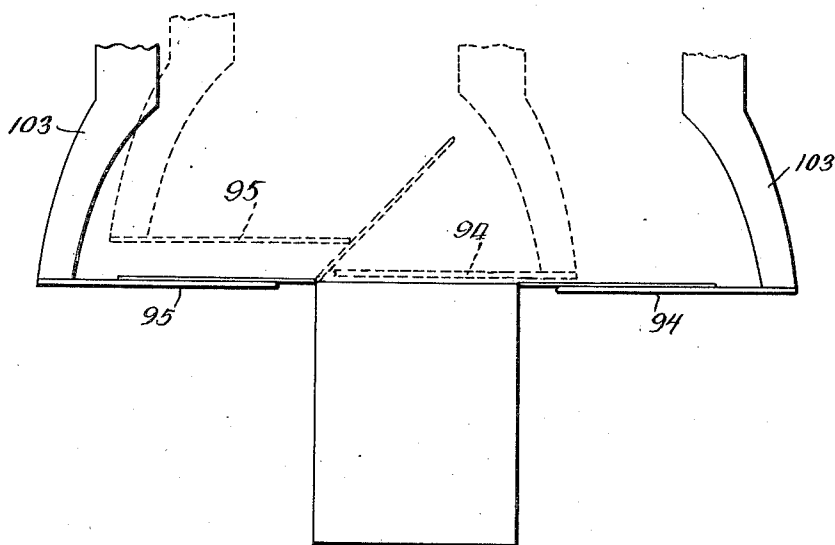


Fig. 12a

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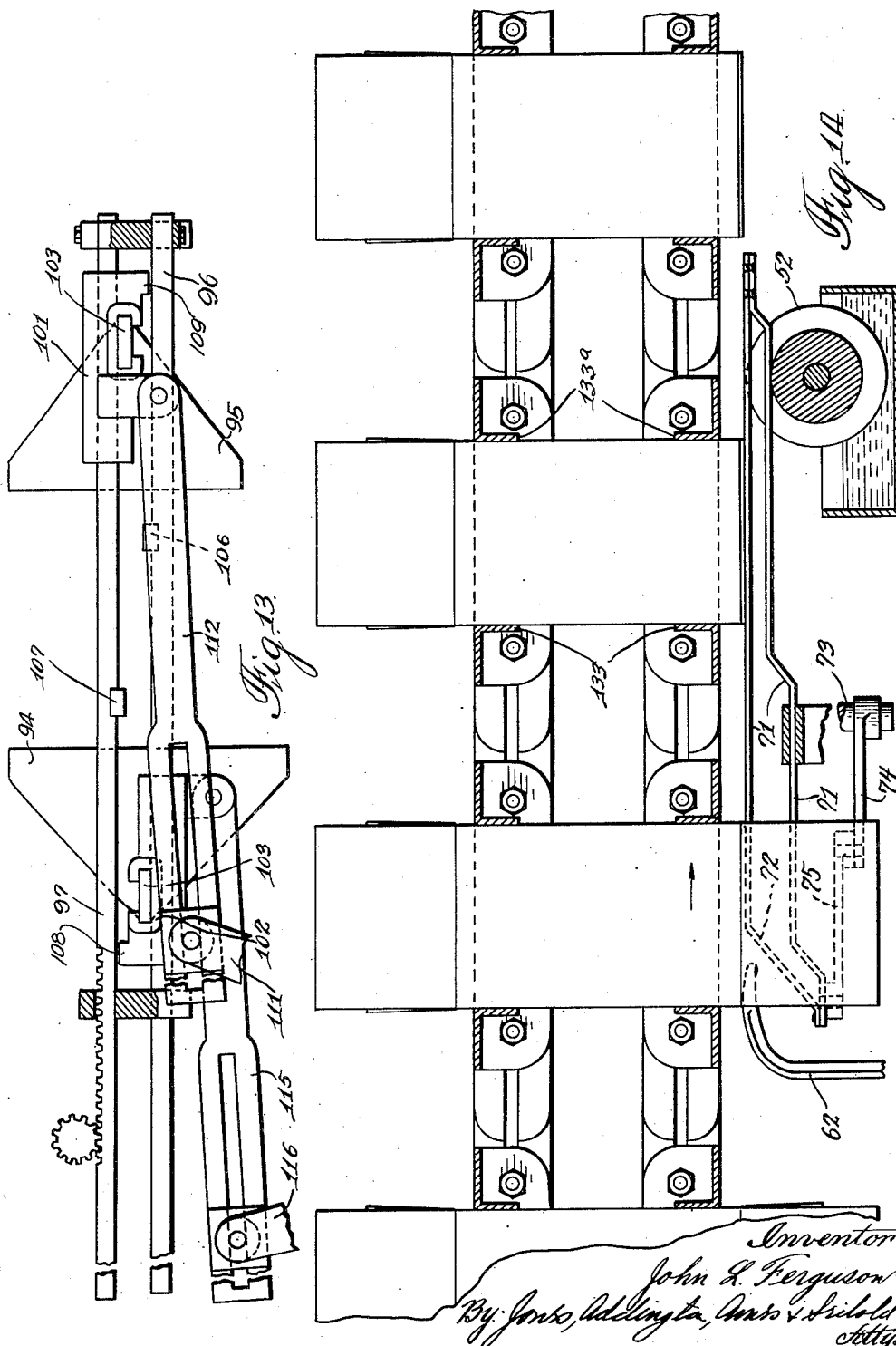
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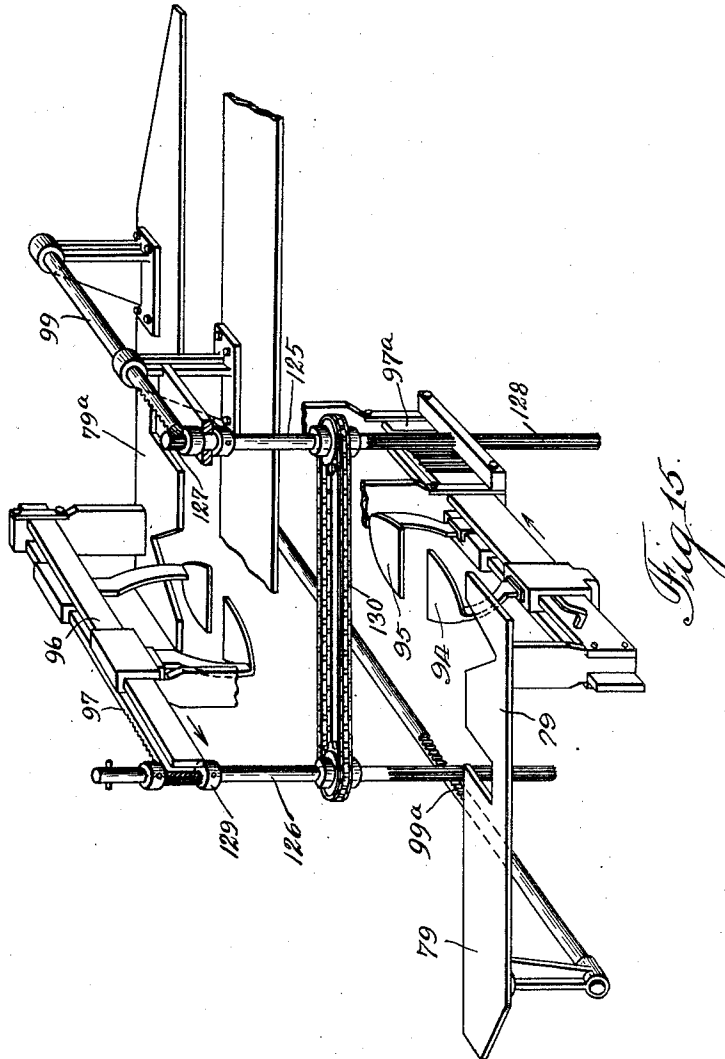
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CARTON SEALING MACHINE

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Inventor:
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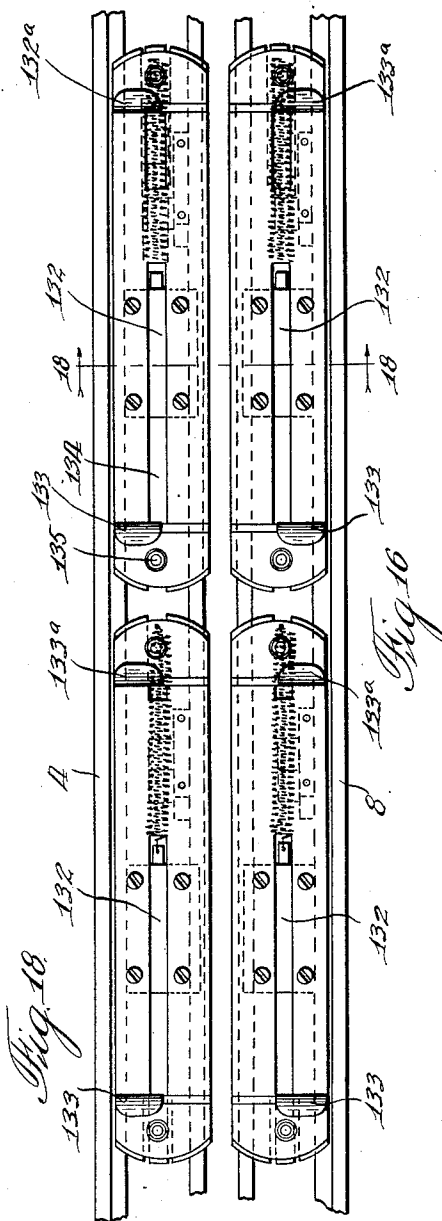
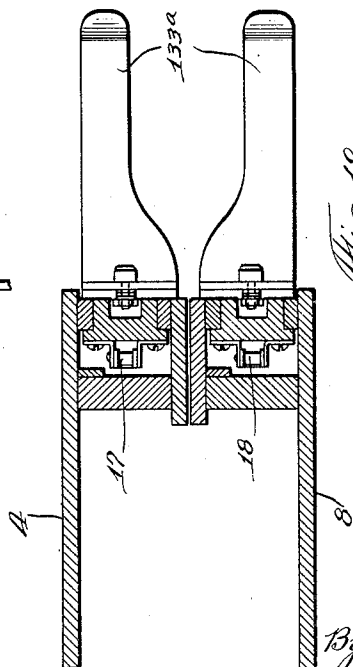
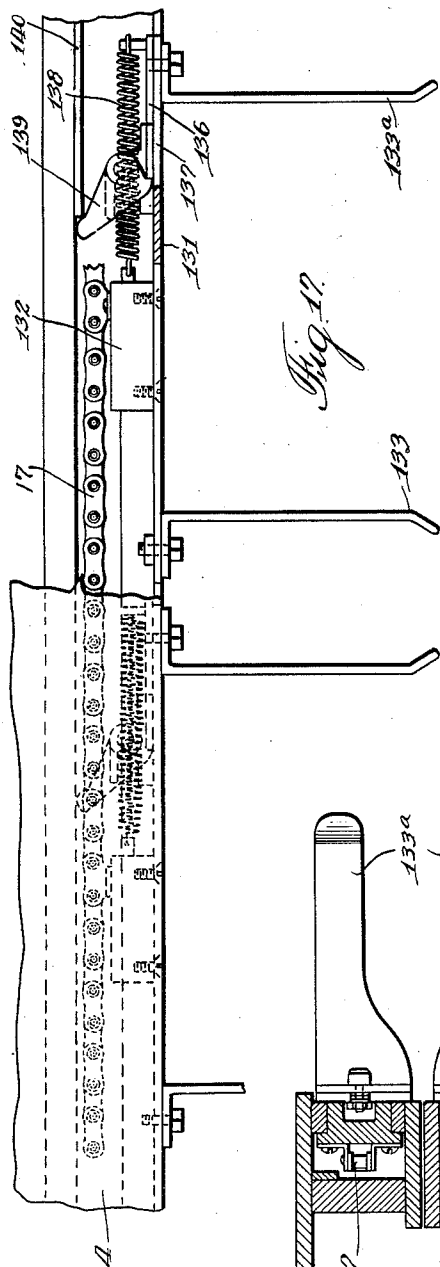
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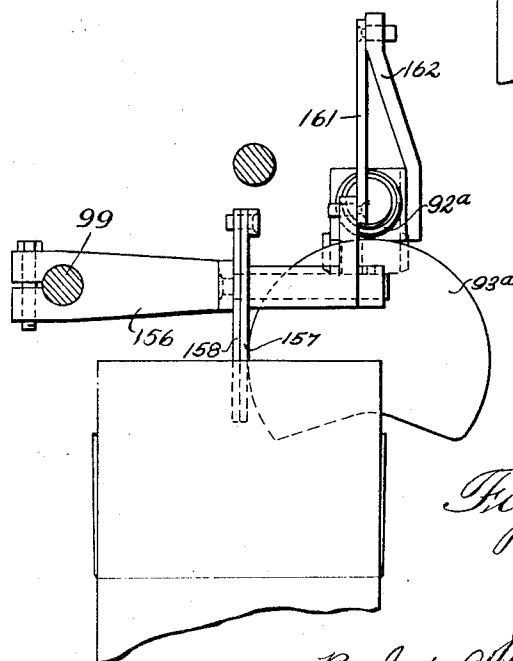
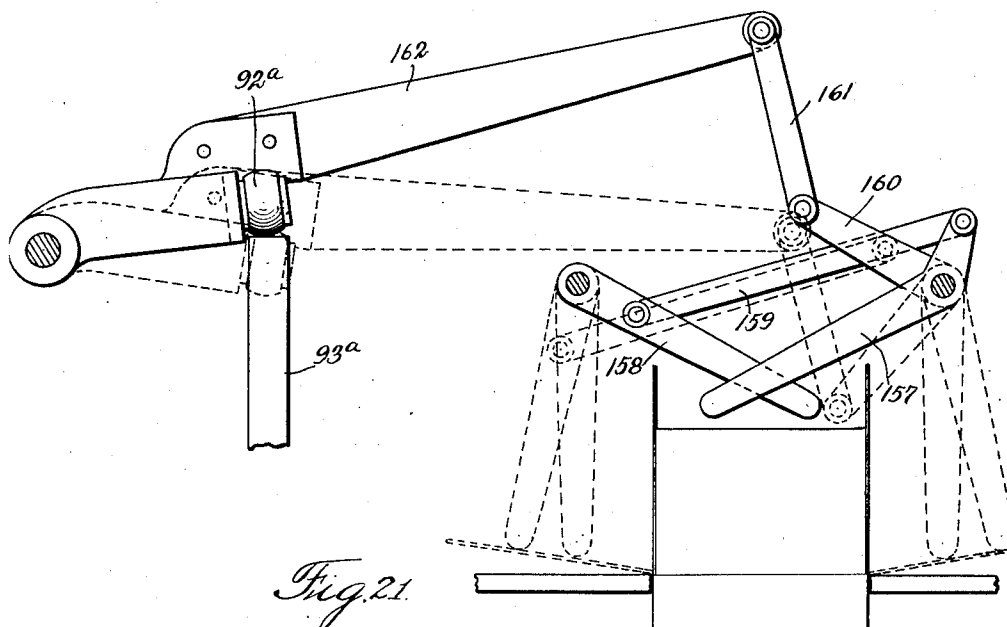
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CARTON SEALING MACHINE

Filed Jan. 20, 1936

13 Sheets-Sheet 13



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UNITED STATES PATENT OFFICE

2,136,901

CARTON SEALING MACHINE

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Application January 20, 1936, Serial No. 59,850

41 Claims. (Cl. 93—6)

This invention relates to carton sealing machines and more particularly to so-called double sealers to which cartons may be continuously fed, either by hand or automatically, and in which one open end of each squared-out carton is automatically sealed. The cartons may then be filled by a suitable filling device, the open end automatically sealed, and the filled and sealed carton may be removed from the machine by suitable mechanism.

It is an object of the invention to provide a comparatively high speed double sealer in which the complete folding and sealing mechanism occupies a very small space and in which the entire device may be adjustable, whereby a single machine may accommodate cartons of various sizes and proportions in accordance with normal requirements. For instance, the particular machine illustrated in the drawings was designed to accommodate cartons from 2½ inches to 6½ inches wide, 1 inch to 4 inches thick, and 4 inches to 10 inches in height. However, the invention is adaptable to machines which may be adjustable in all directions within any reasonable limits.

It is a further object of the invention to provide a double sealer in which the open end of an unfilled carton and the open end of a filled carton may be sealed substantially simultaneously and wherein both of the sealing mechanisms may be simultaneously adjustable for operation on cartons of various dimensions.

It is a further object of the invention to provide a double sealer in which substantially all of the operations, particularly those relating to sealing operations, are simultaneously controlled from a single driven member.

Further objects will be apparent from the specification and the appended claims.

In the drawings,

Figure 1 is a front perspective view of a complete double sealing and filling machine illustrating one embodiment of the invention;

Fig. 2 is an enlarged perspective view of a portion of the back or carton filling side of the machine and particularly illustrates the sealing and gluing mechanism and the driving mechanism therefor;

Fig. 3 is an enlarged side elevation of the sealer controlling mechanism, taken from the back of the machine, as illustrated in Fig. 2, a portion being broken away for purposes of illustration;

Fig. 4 is a top plan view of that part of the machine comprising the folding and sealing mechanism including the carton receiving station and the filling station;

Fig. 5 is a transverse sectional view taken on a line substantially corresponding to line 5—5 of Fig. 3 and illustrates a portion of the folder operating mechanism;

Fig. 6 is a detail elevation, partially in section, of the link-and-lever cam controlled mechanism for operating the end flap folding members illustrated in Fig. 4;

Fig. 7 is a fragmentary sectional view illustrating the relative arrangement of the various parts of the cam controlled mechanism for operating the various sealing members and taken on a line substantially corresponding to line 7—7 of Fig. 5;

Fig. 8 is a transverse sectional view through the frame and taken on a line substantially corresponding to line 8—8 of Fig. 1. This view illustrates the arrangement whereby the entire lower folding and sealing mechanism and the carton supporting frame or table may be vertically adjusted to accommodate cartons of various heights;

Fig. 9 is a top plan view of the base of the machine with the superstructure broken away for the purpose of illustrating the driving mechanism;

Fig. 10 is a side elevation of one embodiment of the liner spreading mechanism;

Fig. 11 is a top view of the automatically movable arms and operating mechanism for moving the filled containers from the container conveyor or into the discharge conveyor;

Fig. 12 is a side elevation of the upper side-flap folding mechanism and illustrates the position of the folders during their movement and when ready to begin a folding operation;

Fig. 12a is a diagrammatic view illustrating the movement of the folder shoes during a folding operation;

Fig. 13 is a top plan view of the side flap folding mechanism with portions broken away for purposes of illustration with the shoes in the position illustrated in Fig. 12;

Fig. 14 is a somewhat diagrammatic vertical sectional view through the bottom carton-sealing mechanism and illustrates the method of sealing the cartons by successive steps;

Fig. 15 is a perspective view of the lateral adjusting mechanism;

Fig. 16 is a side elevation of the conveyor chains and track therefor and illustrates the adjustable flights for engaging the cartons;

Fig. 17 is a top view, partially broken away, of the mechanism illustrated in Fig. 16 and illustrates the tripping mechanism whereby the carton is released by the flights at the filling station.

tion so that it may be operated by a suitable shaker while being filled;

Fig. 18 is a transverse sectional view taken on a line substantially corresponding to line 18—18 of Fig. 16;

Fig. 19 is a top view of the clutch controlling mechanism whereby the sealing operations are synchronized with the step-by-step movements of the cartons;

Fig. 20 is a side elevation, partially in section, of the mechanism illustrated in Fig. 19;

Fig. 21 is a side view of a preferred form of liner folder; and

Fig. 22 is an end view of the liner folder illustrated in Fig. 21.

Referring to the drawings in detail, the embodiment illustrated comprises an elongated base 1, which may comprise a framework having side channel irons and connecting cross bars, as shown, and which may be supported on suitable legs 2. The base 1 is provided with a plurality of vertical posts 3 and these posts are arranged to support the entire folding and sealing mechanism. A framework 4 (Fig. 8) is secured to the top of the posts 3 and rigidly supported thereon and may comprise end plates 5, one of which is mounted at each end of the machine, as shown in Fig. 1, and longitudinal plates 6 and 7 extending between plates 5 and rigidly secured thereto and on which is supported all of that portion of the folding and sealing mechanism arranged for sealing the top of the cartons after they have been filled.

A second frame member or table 8 is substantially identical to the frame member 4 but is inverted as illustrated and is slidably supported upon the vertical posts 3 by means of sleeves 9 which are arranged to telescope the posts 3. The longitudinal plates 6* and 7* of the table 8 are sufficiently wide over portions of their length to provide a support for the moving cartons. Transverse shafts 10 are mounted in suitable bearings in the sleeves 9 and are provided with pinions 11 engaging rack teeth 12 on the posts 3. Worm wheels 13 are secured to the ends of the shafts 10 and operatively engaged by worms 14 on a longitudinal shaft 15, which latter extends along the front of the machine, as illustrated in Fig. 1. The shaft 15 is supported in suitable bearings in the sleeves 9 and may be provided with a crank 16, whereby the lower framework or table 8 and all of the mechanism supported thereon may be vertically adjusted as desired relative to the upper frame or support 4. All of the lower folding and sealing mechanism for sealing the lower end of the unfilled cartons is mounted on the table 8. It will, therefore, be apparent that the device may be accurately adjusted for any desired length of carton by raising or lowering the table.

As illustrated in Fig. 1, the sealer is provided with an endless carton conveyor comprising chains 17 and 18 which are mounted on suitable sprockets 19 and 20, respectively, at each end of the machine. The sprocket 19 is fixed to an idler shaft 21 and in fixed relation to the upper frame member 4 and the lower sprocket 20 is slidably splined on the shaft 21 in fixed relation to the table 8, whereby the lower chain 18 and its associated sprockets are vertically adjustable with the table 8 and relative to the upper fixed frame 4 and the chain 17.

The conveyor chains 17 and 18 are provided with suitable outwardly extending flights for engaging the cartons and the lower adjustable frame 8 is laterally extended to provide a table

or raceway to support the moving cartons between the flights, as illustrated. The construction and operation of the carton holding flights will be described later.

The chains 17 and 18 provide a continuous conveyor for the cartons, and, as illustrated in Fig. 1, the empty cartons are squared out and inserted between the flights at a receiving station, indicated by the reference character A. Suitable mechanism is provided for intermittent operation of the conveyor and is controlled by each insertion of a carton whereby the cartons are moved step by step in accordance with the insertion of the squared out cartons. During the step-by-step movements the lower flaps are folded and sealed. The cartons are then moved by the consecutive movements of the conveyor along the supporting table or frame 8 to the filling position, indicated by the reference character B. The path of movement from the first sealing mechanism may be as long or short as desired and, in the present embodiment, is comparatively long so that other operations may be performed if desired, such as the insertion of liners, coupons, etc.

At the filling station B the cartons are automatically filled by a suitable weighing and dumping device and are then moved, by the successive intermittent step-by-step movements of the conveyor, under a suitable sealing mechanism which completely folds and seals the flaps of each carton. Continued movement brings each filled carton into alignment with a suitable discharge conveyor, indicated generally by the reference character C, into which the cartons are delivered.

The conveyor C may be of any of the usual types and may comprise upper and lower belts 22 and 23 supported on suitable pulleys 24 and 25, respectively, and continuously driven by means of a vertical shaft 26. The pulley 24 and belt 22 thereon are supported on a suitable frame 22* which is, in turn, fixedly supported at the top of the supporting posts 3, while the lower pulley 25 and belt 23 are mounted on a frame 23* which is, in turn, secured to the sleeves 9. The lower frame 23* and the lower belt 23 thereon are vertically adjustable simultaneously with the table 8 to conform to a desired height of carton. The discharge conveyor drive shaft 26 may coact with any suitable mechanism for driving these pulleys and belts, such as a fixed worm and bevel gear transmission for driving the pulley 24 and a similar worm and gear transmission slidably mounted on the shaft 26 and having the worm splined thereon for driving the pulley 25. It will, therefore, be apparent that the entire mechanism, including the discharge conveyor, is adjustable by means of the crank 16 to accommodate any desired length of carton.

The carton conveyor, comprising the chains 17 and 18, is intermittently driven by means of a vertical shaft 27 provided with suitable bearings in the base 1 and in the upper frame member 4 and secured to its associated upper sprocket 19, the lower sprocket 20 being splined or otherwise slidably mounted in driven relation on the shaft. It will be apparent from the above description, with particular reference to Fig. 1, that the upper chains 17 and associated sprockets 19 at each end of the machine are supported in fixed relation to the upper frame 4 and that the lower chain 18 and associated sprockets 20, one of which is also at each end of the machine, are carried by the adjustable table 8 and are adjustable therewith. The sprockets mounted on the

short shaft 21 are idlers, while the similar sprockets at the opposite end of the machine are the driving sprockets and are driven by means of the shaft 27.

5 Suitable glue rolls, which may be of the ordinary, well-known type, are provided for both the upper and lower sealing mechanism and these glue rolls are continuously driven by means of a vertical shaft 28 mounted in suitable bearings in 10 the base 1 and in the upper frame member 4. All of the folding and sealing mechanism, except the glue rolls, is intermittently operated in synchronism with the movement of the carton conveyor by means of a vertical cam shaft 29, this cam shaft also being mounted in suitable bearings in the base 1 and in the upper fixed frame 4.

The discharge conveyor drive shaft 26 and the glue roll drive shaft 28 are continuously driven, while the carton conveyor drive shaft 27 and the sealer mechanism cam shaft 29 are intermittently driven. This is accomplished by a suitable mechanism mounted in the base 1 (Fig. 9) and which comprises a motor 30 connected in driving relation to a transverse shaft 31 by means of a belt 30^a and suitable pulleys. The shaft 31 is connected in driving relation to a second transverse shaft 32 by means of suitable speed reducing gears 33. The shaft 32 drives the discharge conveyor drive shaft 26 through bevel gears 34 and the discharge conveyor will, therefore, be driven continuously. A transverse shaft 35 is mounted adjacent the vertical glue roll drive shaft 28 and is driven therefrom by means of suitable bevel gears 36, the shaft 35 being 35 driven from the shaft 32 by means of a chain 37 on suitable sprockets. It is, therefore, obvious that both the discharge conveyor shaft 26 and the glue roll shaft 28 may be continuously driven from the motor 30.

40 In order to drive the vertical cam shaft 29 and the carton conveyor shaft 27 intermittently, a sprocket 38 is secured to the shaft 35 and connected by means of a chain 38^a to a sprocket 39, which latter is rotatably mounted on a transverse shaft 40. The sprocket 39 forms the driving member of a normally disengaged clutch 41, whereby the shaft 40 may be intermittently driven through the mechanism just described by intermittently engaging and disengaging the clutch 41. The sealer mechanism cam shaft 29 is driven from the shaft 40 by means of bevel gears 42 which are preferably a two-to-one ratio.

The clutch 41 may be of any suitable type, for instance, such as shown in Figs. 2, 3, and 4 of Patent No. 1,967,374, issued to Scott, July 24, 1934. The clutch 41 is provided with a pawl 41^a which is similar to the clutch pawl illustrated in the above-mentioned patent, and the clutch is normally retained disengaged by means of a 50 spring-pressed detent, which latter is normally in a position to prevent the engagement of the clutch by retaining the pawl 41^a in clutch disengaging position. A solenoid 43 is arranged to be energized whenever an empty carton is inserted in the machine and this energizing of the solenoid withdraws the spring-pressed detent from engagement with the pawl 41^a and the clutch is immediately engaged and the cam shaft 29 rotated one revolution.

70 The carton conveyor is intermittently driven by a transverse shaft 44 mounted adjacent the vertical carton conveyor drive shaft 27 and connected thereto in driving relation by means of beveled gears 44^a. The shaft 44 is driven from 75 the shaft 40 by means of a sprocket chain 40^a on

suitable sprockets. The sprocket on the shaft 44 is rotatably mounted thereon and forms the driving member of a clutch 40^b, which latter may be substantially identical with the previously described clutch 41 except that it is provided with 5 a loosely mounted stop plate 40^c having two stop lugs thereon, as illustrated in Figs. 19 and 20, for controlling a pawl 46 similar to the pawl 41^a of the cam shaft clutch. The pawl 46 has a pin 46^a thereon extending through a slot 46^b in the 10 plate. The clutch 40^b is normally retained engaged by means of a detent 40^d engaging one of the lugs on the plate.

A suitable clutch controlling mechanism is provided whereby the two clutches may be operated 15 in such a manner that the cam shaft 29 performs one revolution and the shaft 44 performs one-half a revolution, whereby the operation of the cam shaft 29 and the step-by-step movement of the carton conveyor may be properly synchronized. 20

The mechanism for controlling the clutches is shown in Figs. 19 and 20 and comprises a rock shaft 47 mounted in suitable bearings and having a depending clutch engaging arm 47^a for normally retaining the clutch 41 disengaged. The 25 rock shaft 47 is provided with an arm 47^b secured thereto and arranged to be moved by the solenoid 43 to permit engagement of the clutch 41. The arm 47^b is also provided with a forwardly extending cam portion 47^c which is in the path of a roller 47^d secured to the cam shaft 29. It will therefore be apparent that whenever the solenoid is operated to release the clutch pawl to permit engagement of the clutch 41 the rotation of the cam shaft 29 will cause the roller 47^d 35 to engage the cam arm 47^c and prevent the disengagement of the clutch 41 until the cam shaft has made a complete revolution. This arrangement is desirable in view of the fact that the gears connecting the cam shaft to the clutch driven shaft are preferably two-to-one ratio, and it is therefore necessary that the shaft 40 and the driven member of the clutch thereon shall make two revolutions to one revolution of the cam 45 shaft.

In order to properly synchronize the movement of the carton conveyor shaft with the movement of the cam shaft, the conveyor clutch 40^b is controlled by means of a bell crank lever 48 having a cam portion 48^a which is also in the path of the roller 47^d, so that immediately before the cam shaft 29 has completed its revolution the bell crank 48 will be operated to permit the engagement of the clutch 40^b. The bell crank 48 is provided with a rearwardly extending rod 48^c 55 having a detent 40^d thereon which is normally in the path of the lugs on the clutch stop plate 40^c, and is moved by the operation of the bell crank to release the clutch plate and permit engagement of the clutch 40^b. By this arrangement the two clutches are properly synchronized so that the cam shaft is rotated once for each step of the carton conveyor. 60

The solenoid 43 is provided with a suitable electrical circuit for connection with a power source and is in series with a switch 49. The switch 49 is illustrated in detail in Fig. 4 and is mounted on the upper frame 4 adjacent the carton receiving station A and is normally held open by means of 70 a spring 50. The switch will be closed whenever an empty carton is inserted between the conveyor flights at the receiving station and in a position to be moved by the carton conveyor.

The spring-pressed clutch detent, when released 75

by the solenoid, immediately returns to clutch-disengaging position as soon as the inserted carton is moved by the conveyor sufficiently to release the switch 40. The clutch is preferably operated in a manner to cause one revolution of the cam shaft 29 and the conveyor drive shaft 27 whenever an empty carton is inserted.

As the cartons are inserted they are moved step by step by the intermittent operation of the clutches in accordance with the insertion of consecutive cartons. The sealing operation of the lower end of the squared-out carton is accomplished in the first three steps of the intermittent operation after the carton is inserted.

In the first step, the end flaps are folded and are maintained in folded position by means of a longitudinally movable bar or retainer illustrated in Fig. 14. This bar retains the end flaps folded during succeeding steps until the side flaps are folded and sealed and the bar is withdrawn during the final sealing operation. In the second step the side flaps are folded outwardly in a position to be engaged by the glue rolls and have a suitable adhesive applied thereto during the next succeeding step. During the said succeeding step the extended side flaps pass over the glue rolls and the adhesive is applied and suitable laterally movable sealing members or shoes fold the side flaps. One of these shoes retains its position against the flaps after sealing, thereby holding them sealed until the next succeeding step during which the carton is moved onto the laterally extending table 8 which forms a path and supporting member for the cartons as they are moved by the conveyor.

The steps just described refer to the first folding operations on the lower flaps of the empty squared-out carton inserted at A as illustrated in Fig. 1. The mechanism for performing these folding and sealing operations is adjustable for various sized cartons and is supported on the lower table 8 and is vertically adjustable therewith.

After the carton has been filled and leaves the filling station B, the upper flaps are folded in exactly the same manner as previously described for the folding operation on the lower flaps. This final sealing is also accomplished in three steps and substantially simultaneously with the lower end sealing operations on the opposite side of the machine. The mechanism, however, for folding and sealing the upper flaps is supported entirely upon the upper fixed frame 4 as illustrated in Fig. 2.

So-called adhesive applying mechanisms are provided and comprise an adhesive container or tank 51 and a glue roll 52 which are supported on the adjustable table 8 for applying adhesive to the bottom flaps of the empty carton, and a similar adhesive container 51^a and associated glue roll 52^a are mounted on the upper fixed table 4 for applying adhesive to the flaps of the filled container. The glue roll 52^a is continuously driven from the vertical glue roll shaft 28 by means of beveled gears 53 (Fig. 3) and the lower glue roll 52 is driven from the same vertical shaft 28 by means of a short vertical shaft 54 which is supported in a suitable bearing 55 on the lower table 8 and is telescopically mounted in a bearing 56 on the upper fixed table 4. The short shaft 54 is driven from the shaft 28 by means of a chain 57 on suitable sprockets. The sprocket on the shaft 54 is splined thereon to permit the shaft to telescope the sprocket as well as the upper frame 4 when the table 8 is vertically adjusted. The

lower glue roll 52 is driven from the short shaft 54 by means of beveled gears 58.

By this construction it will be apparent that when the lower table 8 is adjusted vertically to conform to a carton of the desired height, the lower glue roll 57 will also be raised or lowered.

A plurality of cams 59, 60 and 61 are secured to the vertical cam shaft 29, and these cams control substantially all of the sealing mechanism for sealing both the lower and upper flaps. With each single revolution of the cam shaft and cams thereon all of the folding operations just described are performed simultaneously on various cartons. The first folding operation in the first step beyond the receiving station A is accomplished by means of an angular folder or tucker 62 secured to a transverse shaft 63 which is oscillatably mounted in suitable brackets on the lower table 8. This shaft 63 is provided with a continuously engaged friction clutch 64 which is connected by means of a link 65 to an outwardly extending arm 66 on a vertical shaft 67. The vertical shaft 67 is mounted in a suitable telescopic bearing on the lower table 8. The lower end of the shaft 67 is supported in a suitable bracket having a bearing 68, and the shaft is provided with a cam arm 69 having a suitable roller thereon for engagement in a cooperating groove in the cam 61. With each revolution of the cam 61, the tucker 62 will fold in one of the downwardly extending end flaps.

The tucker shaft 63 is provided with an upwardly extending arm 63^a having an adjusting screw 63^b bearing against the shaft supporting bracket 63^c. This adjusting screw provides an adjustable stop for limiting the upward movement of the tucker 62, whereby the upward stroke of the tucker may be limited to conform to the size of carton being sealed. While the stroke of the mechanism operating the tucker is fixed, the friction connection 64 between the mechanism and the tucker shaft 63 permits the use of the adjustable stop to limit the movement.

When the squared-out cartons are inserted between the conveyor flights at the receiving station A, they are supported on the extended lower flap ends by means of a vertically adjusted bracket 70 (Fig. 1) which is mounted on the lower table 8. The vertical adjustment of bracket 70 is for the purpose of accommodating various sized cartons having flaps of a corresponding length. During the movement of the carton to the first step position, the advancing lower end flap is folded rearwardly by engagement with an elongated flap folder and retainer bar 71, which is illustrated in detail in Fig. 14. This folder bar 71 is slidably mounted in a suitable bearing on the glue container 51 and extends forwardly beyond the glue roll in a position to retain the end flaps in their folded relation through the second and third steps and until the side flaps are folded sufficiently in the third step to retain the end flaps. During the final folding of the side flaps in the third step, the retainer bar 71 is moved rearwardly out of engagement with the carton in order to allow the side flaps to be completely folded. This rearward movement of the retainer bar 71 causes the inclined end 72 of the bar to fold the forward end flap of the advancing carton at the first step position. The bar extends beyond this flap sufficiently to retain the opposite flap in folded position after it has been moved inwardly by the tucker 62. As the carton moves forwardly the bar 71 also moves forwardly so that the opposite end travels with the preceding car-

ton to the third step to retain the end flaps as described above.

The sequence of the folding operations will be described later with special reference to Fig. 14.

5 It should be noted that the folding and sealing mechanism illustrated in Fig. 14 is for folding the bottom flaps of the squared-out cartons moving consecutively from station A and that a substantially identical mechanism is used on the 10 opposite side of the machine and inverted from the position illustrated in Fig. 14 for sealing the upper flaps after the cartons have been filled and are moving consecutively from the filling station B.

15 Both of the retaining bars 71 are operated in synchronism with the tuckers and are operatively connected to the vertical shaft 67 which is oscillated by means of cam 61. The lower bar 71 for operating on the lower end flaps is connected to a 20 stub shaft 73 by means of an outwardly extending arm 74 secured thereto and connected to the bar 71 by means of a link 75. The stub shaft 73 is operatively connected to the cam operated shaft 67 by means of an arm 76 on the stub shaft 25 and a link 77 connected to an arm 78, which latter is oscillatably mounted in a suitable bearing in the lower table 8 so as to be vertically adjustable with the table as indicated in Figs. 3 and 7. The shaft 67 is preferably square and telescopes 30 the arm 78 through the arm bearing, as shown in Figs. 5 and 7. It will therefore be obvious that both the upper and lower flap retaining bars 71 will be reciprocated with each intermittent rotation of the cam 61.

35 A laterally extending shelf 79 (Fig. 1) is mounted for lateral adjustment on the lower table 8, and a similar laterally extending shelf 79^a (Figs. 2 and 4) is mounted for simultaneous lateral adjustment on the upper frame 4 and on the opposite 40 side of the machine. These shelves 79 and 79^a, in cooperation with the lower table 8 and upper frame 4, respectively, provide adjustable guides between which the cartons are guided during the sealing operations. The shelves 79 and 45 79^a are in horizontal alignment with the surface of the lower table 8 and the upper frame 4, respectively, whereby the side flaps may be spread out against the surface of these members and pressed against the adjacent glue rollers during 50 the movement of the carton to the final step position.

Fig. 4 illustrates clearly a top view of the sealing mechanism and the relation of the side flap spreaders thereto. The spreaders for spreading 55 the lower flaps are identical with those illustrated in Fig. 4 for the top flaps, except inverted in position. It is therefore believed that a description of the top spreaders illustrated in Fig. 4 will be sufficient for both mechanisms.

60 The side flap spreaders comprise the usual tapered sheet metal members 80 and 81, which are secured to the frame member 4 and the shelf 79^a, respectively, as illustrated. Spreader 81 is therefore laterally adjustable with the shelf 65 79^a. The adhesive container and glue roll are not secured to the shelf 79^a, but instead are supported on the frame 4 and overhang the shelf and a portion of the frame with sufficient clearance so that the spread side flaps may pass there- 70 between. The tapered ends of the spreaders are preferably formed upwardly and curved in cross-sectional contour so as to engage between the flaps of the moving carton and cause them to be moved outwardly by the angular edges of the 75 spreaders and to completely spread the flaps into

a horizontal position adjacent the shelf 79^a and the upper frame 4. This spreading occurs as the carton moves from the first step position to the second step, and during the third step the carton moves beyond the glue roller and receives a 5 suitable adhesive and stops at the end of the third step where suitable transversely movable shoes close and seal the side flaps and retain them in closed position until the carton moves from the third step position under a laterally extending 10 portion of the upper table 4, which portion retains the flaps sealed until they are ejected from the machine into the discharge conveyor by mechanism which will be described later.

In the lower sealing mechanism, the lower 15 flaps are retained sealed by the folder mechanism until the carton moves onto the laterally extending portion or track of the lower table 8 whereby they are retained sealed as they move 20 around the machine to the filling station.

The sealing portion of the mechanism is very compact and a very short machine may be provided if desired. In the embodiment illustrated herein, however, the forward end of the machine is somewhat extended; that is, the carton 25 conveyor is elongated so that any desired operations may be performed while the carton is moving from the first sealing mechanism to the loading station. For instance, it is sometimes desired to insert so-called liners in these car- 30 tons. The liners comprise paper bags which are inserted in the containers after the bottom is sealed, the bags being open in such a manner as not to interfere with the filling operation. The upper ends of these bags are prefer- 35 ably folded with the flaps in such a manner that the folded portions of the bag interlock with the sealed flaps.

The upper folding and sealing mechanism is provided with a tucker 62^a which is similar to 40 the tucker 62 of the lower mechanism. It will be apparent that this tucker might be operatively connected to the shaft 67 to operate simultaneously with the tucker 62. However, when 45 liners are used, it is desirable to time the tucker mechanism somewhat differently in order to cooperate with the movement of a suitable liner spreading device. Therefore, in the present embodiment the tuckers 62^a are secured to an oscillatable transverse shaft 82. The shaft 82 is provided with a cam arm 83 having a roller 84 coop- 50 erating with a cam 85, which latter is secured to a short shaft 86 mounted in a suitable bracket on the upper frame 4. The short cam shaft 86 is driven from the main vertical cam shaft 29 by means of bevel gears 87. The roller 84 is normally held against the cam with the tucker 62^a 55 in the raised position illustrated, by means of a spring 88 on the shaft 82.

One method of spreading the liners is illus- 60 trated in Fig. 10. The spreader comprises a U-shaped rod 89 adjustably secured to a longitudinal rod 90, which latter is adjustably supported on a compound lever arrangement 91. The arms of this compound lever are pivoted on 65 suitable brackets and provided with a roller 92 in engagement with a cam 93 secured to the short shaft 86. The liner-spreader 89 therefore has a substantially vertical motion which may be so synchronized with the movement of the 70 carton and with the tuckers that the downward movement of the spreader will spread the liners immediately before the folding-in of the end flaps, and as these end flaps are folded in, the spreader 89 will simultaneously raise out of 75

the way of the flaps, and the flaps in their continued closing movement will also fold the ends of the liner inwardly, leaving the sides spread in a closed triangular formation. The upwardly extending portions of the liner adjacent the side flaps will then be further spread during the next step by the side flap spreaders to pass under the glue roll and will be folded inwardly during the final side flap folding operation so that the triangular shaped liner ends are interlocked between the flaps as they are sealed. A preferred form of liner-spreading mechanism is illustrated in Fig. 21 and will be described later.

As previously stated, suitable transversely movable side flap folding mechanisms are provided, one of these mechanisms being mounted on the lower table 8 for folding the lower side flaps and a similar mechanism being inverted and mounted on the upper frame 4 for folding the upper flaps after the carton has been filled. As these mechanisms are substantially identical, it is believed that a description of the upper mechanism for folding the filled cartons will suffice for both. This mechanism, as illustrated particularly in Figs. 4, 12, 12a, and 13, comprises transversely movable shoes or folding members 94 and 95, which are preferably triangular as illustrated, and, when in a position to receive the flaps thereover, are housed in suitable openings 94^a and 95^a in the shelf 79^a and the frame 4, respectively, so that their upper surfaces are substantially flush therewith. The shoes are mounted on an adjustable telescopic framework comprising a bar 96 rigidly secured to the upper frame 4 by means of suitable brackets, and an inwardly movable bar 97 slidably mounted on the member 96 in parallel relation, as illustrated in Fig. 13. The shelf 79^a is secured to this adjustable bar 97 by means of a bracket 98 (Fig. 2), the opposite end of the shelf 79^a being supported on a rack bar 99, which is slidably mounted in suitable brackets 100 on the upper frame 4. It will be apparent that the shelf 79^a may be adjusted laterally and the folders will be simultaneously adjusted to operate on a desired size of carton.

Slide members 101 and 102 are mounted on the bars 96 and 97, respectively, and the folding shoes 94 and 95 are provided with upwardly extending arms 103 which are slidably mounted for vertical movement of the slide members 101 and 102. The shoe arms 103 are provided with inwardly extending pins 104 engaged in elongated slots 105 in the respective bars 96 and 97. The slots 105 are oppositely disposed in the bars 96 and 97 and are so shaped that when the slides are moved inwardly each of the shoes will make an angular upward and downward movement, thereby lifting and closing its respective side flap. The continued movement causes each shoe to slide over its respective flap and press it snugly in position. The normal stopped position of the shoe 94 is immediately over the carton flap and pressing thereon as illustrated in Fig. 4, whereby the flaps are retained in closed position until the next intermittent movement whereby the shoe is moved to the position of Fig. 12 to receive another carton and the sealed carton is moved under the laterally extending portion of the upper frame 4, which continues to hold the flaps sealed. Figs. 12 and 13 show the position of the shoes ready to receive the flaps of a succeeding carton during an intermittent movement and is not the normal stopped position.

The bars 96 and 97 are provided with stops 106 and 107, respectively, to limit movement of the shoe slides. These stops are engaged at the limit of the inward movement by projections 108 and 109 on the slide members, and it will be apparent that, as the slide bar 96 is fixed on the upper frame member 4, the stop 107 will always stop the shoe 94 at a fixed point in its inward movement irrespective of any adjustment. The guide bar 97 being adjustable, the stop 106 will always stop the shoe 95 in a position corresponding to the width of the carton to which the machine has been adjusted.

Figs. 12 and 12a illustrate the shoes 94 and 95 moved from their normal stopped position and their relation to a sealed carton which is stopped at the third step position. In Fig. 12a the movement of the shoes during the folding operation is illustrated in dotted lines. As soon as the intermittent movement is started the shoe 94 moves outwardly from the stopped position of Fig. 4 to the position indicated in Figs. 12 and 12a, and during this movement the sealed carton moves forwardly and a succeeding carton, with the side flaps extended and glued by passing under the glue roll, moves to a position to be folded by the shoes. The shoe 94 is preferably somewhat narrower than the shoe 95, so that the forward movement of the succeeding carton allows the shoe 94 to be moved to the position indicated in Figs. 12 and 12a before the succeeding carton has advanced sufficiently to have its movement interfered with by the shoe. Also, at the start of this forward movement, the inner open flap starts over the shoe 95 and the shoe 95 simultaneously starts toward sealing position, thereby raising the flap to the dotted line position shown in Fig. 12a. The cam operating the shoe is so shaped that the shoe 95 hesitates substantially at the position indicated by dotted lines, in which position the side flap has been moved to angular position sufficiently to retain the inner end flaps closed, while the retainer bar 71 (Fig. 14) is withdrawn by its rearward movement previously described. During this movement of the shoe 95, the shoe 94 performs a similar operation on the opposite side flap and moves to the closed position indicated by dotted lines and then moves outwardly to its original position. During this outward sliding movement of shoe 94 the shoe 95 continues its movement and completely closes the outer flap. The shoe 95 remains in this sealing position until the next intermittent movement, thereby retaining the flaps sealed until the carton is again moved. The movement of the shoe 95 is somewhat delayed relative to the movement of the shoe 94 whereby the shoe 94 is completely withdrawn from the carton before the shoe 95 completely closes the opposite flap.

When it is desired to seal cartons having short side flaps, or when the flaps do not overlap or may meet edge to edge on the center line of the carton, the movement of the shoes 94 and 95 may be adjusted so that they do not overlap. They may be made to move inwardly simultaneously if desired, with a dwell at the proper time to permit the retaining bar 71 to be withdrawn.

The slide 101 for moving the shoe 94 is operated from a vertical shaft 110 which is positioned on the axial line of the machine and centrally located between the side flap folding mechanisms. The shaft 110 is provided with an arm 111 which is connected with the slide 101 by means of a link 112. The arm 111 is provided with a pivoted friction block 113 which is engaged

in a slot 114 in the link 112. This friction block-and-slot connection permits the longitudinal adjustment of the telescoping bar 97 relative to the bar 96, whereby, although the stroke of the arm 111 is fixed, the stroke of the slide 101 and its corresponding shoe 94 will be limited in its inner movement by the slide stop 106 and its outer movement will be limited by abutment against the bracket 98, the friction block-and-slot arrangement providing sufficient lost motion so that the movement of the shoe 94 will be relative to the width of the package or of the flaps to which the machine is adjusted.

The slide 102 for controlling the shoe 95 is also provided with a slotted link 115 which is frictionally secured to an arm 116 in the same manner as previously described for the link 112. The arm 116 is secured to a sleeve 117 (Fig. 7) on the shaft 110 and this sleeve is oscillated by means of the cam 60 to move the slide 102. The shaft 110 is provided at its lower end with a cam arm 118 secured thereto and provided with a suitable roller engaging in a cam slot in the cam 59. Through this connection the shoe 94 may be operated and timed in accordance with the contour of the cam. The sleeve 117 is provided with a cam arm 119 also having a suitable roller engaging in a cam slot in the cam 60, whereby the movement of the shoe 95 may be controlled in accordance with the contour of the cam.

The mechanism for folding and sealing the lower flaps during the intermittent movement of the open carton after it has been inserted at the receiving station A may be identical with the upper sealing mechanism just described, and in order to operate this lower sealing mechanism, arms 116^a and 111^a are arranged to be operated from their respective cams through the sleeve 117 and the shaft 110, respectively, in the same manner and with the same stroke as the arms 111 and 116. This arrangement is illustrated in Fig. 7, in which the arm 116^a comprises a skeleton frame slidably mounted on the sleeve 117 and supported under the lower table 8 by means of an interengaging bracket 120. A vertical rod 121 is secured to the skeleton frame of the arm 116 and its lower end is slidably mounted in an outwardly extending skeleton arm 122 secured to the lower end of the sleeve 117. The rod 121 is arranged to telescope through the arm 122 when the table 8 is raised or lowered. The arm 111^a also comprises a skeleton framework which is oscillatably and slidably mounted on the sleeve 117 and is retained in its relative position by having its bearings interlocked with the bearings of the arm 116^a. This arm 111^a is also provided with a vertical rod 123 secured thereto, and which telescopes through the skeleton frame 124 of the cam arm 118. By this construction it will be apparent that the cam 59 will oscillate the arms 111 and 111^a and the corresponding shoes to which they are connected. Also, the cam 60 will oscillate the arms 116 and 116^a and their corresponding shoes. Furthermore, the arms 116^a and 111^a, together with the lower folding mechanism, may be raised or lowered with the table 8 without disturbing the operative connections which are telescopically mounted as described.

As previously stated, the shelves 79 and 79^a are laterally adjustable simultaneously with the folding mechanisms. The upper shelf 79^a is secured to the telescopic folder bar 97 and the rack rod 99, and the lower shelf 79 is secured by suitable brackets to the telescopic folder bar 97^a

and the rack bar 99^a. This is indicated diagrammatically in Fig. 15. In order that all of these parts may be simultaneously adjusted, suitable pinion rods 125 and 126 are rotatably supported in suitable bearings in the upper frame 4. The pinion rod 125 is provided with a pinion 127 at its upper end meshing with the rack bar 99. The lower end of the pinion rod 125 is provided with elongated pinion teeth at 128 which mesh with corresponding rack teeth on the folder bar 97^a. The rod 126 is provided at its upper end with pinion teeth 129 engaging with suitable rack teeth on the upper folder bar 97. The lower end of this pinion rod 126 meshes with suitable teeth on the rack bar 99^a. The pinion rods 125 and 126 are connected for simultaneous rotation by means of a sprocket chain 130 on suitable sprockets as illustrated.

The upper end of the rod 126 is somewhat extended and arranged to receive a suitable wrench whereby the pinion rods may be rotated and, through the construction just described, may simultaneously laterally adjust both the upper and lower folding mechanisms and corresponding guide shelves.

Figs. 16, 17, and 18 illustrate the carton conveyor chains and the adjustable flights thereon. This conveyor comprises the upper chain 17 supported on the sprockets 19 and guided in a suitable track on the upper frame 4, as indicated in Fig. 18. The lower chain 18 is supported on the sprockets 20 and guided in a similar track on the lower adjustable table 8.

Flight supporting members 131 are secured to the chains by means of suitable guide blocks 132, and spaced flights 133 and 133^a are adjustably mounted on the member 131. The flight 133 is mounted for sliding adjustment in a slot 134 and may be secured in any adjusted position corresponding to the desired width of carton by means of a retaining screw 135. The opposite flight 133^a is secured to a block 136 which is slidably mounted in a slot 137. The block 136 is normally retained in the position illustrated in Fig. 17 by means of a spring 138 secured thereto and having its opposite end secured to the block 132. The block 136 is provided with a pawl 139 arranged to engage a cam surface 140 which is positioned adjacent the filling station B, whereby, when the carton arrives in the filling position at the station A, the pawl 139 will be engaged by the cam surface 140 and moved inwardly, thereby moving the flight 133^a outwardly and releasing the carton so that it may be vibrated during the filling operation.

The mechanism for vertically vibrating the carton is illustrated in Fig. 2 and comprises a carton receiving table 141 which is slidably mounted in a guide member 142 and connected to a motor 143 by means of a connecting rod 144. The table 141 is constantly vibrated by means of a motor 143 and, as the carton passes onto the vibrating table 141 and between the guide shelf 79^a and the upper frame 4, the flight 133^a is simultaneously moved to release the package and permit the carton to vibrate.

After the carton is filled and sealed, the continued intermittent operation of the conveyor brings it into alignment with the discharge conveyor C. Simultaneously with the movement of the carton into alignment with this conveyor, the carton is engaged by movable fingers which move it from the carton conveyor into the discharge conveyor.

The mechanism for moving the cartons into

the discharge conveyor comprises an arm 145 provided with an intumed finger 146 and slidably mounted on the upper frame 22^a of the discharge conveyor. A similar arm 147 is slidably mounted on the lower adjustable frame of the discharge conveyor and provided with a similar intumed finger for engaging the carton. These arms 145 and 147 are adjustably connected together by means of a vertical bar 148 which is slidably mounted in the lower bar 147 so that the lower bar may be vertically adjusted with the lower discharge conveyor frame. An arm 149 is pivoted on the bar 148 and oscillatably mounted on the lower frame 1 as illustrated. This link 149 is connected to the cam arm 119 by means of the link 150. The cam arm 119 is operated by means of the cam 60 previously described.

The filling of the cartons may be accomplished by any suitable mechanism, the material preferably being weighed by a weighing mechanism which may be mounted on a vertical sleeve 151. A vertical shaft 152 for operating the weighing and dumping mechanism is mounted in the sleeve 151 and may be driven from the main vertical cam shaft 29 by means of a chain 153 and suitable sprockets. The weighing and dumping mechanism is preferably electrically operated and arranged to dump a predetermined amount of material into a suitable chute 154 when the electrical controlling device is operated by the arrival of a carton at the loading station.

In order to operate a suitable electrical mechanism for the weighing and loading, a switch 155 is provided adjacent the filling station and having an outwardly extending arm in the path of the moving carton. This switch may be similar to the previously described switch 49, and the closing of this switch by a carton moving to filling position may operate the weighing and dumping mechanism whereby each carton is filled at the station B.

Figs. 21 and 22 illustrate a preferred form of liner folding mechanism. This mechanism comprises a bracket 156 secured to the adjustable rack rod 99. Oppositely disposed liner spreading fingers 157 and 158 are pivoted on the bracket as illustrated in Fig. 22 and normally overlap relative to the carton as shown. These fingers are connected together by means of a link 159 whereby they operate simultaneously in opposite directions. The finger 157 is provided with an arm 160 which is connected by means of a link 161 to a single cam arm 162 which corresponds to the compound lever 91 of Fig. 10 and is provided with a cam roller 92^a corresponding to the cam roller 92 and arranged to be engaged by a cam 93^a corresponding to cam 93 to operate the arm in the same manner as previously described.

It will be apparent that with the carton and liner in the position indicated in Fig. 21, when the cam 93^a is lowered the fingers 157 and 158 will move outwardly to the first dotted line position whereby the liners and flaps are spread. The cam 93^a for operating the arm 162 is arranged to cause the fingers 157 and 158 to hesitate in the first dotted line position shown, whereby the spread triangular ends of the liner are retained in the spread position while the end flaps are folded over the liner. Immediately before the next forward movement of the carton, the fingers continue their outward movement to the second dotted line position whereby they are released from between the intumed edges of the triangular portions of the liner and

move outwardly and retain the side flaps in the spread position until they move under the flap guides. The flaps are then glued and folded as described.

Modifications may be made by those skilled in the art without departing from the spirit of the invention. It is desired, therefore, that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. In a carton sealer, means for moving open cartons step by step to a sealing step position wherein the end flaps are in closed position and the side flaps extended laterally, means for closing the end flaps and gluing the extended side flaps during said step by step movement, and transversely reciprocating means for closing said side laterally extending flaps.

2. In a carton sealer, means for moving open cartons step by step with laterally extending open flaps at one step, and a pair of transversely reciprocating means independent of said moving means for closing each of said flaps from said laterally extending position into snugly overlapping relation at said step, one of said reciprocating means being arranged to retain said flaps closed while at said step and during at least partial movement therefrom.

3. A carton sealer comprising means for moving squared-out cartons step by step, means for closing the end flaps and laterally extending the side flaps, and means for thereafter gluing and sealing said side flaps during a succeeding single step movement.

4. A carton sealer comprising a carton conveyor movable step by step, means controlled by the positioning of consecutive empty cartons on said conveyor to move said conveyor, means for closing the end flaps and laterally extending the side flaps during said step by step movements, means for gluing said extended side flaps during a succeeding step movement, and means for sealing said side flaps during the said succeeding step movement.

5. A carton sealer comprising a carton conveyor movable step by step, means controlled by the positioning of consecutive empty cartons on said conveyor to move said conveyor, means for closing the end flaps and laterally extending the side flaps during said step by step movements, means for gluing said flaps during a succeeding step movement, and means for sealing said side flaps in the said succeeding step movement, said sealing means being arranged to retain said flaps sealed while at the sealing step position and during initial movement therefrom.

6. A double sealer comprising a base, an upper frame supported on said base and having mechanism thereon for automatically sealing filled cartons, a vertically adjustable table under said frame and having mechanism thereon and adjustable therewith for sealing one end of unfilled cartons, means for automatically driving both of said sealing mechanisms, a filling station intermediate the sealing mechanism, means for moving cartons past said sealing mechanisms, said last means comprising a conveyor having arms for engaging the cartons therebetween, and means for causing said arms to release and re-engage the cartons at the filling station.

7. An adjustable double sealer comprising a pair of sealer-mechanism supporting means ad-

justable relative to each other in accordance with the height of cartons to be sealed, a conveyor for moving squared-out cartons adjacent said supporting means, means on each supporting means and adjustable therewith for sealing one end of each carton, means for lateral adjustment of the sealing means in accordance with the thickness of the cartons, and carton engaging means on said conveyor and adjustable in accordance with the width of the cartons, and means to release the engagement of said last means at a predetermined filling station and to automatically cause re-engagement during the continued movement.

8. A double sealer comprising an upper support having a conveyor thereon, a lower support having a conveyor cooperating with said upper conveyor to move cartons around both supports, said conveyors being adjustable relative to each other in accordance with the height of cartons to be sealed, means controlled by the insertion of squared-out cartons to operate said conveyors to move said cartons around said supports step by step, means on said lower support for folding and sealing the lower flaps during their step by step movement on one side of the supports, means on said upper support for folding and sealing the upper flaps on the opposite side of said supports, a filling station in the path of the cartons between said sealing mechanisms, and means adjacent said filling station and controlled by said cartons for controlling a filling mechanism.

9. A double sealer comprising an upper support having a conveyor thereon, a lower support having a conveyor cooperating with said upper conveyor to move cartons around both supports, said conveyors being adjustable relative to each other in accordance with the height of cartons to be sealed, means controlled by the insertion of squared-out cartons to operate said conveyors to move said cartons around said supports step by step, means on said lower support for folding and sealing the lower flaps during their step by step movement on one side of the supports, means on said upper support for folding and sealing the upper flaps on the opposite side of said supports, a filling station in the path of the cartons between said sealing mechanisms, means adjacent said filling station and controlled by said cartons for controlling a filling mechanism, a discharge conveyor, and means synchronized with said sealing mechanisms for removing filled and sealed cartons from said carton conveyor to said discharge conveyor.

10. A double sealer comprising an upper support having a conveyor thereon, a lower support having a conveyor cooperating with said upper conveyor to move cartons around both supports, said conveyors being adjustable relative to each other in accordance with the height of cartons to be sealed, means controlled by the insertion of squared-out cartons to operate said conveyors to move said cartons around said supports step by step, means on said lower support for folding and sealing the lower flaps during their step by step movement on one side of the supports, means on said upper support for folding and sealing the upper flaps on the opposite side of said supports, a filling station in the path of the cartons between said sealing mechanisms, means at said filling station and controlled by said cartons for controlling a filling mechanism, a moving discharge conveyor, means synchronized with said sealing mechanisms for removing filled and

sealed cartons from said carton conveyor to said discharge conveyor, and a single cam shaft for driving and synchronizing all of said sealing mechanisms and said carton removing means.

11. In a carton sealer having means for positioning a carton with laterally extending side flaps, a side flap folding device comprising spaced shoes closely adjacent the outside surface of said open flaps, said shoes being transversely reciprocable with an undulatory movement whereby said shoes initially move upwardly and inwardly and then downwardly and inwardly to close said flaps.

12. In a carton sealer having means for positioning a carton with laterally extending side flaps, a side flap folding device comprising spaced shoes closely adjacent the outside surface of said open flaps, said shoes being transversely reciprocable with an undulatory movement whereby said shoes initially move upwardly and inwardly and then downwardly and inwardly to close said flaps, and means for moving said shoes to fold one flap slightly in advance of the other.

13. In a carton sealer, means for moving cartons with open flaps, means for folding the end flaps, means for retaining said end flaps closed, means for spreading the side flaps, means for applying adhesive to the inner surface of said spread side flaps, and means for folding said side flaps, said side flap folding means comprising a transversely movable shoe on each side of said carton and each shoe arranged to close its associated flap by an inward undulatory movement of the shoe in contact with the outside of the flap whereby one flap is closed slightly in advance of the other, said shoes being arranged to hesitate during the folding movement sufficiently to permit the end flap retaining means to be withdrawn after the side flaps are sufficiently folded to retain the end flaps.

14. A double sealer comprising an upper support having a horizontally disposed conveyor thereon, a lower support having a horizontally disposed endless conveyor cooperating with said upper conveyor to move vertically positioned cartons in a horizontal plane, said conveyors being adjustable relative to each other in accordance with the height of cartons to be sealed, means on said conveyors to cooperatively engage squared out cartons at a receiving station, means on said lower support to seal the lower flaps of said squared out cartons, means on said upper support to seal the upper flaps, and means intermediate said upper and lower sealing means to fill said cartons.

15. A carton sealer comprising a fixed support, a movable support, cooperating conveyors on said supports for moving consecutive vertically positioned squared out cartons, means for relative movement of one of said supports whereby said conveyors may accommodate cartons of various heights, a sealing mechanism carried by one of said supports for folding and sealing the bottom flaps of said cartons, a sealing mechanism on the other support for folding and sealing the top flaps of said cartons, said folding and sealing means being adjustable to accommodate cartons of various widths, and a transmission between said folding and sealing mechanisms whereby both may simultaneously be adjusted to accommodate the same size cartons.

16. A carton sealer comprising a fixed support, a movable support, cooperating conveyors on said supports for moving consecutive vertically positioned squared out cartons, means for relative movement of one of said supports whereby

said conveyors may accommodate cartons of various heights, a sealing mechanism carried by one of said supports for folding and sealing the bottom flaps of said cartons, a sealing mechanism on the other support for folding and sealing the top flaps of said cartons, said folding and sealing means being adjustable to accommodate cartons of various widths, and a transmission between said folding and sealing mechanisms whereby both may simultaneously be adjusted to accommodate the same size cartons, said transmission being constructed and arranged to permit relative adjustment of said supports separately or simultaneously therewith.

15 17. A sealer comprising an endless conveyor, means on said conveyor for snugly engaging empty cartons for movement past a filling station, means to release said cartons at said filling station and to re-engage them after being filled, and means to vibrate said cartons while released.

18. A carton sealer comprising a pair of horizontal superposed endless conveyors, means for driving said conveyors in synchronism, outwardly extending members on said conveyors for snugly embracing and conveying squared out cartons, a sealing mechanism for the lower ends of said cartons, a second sealing mechanism for the upper ends of said cartons, and means for temporarily releasing said embracing members intermediate said sealing mechanisms.

19. A double sealer comprising a horizontally disposed intermittently movable endless conveyor for vertically positioned cartons, outwardly extending fingers on said conveyor for resiliently embracing squared out cartons, a sealing mechanism for the lower ends of said cartons, a second sealing mechanism for the upper ends of said cartons, means for releasing said embracing fingers at a stop position intermediate said sealing mechanisms, means for filling said released cartons, and means for vibrating said cartons during filling.

20. In a flap folder for carton sealing machines having means for folding end flaps inwardly and side flaps outwardly and means for applying adhesive, a pair of oppositely disposed shoes arranged to engage the outside of said side flaps, means to move said shoes toward each other with an undulatory movement to close said flaps, said shoes thereafter moving inwardly with a continued substantially straight line movement to completely seal said flaps.

21. In a flap folder for carton sealing machines having means for folding end flaps inwardly and side flaps outwardly and means for applying adhesive, a pair of oppositely disposed shoes arranged to engage the outside of said side flaps, means to move said shoes toward each other with an undulatory movement to close said flaps and a continued substantially straight line movement to completely seal said flaps, means to cause at least one of said shoes to hesitate in their movement prior to complete closing of the flaps.

22. In a carton sealer, means for folding oppositely disposed laterally extending carton flaps, said means comprising a pair of oppositely disposed substantially flat shoes arranged to reciprocate across the end of a carton therebetween, said open flaps overhanging said shoes, means to reciprocate said shoes in timed relation to close one flap slightly before the other, means to cause an undulatory movement of each shoe to first close its respective flap, said last-mentioned means being arranged then to continue forward movement of each shoe substantially in the plane

of the flap to press each respective flap in sealed relation.

23. In a carton sealer, for folding oppositely disposed laterally extending flaps of cartons, a pair of oppositely disposed substantially flat shoes arranged to reciprocate transversely of a carton therebetween, said shoes engaging the outside of said flaps, means to cause an undulatory movement of said shoes at the beginning of their movement toward said carton to close said flaps and to press each flap snugly in closed position, said last-mentioned means being arranged to continue movement of at least one of said shoes along the surface of its corresponding flap to press all of said flaps together in sealing relation.

24. In a carton sealer having means for folding end flaps inwardly and side flaps outwardly and means for applying adhesive, movable means engaging said end flaps to retain them in closed relation, a pair of oppositely disposed shoes to engage the outside of said side flaps, means to move said shoes toward each other with an undulatory movement to close said flaps and in a continued substantially straight line movement to completely seal said flaps, means to withdraw said end flap retaining means after the side flaps have been sufficiently closed to prevent opening of the end flaps, and means to cause a dwell in the closing movement of said shoes to enable said end flap retaining means to be withdrawn.

25. A double sealer comprising means for moving open cartons in two adjacent substantially parallel paths, a pair of transversely movable shoes adjacent each path for closing the lower flaps in one path and the upper flaps in the other path, means to move said shoes toward each other with an undulatory movement to close said flaps and a continued substantially straight line movement to completely seal said flaps, and a transmission for simultaneous adjustment of all of said shoes to accommodate cartons of various dimensions.

26. In a carton sealer, means for moving cartons to a sealing station with the end flaps closed and the side flaps extended laterally, means for closing the end flaps, means for gluing the extended side flaps, and transversely reciprocating means for closing said side flaps over said end flaps.

27. In a carton sealer, means for moving cartons to a sealing station with the end flaps closed and the side flaps extended laterally, means for closing the end flaps, means for gluing the inner sides of the extended side flaps, and transversely reciprocating means for closing said side flaps over said end flaps.

28. In a carton sealer, means for moving cartons to a sealing station with the end flaps closed and the side flaps extended laterally, means for closing the end flaps, means for gluing the inner sides of the extended side flaps, and transversely reciprocating means for closing said side flaps over said end flaps, and maintaining pressure on said flaps while the carton is moving from the sealing station.

29. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes adjacent the outside surface of said open flaps, a transversely reciprocable carriage for each shoe, and means for raising and lowering each shoe during reciprocation to close said flaps.

30. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes ad-

5 jacent the outside surface of said open flaps, a transversely reciprocable carriage for each shoe, means for raising and lowering each shoe during reciprocation to close said flaps, and means for limiting the movement of said carriages to accommodate various sizes of cartons.

10 31. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes normally below and adjacent the outside surface of said open flaps, and means for moving said shoes in transverse overlapping paths to completely close said flaps.

15 32. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes adjacent the outside surface of said open flaps, means for moving said shoes in transverse overlapping paths to completely close said flaps, and adjustable means to limit the overlap to a predetermined amount.

20 33. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes adjacent the outside surface of said open flaps, means for moving said shoes in transverse overlapping paths to completely close said flaps, and adjustable means to limit the overlap to a predetermined amount or to prevent overlap.

25 34. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes adjacent the outside surface of said open flaps, means for moving said shoes in transverse overlapping paths to completely close said flaps, and means to cause one shoe to move slightly in advance of the other.

30 35. In a carton sealer having means for positioning a carton with laterally extending flaps, a flap folding device comprising spaced shoes adjacent the outside surface of said open flaps, means for moving said shoes in transverse overlapping paths to completely close said flaps, means to cause one shoe to move slightly in advance of the other, and means to cause at least one shoe to hesitate during its closing movement.

35 36. A double sealer comprising a support, a mechanism for sealing one end of cartons, a second mechanism for sealing the opposite ends of said cartons, means for automatically driving both said mechanisms, said mechanisms being vertically and laterally adjustable relatively to each other to accommodate various sizes of cartons, a filling station intermediate said sealing

mechanisms, means for engaging and moving cartons past said sealing mechanisms and said filling station, said last means being arranged to disengage said cartons during the filling operation.

5 37. A double sealer comprising means for moving squared out cartons, a pair of transversely movable shoes adjacent the path of said cartons for closing the lower flaps, a second pair of transversely movable shoes for closing the upper flaps, means to move the individual shoes of each pair toward each other with an undulatory movement to close said flaps and a continued straight line movement to completely seal said flaps.

10 38. In a container handling machine having a filling station, a conveyor for moving consecutive containers to and from said filling station, consecutive grasping means on said conveyor, each means normally grasping a container for movement thereof to said station, and control means to cause each grasping means to release its respective container sufficiently to permit relative movement during filling and to again grasp said respective container for movement from said station after filling.

15 39. In a container filling machine having a filling station, an endless conveyor, means movable with said conveyor for grasping engagement of a single container and causing it to be moved with said conveyor past said filling station, and control means to cause temporary release of said container during a filling period at said station.

20 40. In a container handling machine having a filling station, a movable conveyor for moving consecutive containers past said filling station, consecutive means on said conveyor, each means comprising spaced members normally grasping a container therebetween, resilient means for retaining said members in grasping relation, means on said conveyor operable to cause each grasping means to release its respective container, and fixed means adjacent said filling station to operate said last means to permit free movement of the container during filling and to again grasp said respective container after filling.

25 41. In a container filling machine having a filling station, a horizontal endless conveyor having consecutive pairs of laterally extending arms thereon, means to cause said arms of each pair to resiliently grasp a container inserted therebetween, and control means to temporarily spread each pair of arms during a container filling period at said station.

JOHN L. FERGUSON.

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CERTIFICATE OF CORRECTION.

Patent No. 2,136,901.

November 15, 1938.

JOHN L. FERGUSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 8, second column, line 20, claim 1, strike out the words "laterally extending" and insert the same after "said" in line 19, same claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of December, A. D. 1938.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.