

No. 749,681.

PATENTED JAN. 12, 1904.

R. F. W. BEARDSLEY.
PACKAGE SEALING MACHINE.

APPLICATION FILED MAR. 12, 1902.

NO MODEL.

5 SHEETS—SHEET 1.

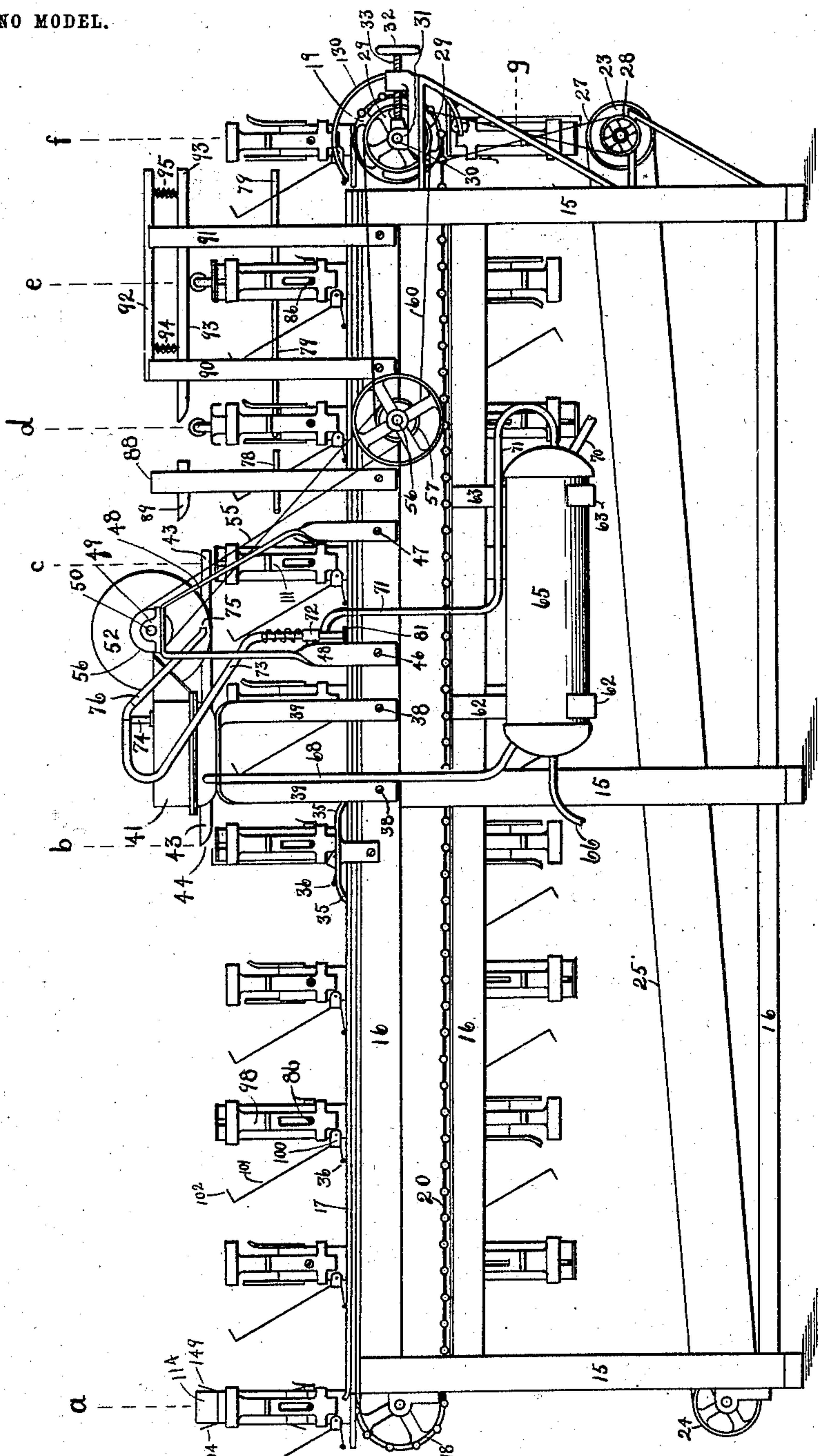


Fig. 1

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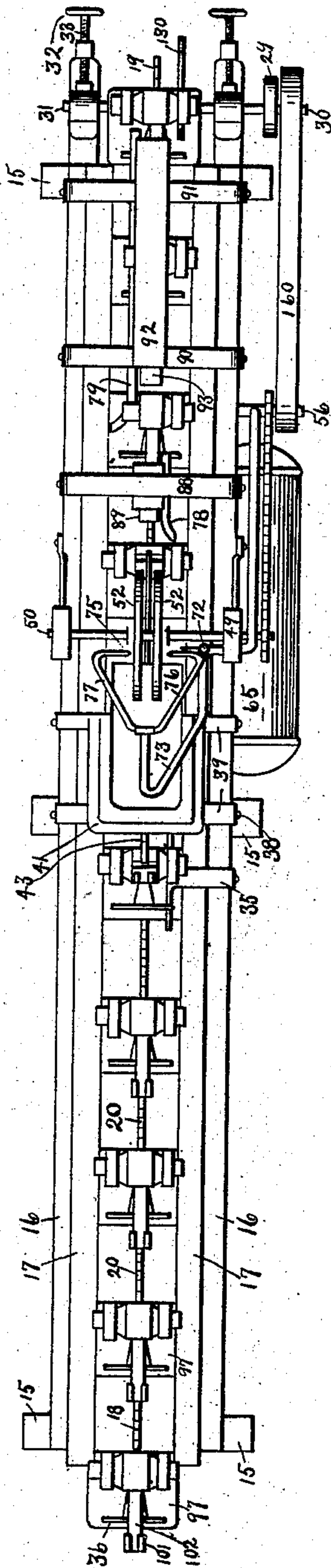
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5 SHEETS—SHEET 2.

Fig. 2.



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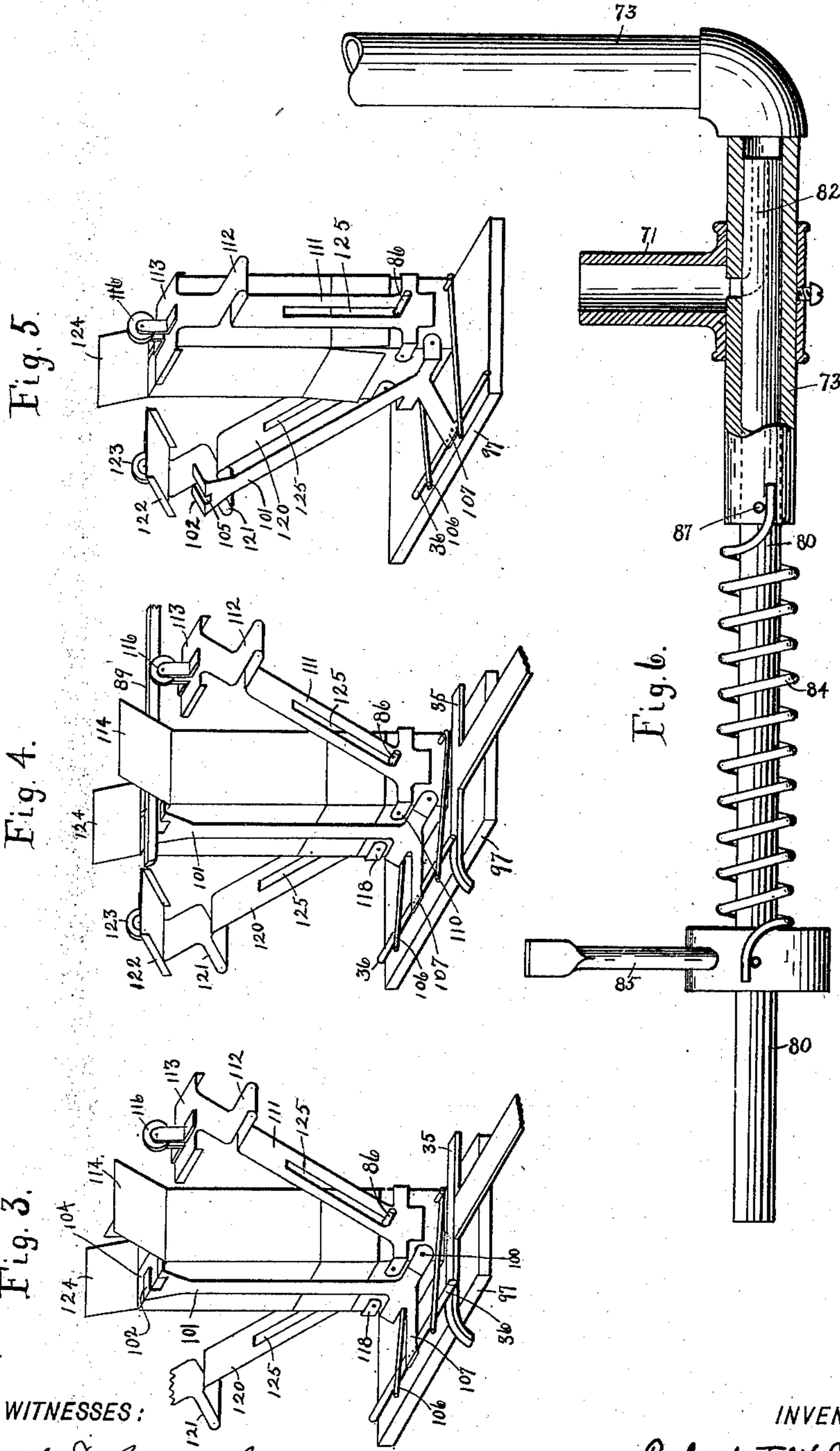
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

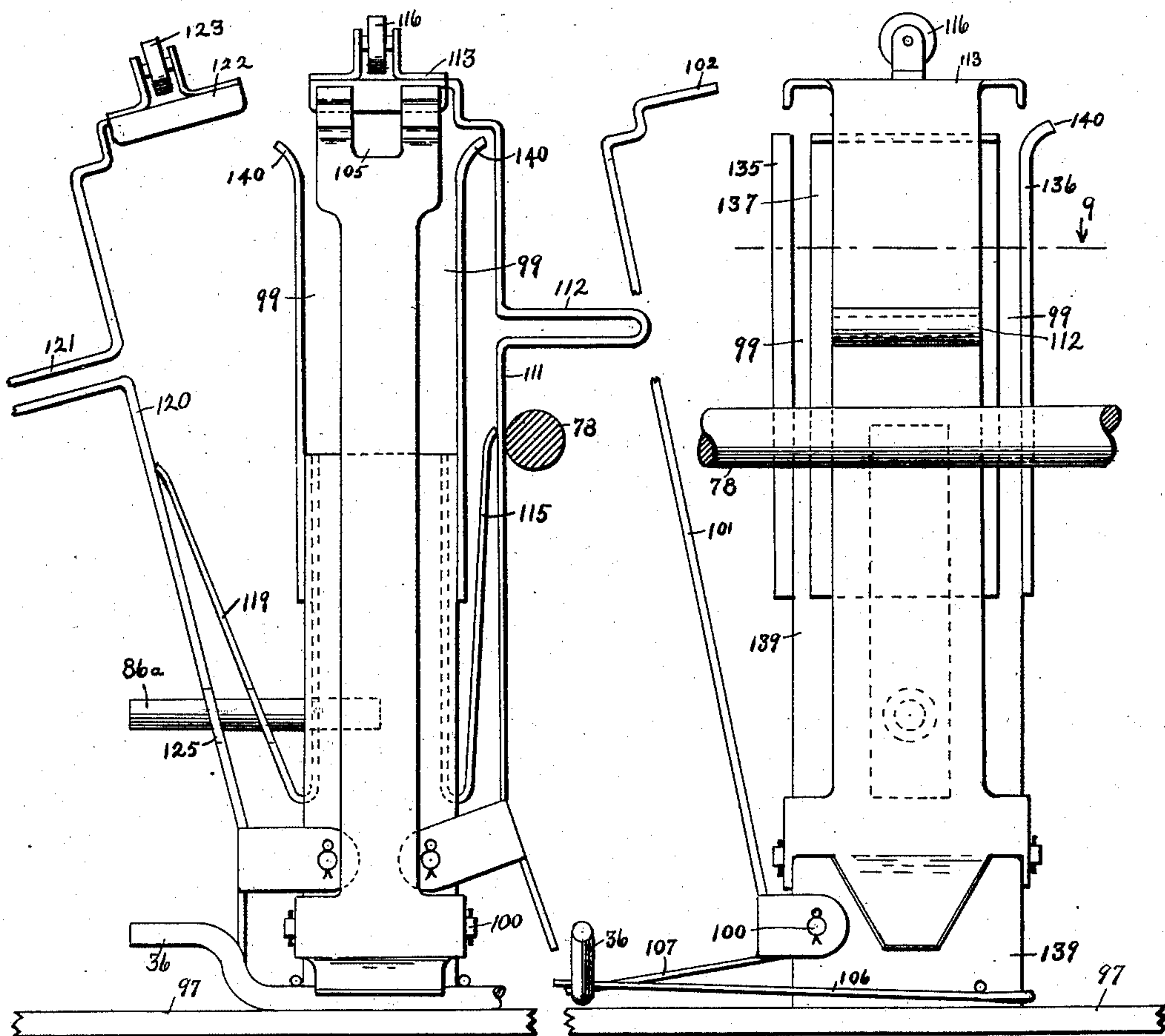


Fig. 7.

Fig. 8.

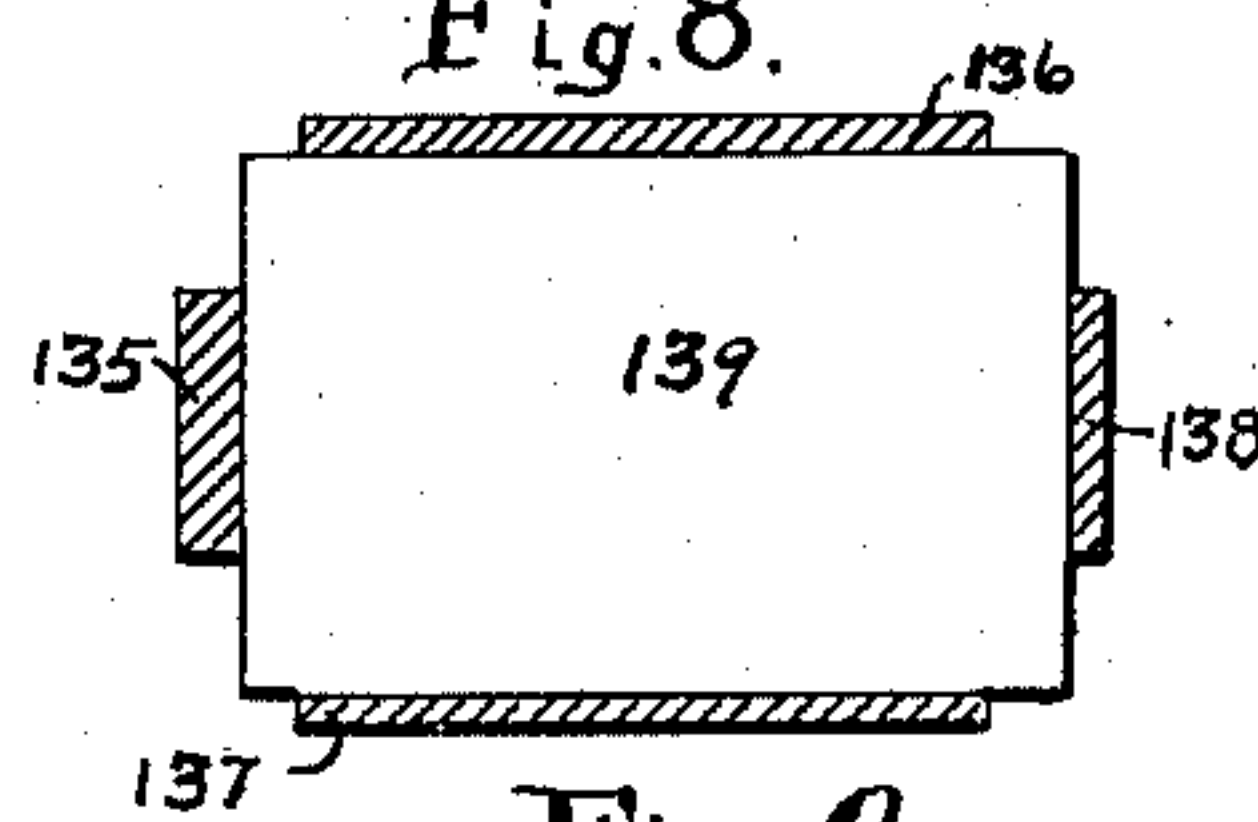


Fig. 9.

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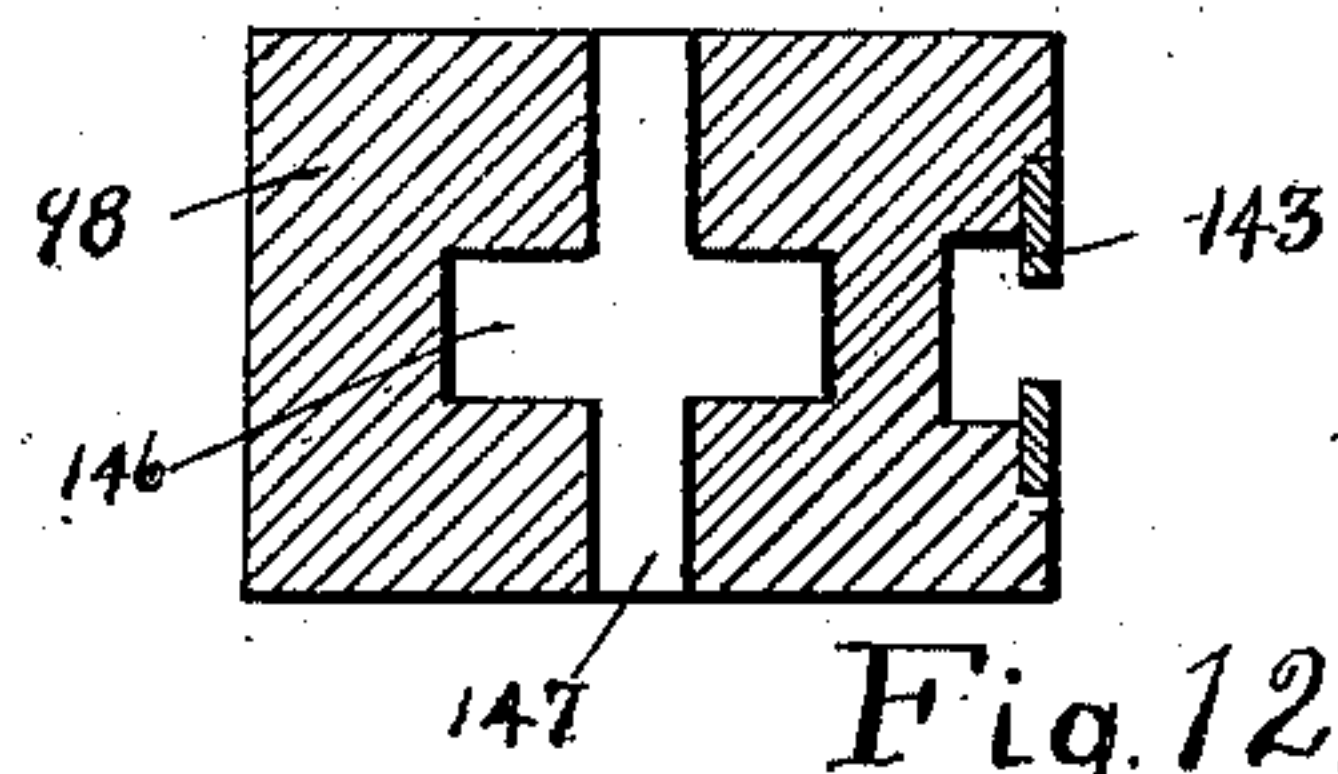
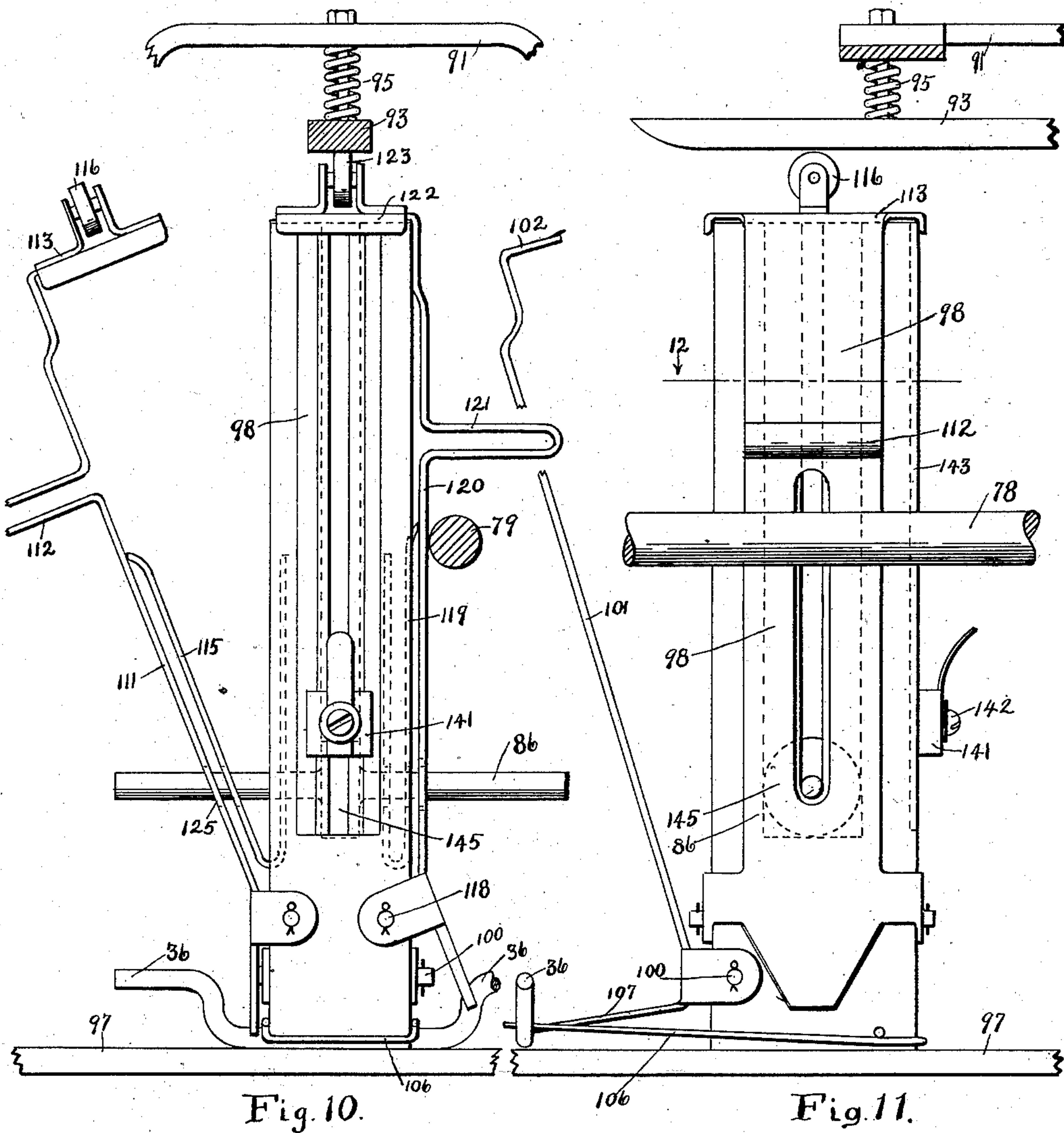
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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PACKAGE-SEALING MACHINE.

SPECIFICATION forming part of Letters Patent No. 749,681, dated January 12, 1904.

Application filed March 12, 1902. Serial No. 97,948. (No model.)

To all whom it may concern:

Be it known that I, ROBERT F. W. BEARDSLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Package-Sealing Machine, of which the following is a specification in its best form now known to me, reference being had to the accompanying drawings, in which similar numerals indicate the same parts throughout the several views.

My invention relates to package or carton sealing machines; and the object of my invention is to provide a machine on which the carton or the package, either empty or filled, may be placed, which will automatically fold successively the flaps constituting the end of the box or carton and seal the same and deliver the carton at a desired location.

My invention consists in a machine capable of automatically performing the above functions.

It also consists in means for applying the glue or other adhesive material to the flaps of the carton in a neat manner without clogging the machine with refuse glue, and the application of this particular feature of the invention is not to be understood as limited to carton-sealing machines, as it is applicable to many forms of machines in which cloth, paper, or some other material is to be pasted onto something else, or in which a gummed surface is moistened, as in the pasting of labels to boxes. This feature consists, preferably, in a wheel or other adhesive material-carrier, whose sides are coated with glue or other adhesive material and means for holding the insides of certain flaps of the carton or other article to be glued, or have a gummed surface moistened against the sides of the wheel by air or other gas pressure, thereby doing away with mechanism which can become dirty and clogged with glue or other gum.

My invention consists in a machine adapted for use on both empty and filled cartons capable of accomplishing all of the above-described objects which can be easily and

cheaply made and economically operated without liability to clog or get out of order.

It also consists of many details of construction hereinafter more fully described and claimed.

In the drawings, Figure 1 represents a side elevation, and Fig. 2 a plan view, of a machine embodying my invention. Figs. 3, 4, and 5 show, respectively, the carton in different positions of the machine and the position of the corresponding parts after the first, second, and third flaps have been successively closed in. Fig. 6 represents a detail view of the air-valve. Figs. 7 and 8 are respectively rear and side detail views of the carton-closing mechanism shown with a cup for use of filled packages. Fig. 9 is a sectional view taken on line 9 of Fig. 8. Figs. 10 and 11 represent front and side views of the same with mechanism adapted for empty instead of filled cartons and mechanism for pressing down the flaps of the carton after the glue has been applied thereto, whereby they are held tight together long enough for the glue to set. Fig. 12 is a sectional view on line 12 of Fig. 11.

Again referring to the drawings, 15 represents upright posts, and 16 the horizontal members of a table-frame supporting grooved runways or guides 17. Mounted on suitable brackets at either end of this table are sprocket-wheels 18 and 19, over which passes an endless sprocket-chain 20, guided by the groove or runway 17. This sprocket-chain is driven by a suitable belting or other mechanism (not shown) attached to a pulley 56, mounted on the side of frame 16 and connected by a belt 60 and the pulley 29, mounted on the same shaft as the sprocket-wheel 19, over which the chain passes. Also mounted on the frame 16 of the table are two other pulleys 23 and 24, over which passes an endless conveyer-belt 25. The locations of these pulleys 23 and 24 are so arranged that the belt 25 is directly under the sprocket-chain 20, and the belt 25 is inclined, as shown. At 23 the belt 25 is but a little below the carton as it comes around on the under side of the sprocket-chain 20 in the

manner hereinafter described, and the lower end of the belt 25 is low enough so that the carton will while resting on the belt 25 have entirely cleared itself from the carton-holders 5 98, to be hereinafter described, attached to the sprocket-chain 20, before it reaches the lower end of the belt. This conveyer-belt 25 is preferably driven by a belt 27, passing over pulley 28 on the shaft of wheel 23 and pulley 29 on the shaft of sprocket 19. The shaft 10 30, on which wheels 19 and 29 are mounted, as above described, is slidably mounted on a horizontal surface 31 and is under control of a hand-wheel 32, connected to it by a screw 15 33, so that by turning the hand-wheel 32 the sprocket-chain 20 may be adjusted to the proper tension.

Mounted on the side of the table 16 at the location shown is a stationary cam 35, shaped 20 as shown, over which cross-rods 36 are adapted to pass. Rising from the table-frame 16 and secured by bolts 38 or other suitable mechanism are uprights 39, supporting the glue-pot 41. On the under side of this glue- 25 pot is a long straight flap-closing bar 43, having its end rounded in a curve 44, as shown, the bar acting as a cam for closing one of the flaps of the carton in a manner hereinafter to be described.

Rising from the table 16 and secured to it 30 by the bolts 46 and 47 are the upright supports 48, carrying at their upper ends a journal-box 49, in which is journaled a shaft 50, carrying a pair of glue-wheels 52, disposed on 35 opposite sides of cam-bar 43. These wheels pass through one side of the glue-box 41 in the usual manner of such wheels when used in automatic machinery for gumming paper. These glue-wheels are driven by a belt 55, 40 passing over the pulley 56, heretofore described.

Mounted below the table 16 on suitable hangers, as 62 and 63, is an air-tank 65, entering one end of which is a pipe 66, connect- 45 ed at its outer end to a suitable source of steam-supply and at its inner end to a steam-coil (not shown) in the tank 65. This steam-coil is also connected by a pipe 68 to the steam-coil (not shown) located in the glue-pot 41. 50 The pipe from this latter coil exhausts into the air or may be trapped back to the boiler, if desired. Entering the other end of the tank 65 is a pipe 70, connected at its outer end to a suitable source of compressed-air supply. Emerging from this air-tank 65 is an 55 air-pipe 71, which passes up the side of the table and through the air-valve 72 into a pipe 73, which is carried up over the support 74 at the top of the glue-pot, where the pipe forks 60 into the branches 76 and 77, the ends terminating in the nozzles 75, having their orifices directed against the outer surfaces of the glue-wheels 52, as shown.

The air-valve 72, above referred to, is shown 65 in detail in Fig. 6 and consists of a rod 80,

entering pipe 73 in such a way as to close the end of pipe 71 and is so journaled in a seat 81, mounted on the table 16, that it can turn on its vertical axis inside of the pipe 72. In the upper end of this rod is an air-passage 82, 70 connecting the pipe 71 and the pipe 73 in such a way that when the rod is given a partial rotation this air-passage will be closed by the pipe 73. On this rod is a coil-spring 84, hav- 75 ing its lower end secured to a trip-lever 85, rigidly secured to rod 80, adapted to be engaged by a projecting rod 86 on the side of the carton-holder in the manner to be hereinafter described. The upper end of spring 84 is secured at 87 to pipe 73. In normal posi- 80 tion the valve is closed, and when this trip-lever 85 is turned about a quarter of a revolution it turns the rod 80 against the action of spring 84 to the position shown in Fig. 6, 85 when the valve is opened, and when the lever is released the spring turns the rod 80 back to its normal position and shuts off the air.

Secured to and rising from the table 16 is a support 88, having at its upper end a cam 89, held down by a spring behind post 88, and 90 therefore not showing exactly, as the springs 94 and 95, operating on cam 93, control it in the manner to be hereinafter described. Also secured to the table 16 and rising therefrom 95 are two other supports 90 and 91, connected together at their top by a bar 92, on the under side of which is a straight cam 93, connected to the bar 92 by the springs 94 and 95 in such a way that when a roller passes under the cam 93 it is raised slightly against 100 the pressure of the springs 94 and 95.

Rigidly secured on opposite sides of the machine are two cams 78 and 79, shaped as shown and adapted to be successively engaged by the closing mechanism of the two side flaps in the 105 manner to be hereinafter described.

Rigidly secured on bases 97, which are detachably secured by screws or other convenient mechanism to the sprocket-chain 20, are carton-holders. In a case where the machine 110 is desired to close the lower ends of an empty carton these holders take the form of a block of wood 98 of an exact size and shape to just fill the inside of the carton, as illustrated in Figs. 10, 11, and 12, so that the carton will slip over 115 them and the holder will just fill it, with the flaps which are to be closed extending above the upper surface of the holder. Where, however, a filled package or carton is to be sealed, these holders take the form of a receptacle 99, 120 as illustrated in Figs. 7, 8, and 9, in which the filled package may be placed, the lower edges of the flaps to be closed being on exactly the same plane as the top of the formerly-described holder when it was in use. In the case where 125 filled cartons are to be closed the receptacle 99 is formed by the four upright strips 135, 136, 137, and 138, rigidly secured to the base 139 and preferably having their outer ends bent outward in the curves 140, so as to permit the ready 130

insertion of the package. As the filled cartons are heavy, they discharge by gravity, and no special discharge mechanism is necessary.

When different-sized cartons are to be sealed, carton-holders of the required dimensions are substituted. Extending from one side of the base 139 is a rigid arm 86^a, passing through slot 125, adapted to engage and trip the air-valve lever 85, heretofore described. In the case where one end of an empty carton is to be sealed carton-holders with different-sized blocks are substituted for use with cartons of different cross-sections. Where cartons of the same-sized section but of different lengths are to be sealed, the holder is adjusted to fit them by moving the stop 141, controlled by the screw 142, adapted to move up and down in the slot 143 in the side of the block 98. In order to provide means for ejecting the empty cartons, which are not heavy enough to eject themselves as the filled cartons do, I provide an ejector-weight 145, adapted to move up and down in the slot 146 in block 98. From this weight 145 are rigid arms 86, extending through slots 147 in the sides of block 98 and also through slots 125 in the flap-closing fingers. The ends of these arms engage the carton to discharge it, and the end of one arm engages the lever 85 of the air-valve in the manner heretofore described.

Pivoted to the rear of each of the above-described carton-holders at 100 is a finger 101, having its upper end bent in the form of an L 102, adapted to fit over the top of the holder and close down the flap 104 of the carton. This L 102 is forked, as shown in Fig. 5, with the notch 105 between the prongs. This finger 101 has extending from and at right angles to its lower portion an arm 107, terminating in the cross-rod 36, adapted to engage the cam 35. This cam is so arranged and located that when the cross-rod 36 passes over it the finger 101 will be forced toward the carton-holder against the action of spring 106 and close in the flap 104 and that as soon as the cross-rod 36 passes off from the cam 35 it will spring back under the action of spring 106 to its original position, as shown at position c, Fig. 1, where it is entirely out of the way of the closed flaps of the carton as they are afterward folded in. Pivoted at 110 to one side of the carton-holder is another finger 111, controlled by a spring 115, bent near its end in the form of a U-shaped spring 112 and having its upper end bent in the form of an L 113, adapted to close one side flap 114. This L 113 carries on its top a roller 116, adapted to engage the cam 89. Pivoted to the opposite side of the carton-holder at 118 is another finger 120, controlled by a spring 119 and having a similar U-shaped spring 121 and L-shaped top 122 and roller 123, adapted to pass under cam 93, all of these parts being adapted to operate on the opposite side flap 124. In the fingers 111 and 120 are vertical slots 125,

through which the projecting rods 86 and 86^a, extending from the sides of the carton-holders, pass, as heretofore described.

It should be understood that the series of carton-holders above described are arranged along the sprocket-chain 20 in series, as shown in Fig. 1, and are so placed that as the machine operates they pass in succession over the cam 35, under the cams 43, 89, and 93, past the lever 85, which operates the air-valve, and between the cams 78 and 79, and that in so doing they pass directly under the glue-wheels 52 at such a height from them that the insides of the carton can be brought in contact with the sides of the wheels and given a coating of glue.

In the operation of the machine it is first equipped with a complete set of holders 98 or a complete set 99, depending on whether empty or filled cartons are to be sealed. Then steam heat is admitted into pipe 66 through the coil in the tank 65, thereby heating the air in the tank. The steam then passes through the pipe 68 into the glue-pot 41, where it heats the glue in the manner heretofore described. Compressed air is then admitted from a suitable source of supply through the pipe 70 into the tank 65, where it is heated by the steam-coil just described and passes into the pipe 71 up to the air-valve 72. Suitable power is now applied to the machine in such a way that the chain 20 moves so that the carton-holders on the top of the table move toward the right when looked at as in Fig. 1, while the bottom of the chain 20 and the top of the conveyor-belt 25 move toward the left, as shown in Fig. 1. Assuming that the machine has been equipped to close and seal empty cartons, the operator now places such a carton upon one of the holders with all four flaps up, as shown on the single holder at position a, Fig. 1. The lower edges of the carton-flaps being now at a level with the top of the holder-block 98 and what will be the height of the inner corners of the L's 102, 113, and 122 when the respective fingers operating said L's are swung to a vertical position, the machine now carries this carton toward the glue-pot. As the carton reaches position b, Fig. 1, and the cross-rod 36 passes over the cam 35 the finger 101 is swung to a vertical position against the action of spring 107, and the rear flap 104 is swung in by the L-top 102 in the manner shown in Fig. 1. The carton is carried in this position along the machine to the right until the front flap 149 opposite the one 104 just closed in strikes against the edge 44 of the cam 43, which is so located that it will just close in this flap 149 and allow the closed carton to pass under it. This is accomplished before the cross-rod 36 has passed off from cam 35, which, as will be seen by an inspection of position b, Fig. 1, happens very soon after the second flap has been folded in as just described. As soon as cross-rod 36 does pass off from cam 35 the finger 101 is forced back to its original

position by the spring 106, the action being possible because of the forked top 102 and slot 105, heretofore described. The front flap 149 having been folded in by the cam 43, as just described, is now held by said cam and in its turn holds the first flap 104 down, while the carton is moved along by the machine under the glue-pot toward the glue-wheels 52, which are so placed, as shown in Fig. 2, that their outer faces are slightly inside the line of travel of the inner faces of the vertical side flaps 114 and 124 of the carton. As the carton is carried past these glue-wheels the rod 86 trips the arm 85 of the air-valve, which allows a sharp discharge of compressed air, preferably warm, to pass through the nozzle 75, arranged as heretofore described, and to strike the outer faces of these side flaps of the carton, thereby driving them against the surfaces of the glue-wheels 52 and causing them to become coated with glue. As they are forced against these glue-wheels by air-pressure and not by mechanical means, there is nothing on the machine to become coated with refuse glue, and thus cause the machine to clog. As the rod 86 passes off from the arm 85 it is released and the air-valve closes in the manner heretofore described, thereby shutting off the supply of air and stopping waste. The carton, with its glue-coated side flaps, now passes along in the position shown in Fig. 4 and position *c*, Fig. 1, until it passes beyond the end of cam 43, and finger 111 strikes cam 78 and is forced up to the position shown in Fig. 5, closing in flap 114. As will be seen from Fig. 2, this happens just before roller 116 strikes spring-cam 89. As soon as it does so the spring of the cam forces the L-top 113 down against the action of spring 112, thereby pressing the glued flap 114 against flaps 104 and 149 during the time the carton is passing under cam 89. As soon as the carton passes cams 89 and 78 to position *d*, Fig. 1, the finger 111 swings back under the action of spring 116 to its original position, (shown at the left of Fig. 10,) leaving the three flaps 104, 149, and 114 glued down and the fourth flap 124 standing vertical. The carton now moves along until finger 120 strikes cam 79 and is elevated to a vertical position, thereby closing in the last flap 124. As soon as this is done roller 123 runs under cam 93, and the L-top 122 is pressed down on the sealed package until at position *f*, Fig. 1, cams 93 and 79 are both passed and finger 120 swings back under the action of its spring to its original position, leaving the package sealed and ready to be removed from the machine. This pressing down of the L-shaped tops during the progress of sealing the packages, as just described, is rendered necessary by the fact that when one flap coated with glue is brought in contact with another flap not coated with glue they do not adhere tightly and smoothly to-

gether unless there is considerable pressure exerted for quite a length of time, and the contact is not smooth and uniform unless the plate which does the pressing bears evenly on all points of the flap. The latter condition is obtained in this case by providing a U-shaped spring on the finger which moves the L-shaped top backward and forward, which spring allows the L-shaped top to be depressed, while remaining in a position always parallel to the top of the carton or parallel to its first position when the flap has been completely closed in. As stated, the carton is now at position *f* at the right-hand end of the top of the machine and could be removed by hand at this point, if desired; but I prefer to remove it by gravity and the carrier 25 in the manner herein-after described. It is now at the point where the sprocket-chain passes around the sprocket-wheel 19 to the lower side of the machine, and to prevent the carton falling off while the chain is passing around the semicircumference of this wheel to position *g* I place a cam 130 at the end of the machine, which cam is so shaped that as the cross-rod 36 passes over it the finger 101 will be thrown up over the top of the carton and secure it to the carton-holder. This cam causes the finger to remain in this position until the carton has passed from the upright vertical position at *f* to the inverted vertical position directly below it at *g*, Fig. 1. At about this point the cam 130 allows the cross-rod 36 to pass from it, and the finger 101 is thrown back out of the way under the action of spring 106. Thus the empty carton is at liberty to slip off from the block 98 under the action of weight 145 until it strikes the top of the carrier-belt 25. As the machine continues its motion this carton rests on this belt and is gradually carried by gravity and the weight 145 off from the holder until when it reaches the left-hand end of the machine it is sufficiently below the carton-holder to entirely clear it, when it will pass off from the belt 25 over wheel 24 into a convenient receptacle, or it may be removed by hand to a desired place. The empty carton-holder now passes around wheel 18 and up to the original position *a*, where another empty carton is placed upon it, and the operation is repeated. When it is desired to seal filled cartons in place of empty ones, it is simply necessary to change the form of holders, as heretofore described.

As heretofore stated, the use of air or gas pressure to bring the flaps of the carton into contact with the glue-wheels is entirely new, in so far as I am aware, and I do not wish to be understood as limiting myself to its use in a carton-closing machine.

I do not wish to be understood as limiting myself to the exact details of construction, which may be varied within reasonable limits without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In mechanism of the class described, the combination of a carton-carrying plug or holder, a weight slidably mounted within the plug, and members connected to said weight extending outside the plug, adapted to engage the carton, whereby when said plug is inverted, the weight forces the carton from the plug.

2. In a carton-sealing machine, a holder adapted to carry a carton with its flaps raised, pivoted fingers adjacent to said holder and held normally away from it each adapted to close one flap of the carton, mechanism for successively moving said fingers whereby said flaps of the carton are successively closed in and a weight slidably mounted within said holder having a part adapted to bear against the carton and remove it from the holder when the same is turned to an inverted position, for the purposes described.

3. In a carton-sealing machine, the combination of, a holder adapted to carry a carton, with its flaps raised through the machine, mechanism for moving said holder, pivoted L-shaped fingers adjacent to said holder, moving with it and normally held away from it, each adapted to close in one flap of the carton, mechanism for successively moving said fingers whereby said flaps of the carton are successively closed in, spring mechanism adapted to allow the top of each L-finger to be depressed on the carton-flap which it has closed in without the finger itself being depressed, the L-top of the finger remaining always in a horizontal position, and mechanism adapted to so depress the top of each finger when said finger has closed in its flap.

4. In a carton-sealing machine, the combi-

nation of a carton-blank-holding block or plug, an L-shaped finger pivotally mounted to fold in a flap or carton on said plug, spring mechanism in the upright portion of said L-shaped finger adapted to allow the top of said L-shaped finger to be depressed by any suitable means on the carton-flap which said finger closes in.

5. In a carton-sealing machine, the combination of a holder adapted to receive and hold a carton with its flaps up, a finger 111 pivoted near the base of said holder adapted to be moved toward the plug and carton by any suitable means, a U-shaped spring 112 in the body of said finger, and an L-shaped top 114 extending from the top of the finger adapted to fold in the carton-flap, substantially as shown and described.

6. In a carton-sealing machine, the combination of a table, a continuously-moving carrier, a series of carton-holders mounted on said carrier adapted to carry a carton, a finger pivoted to the base of one of said carton-holders having an L-shaped top adapted to fit over a flap of the carton and hold it in when said finger is raised into contact with said carton, mechanism for normally holding said finger away from the carton, mechanism at the end of the machine for forcing said finger up against the carton and the L portion over the top of the carton whereby the carton is held on the carton-holder while the carrier is passing from the top of the table with the holder upright to the bottom of the table with the holder and carton upon it in an inverted position, and means for then releasing said finger for the purposes set forth.

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