

May 9, 1933.

W. E. WILLIAMS

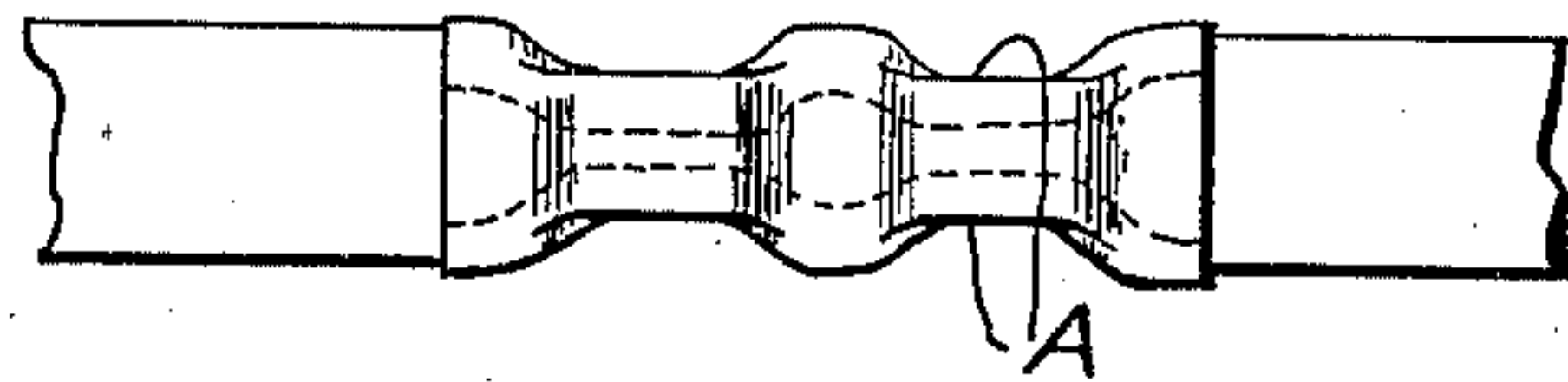
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PACKAGE STRAPPING MACHINE

Filed Nov. 14, 1929

9 Sheets-Sheet 1

*Fig. 1.*



*Fig. 2.*



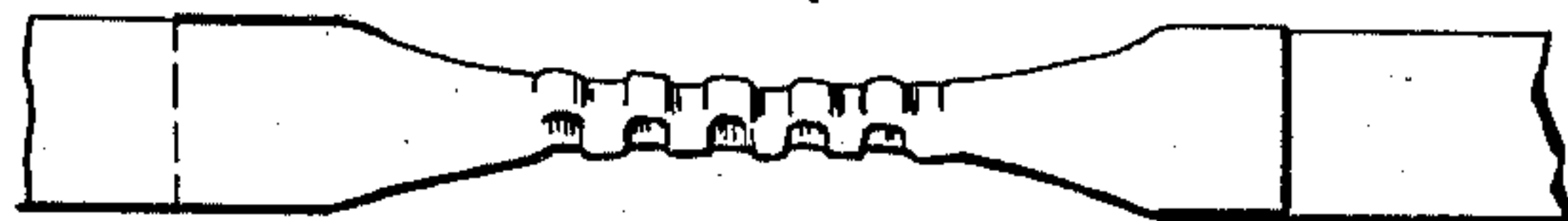
*Fig. 3.*



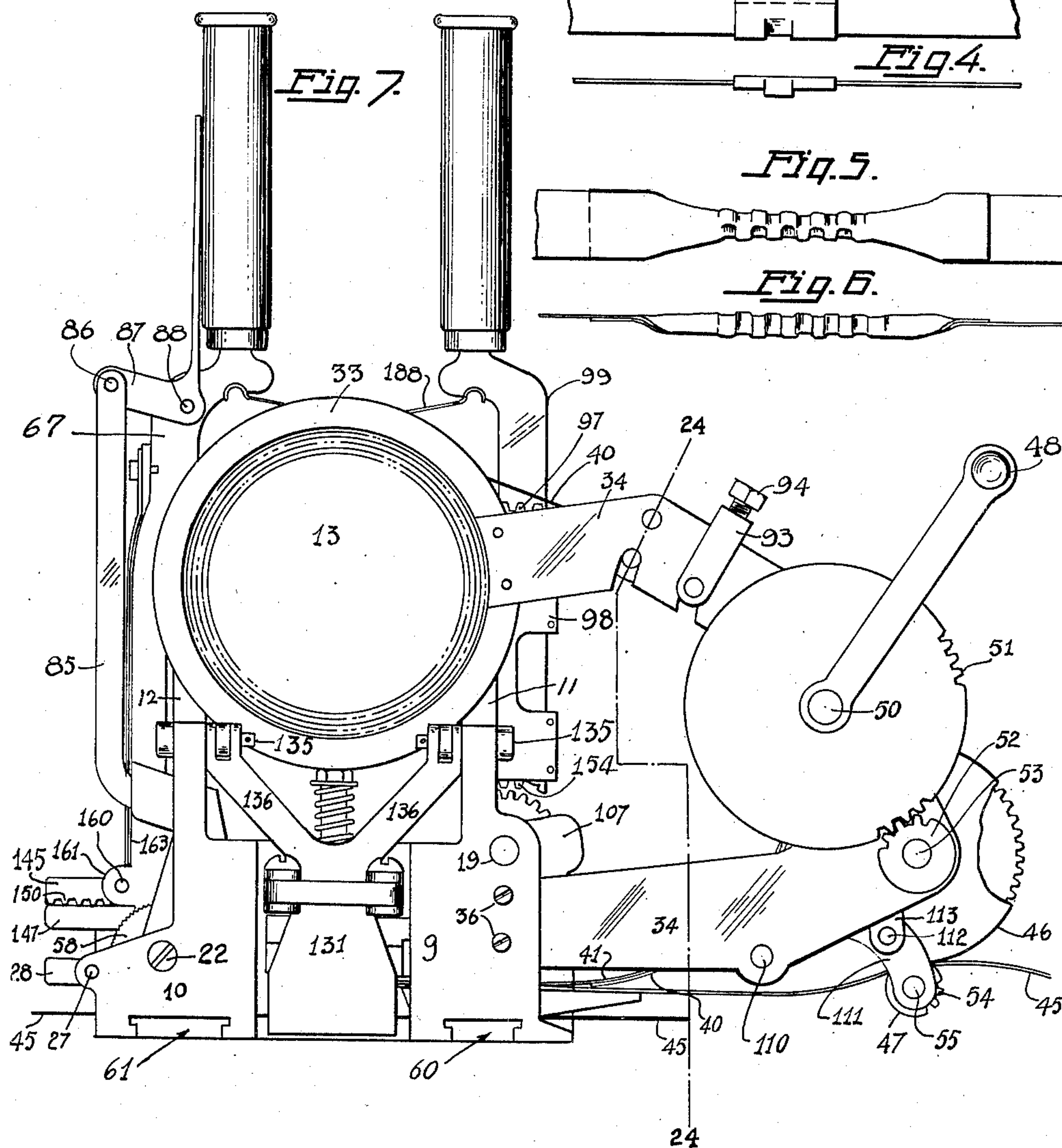
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



INVENTOR:

*William Erastus Williams*

May 9, 1933.

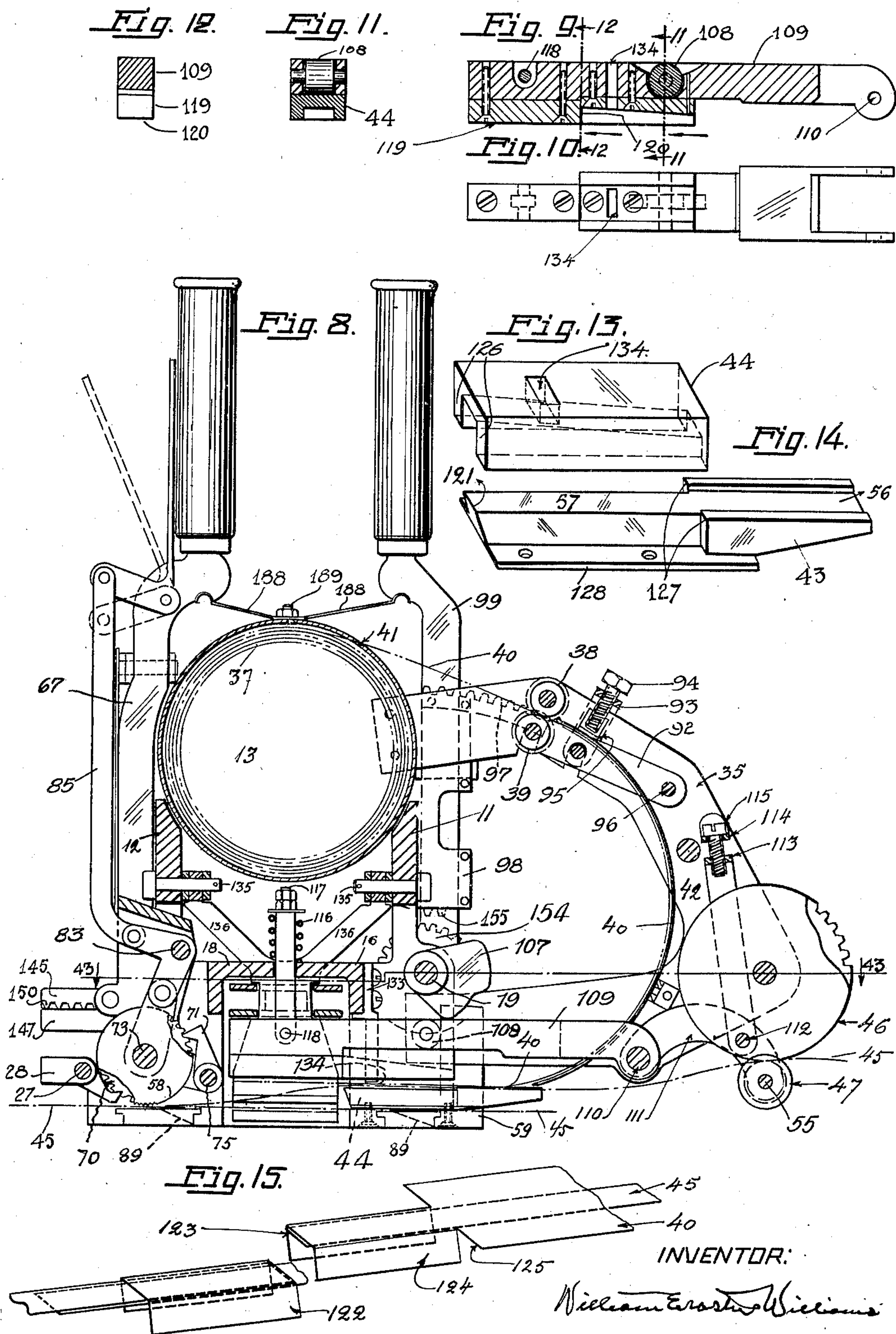
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PACKAGE STRAPPING MACHINE

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INVENTOR:

William Erastus Williams



May 9, 1933.

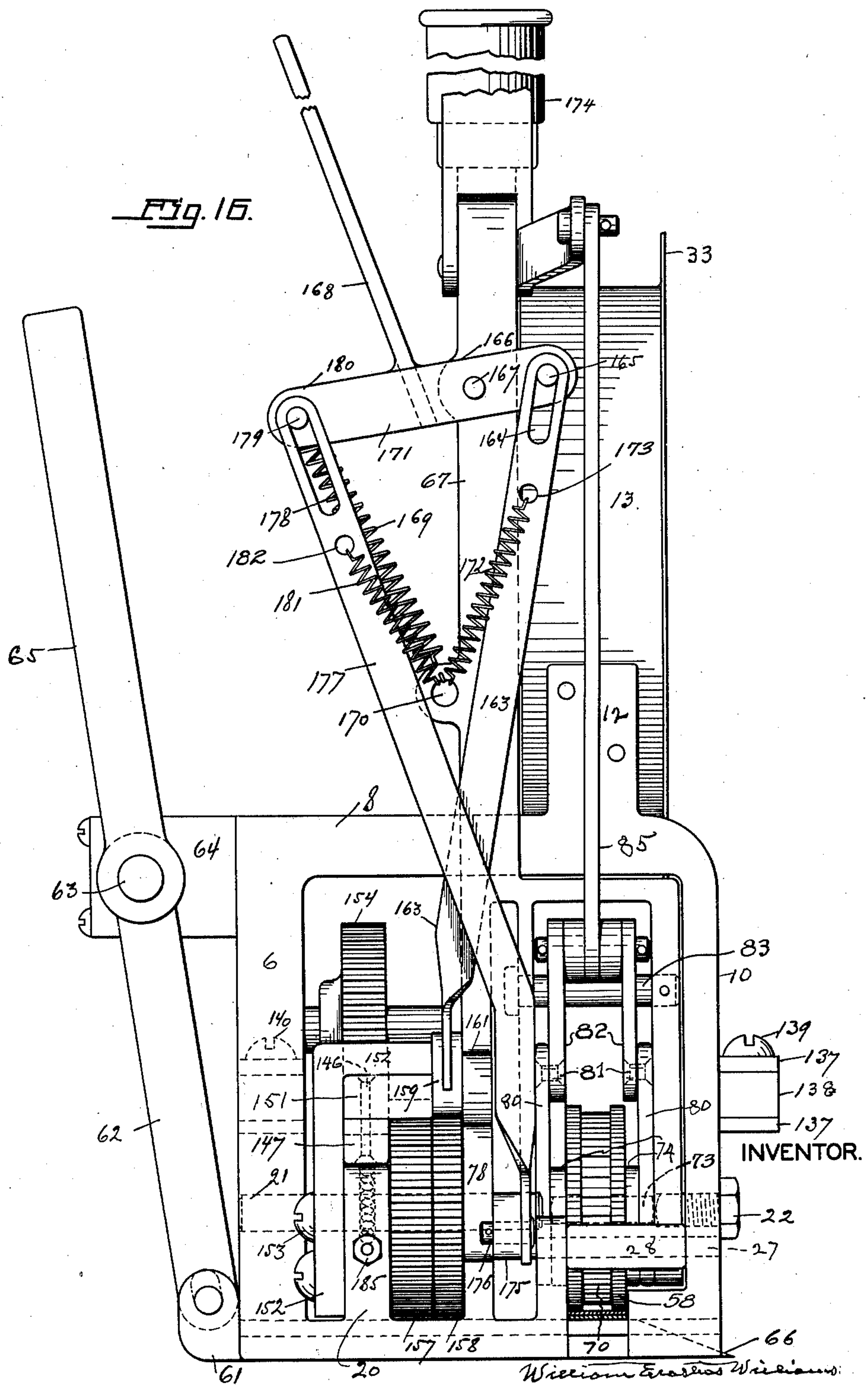
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PACKAGE STRAPPING MACHINE

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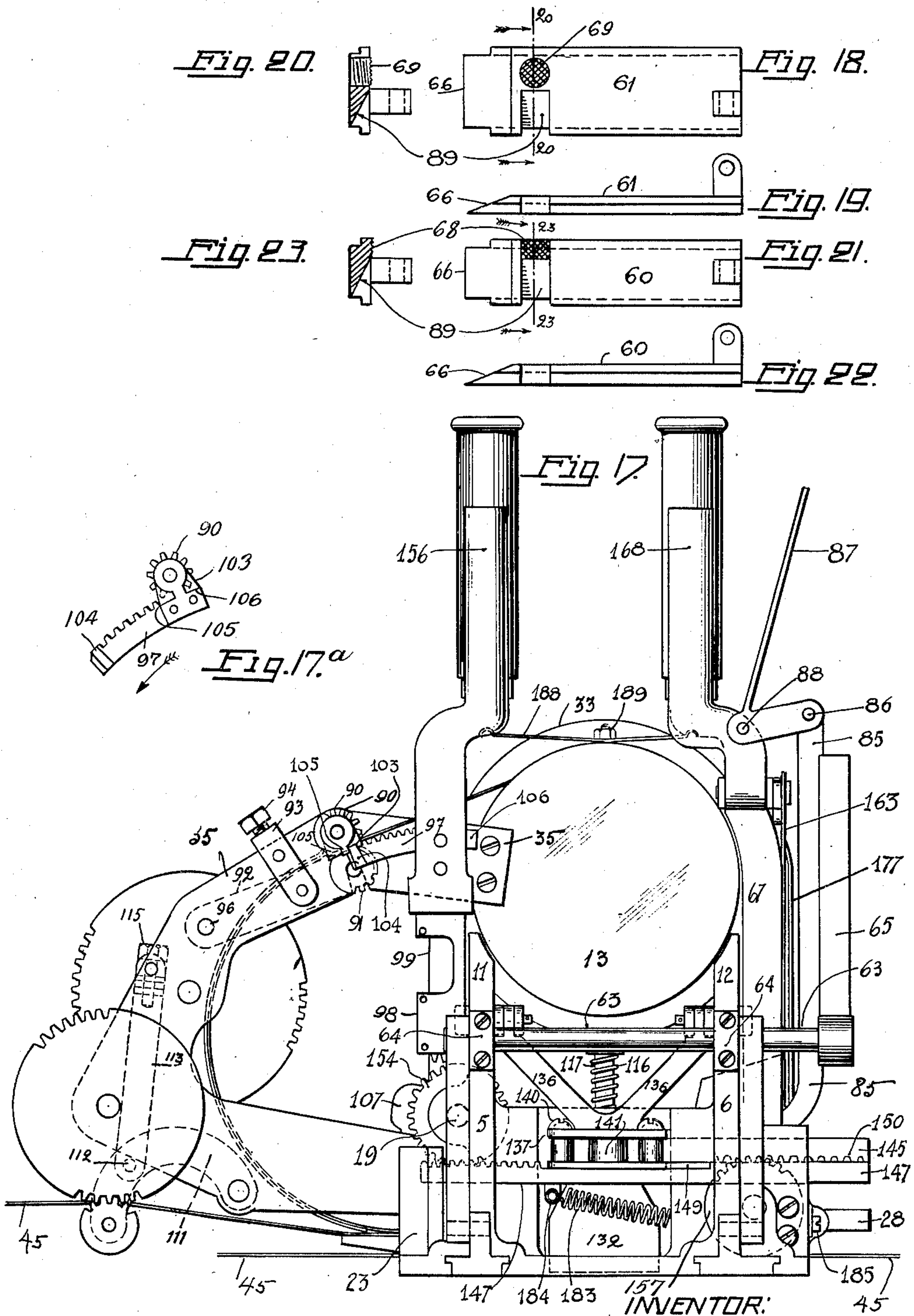
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PACKAGE STRAPPING MACHINE

Filed Nov. 14, 1929

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INVENTOR:  
William Ernest Williams

May 9, 1933.

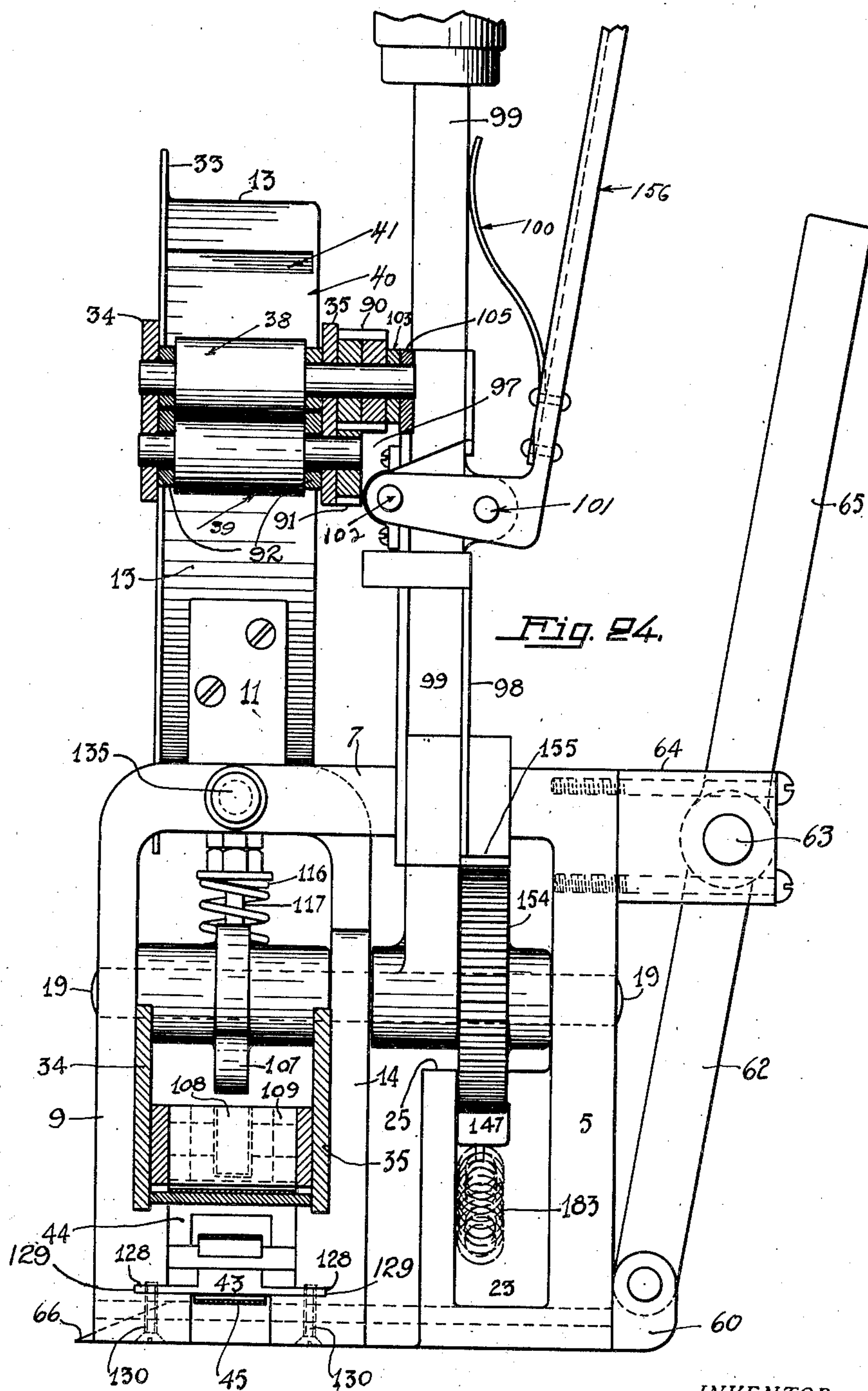
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PACKAGE STRAPPING MACHINE

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William E. Williams



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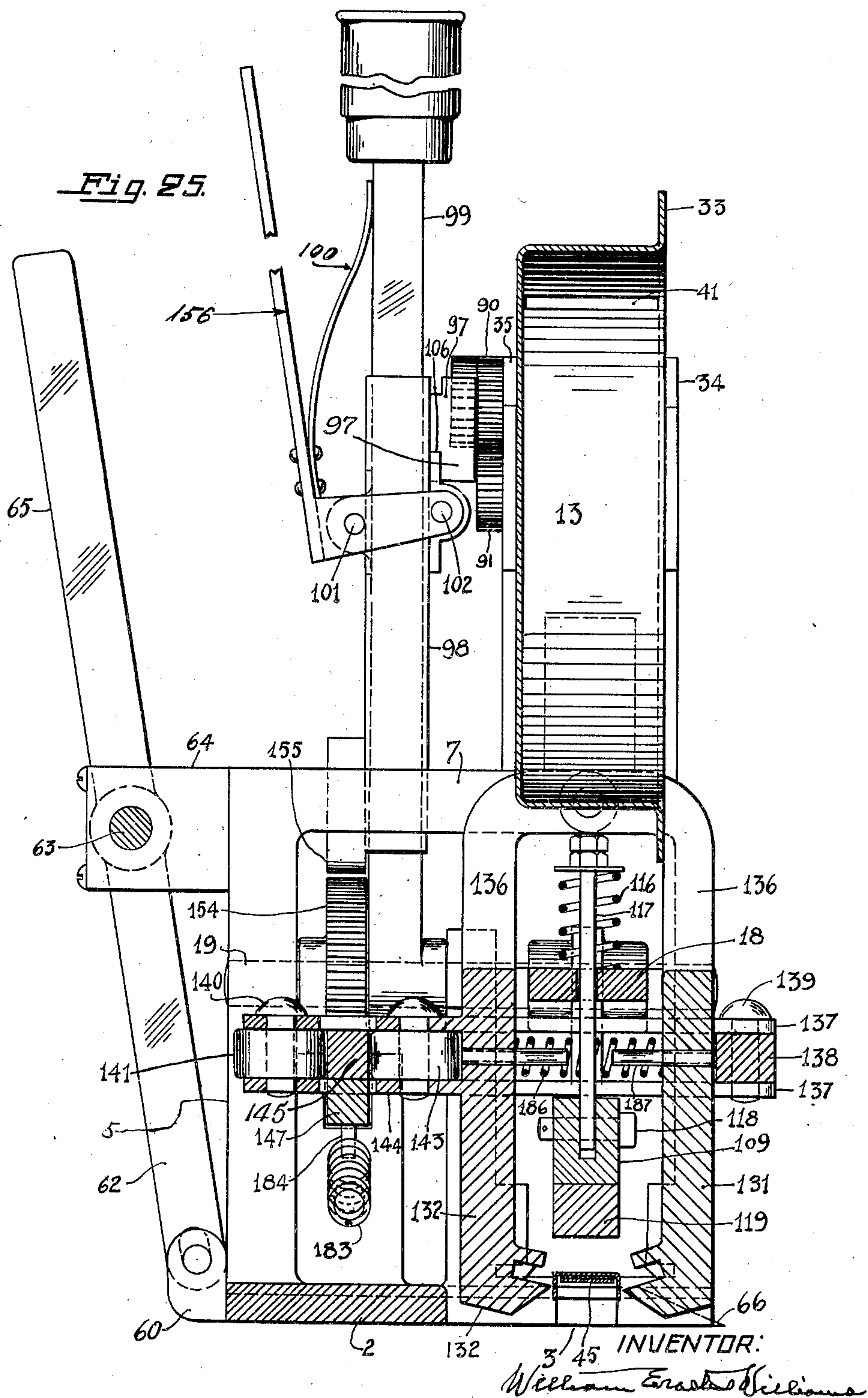
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PACKAGE STRAPPING MACHINE

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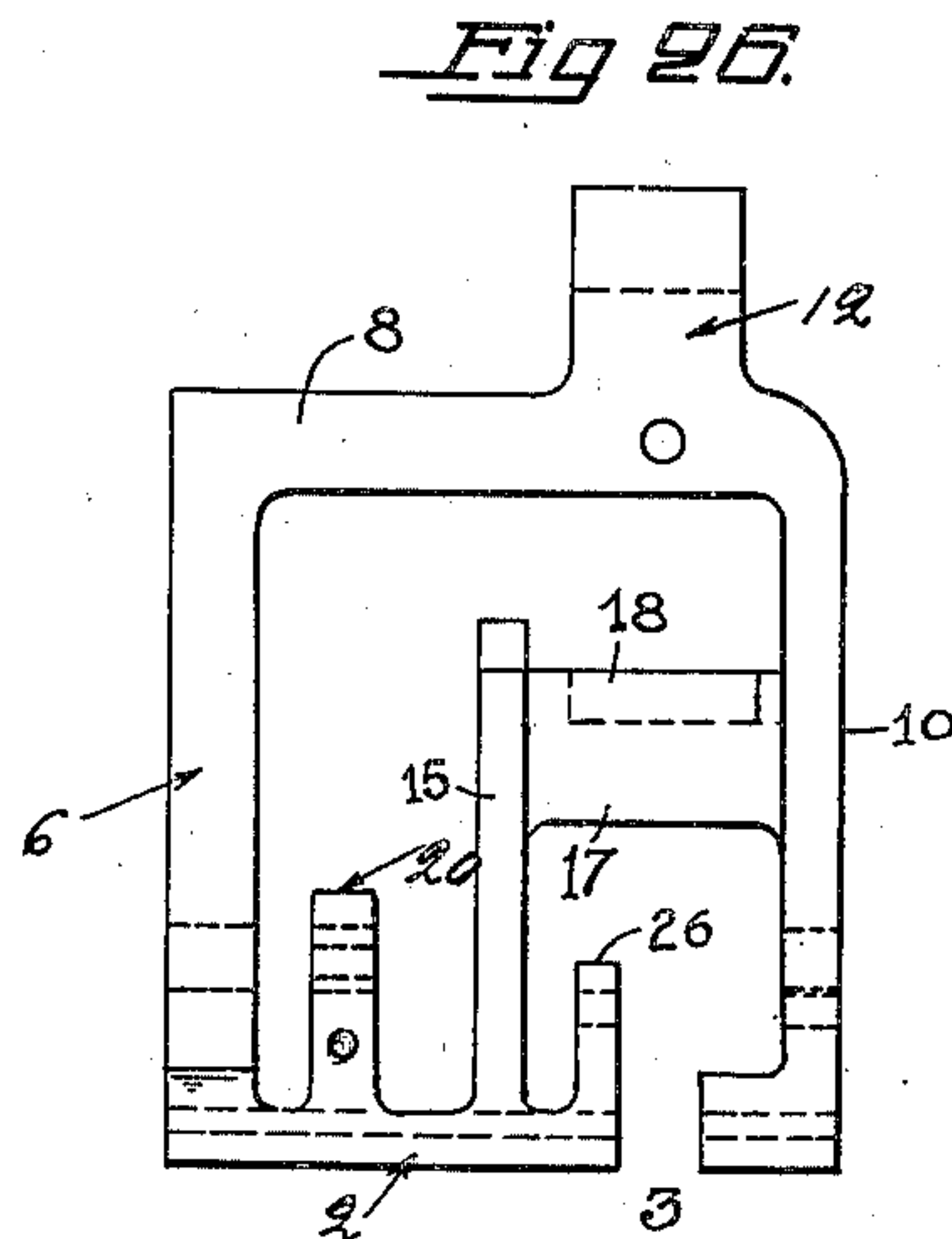
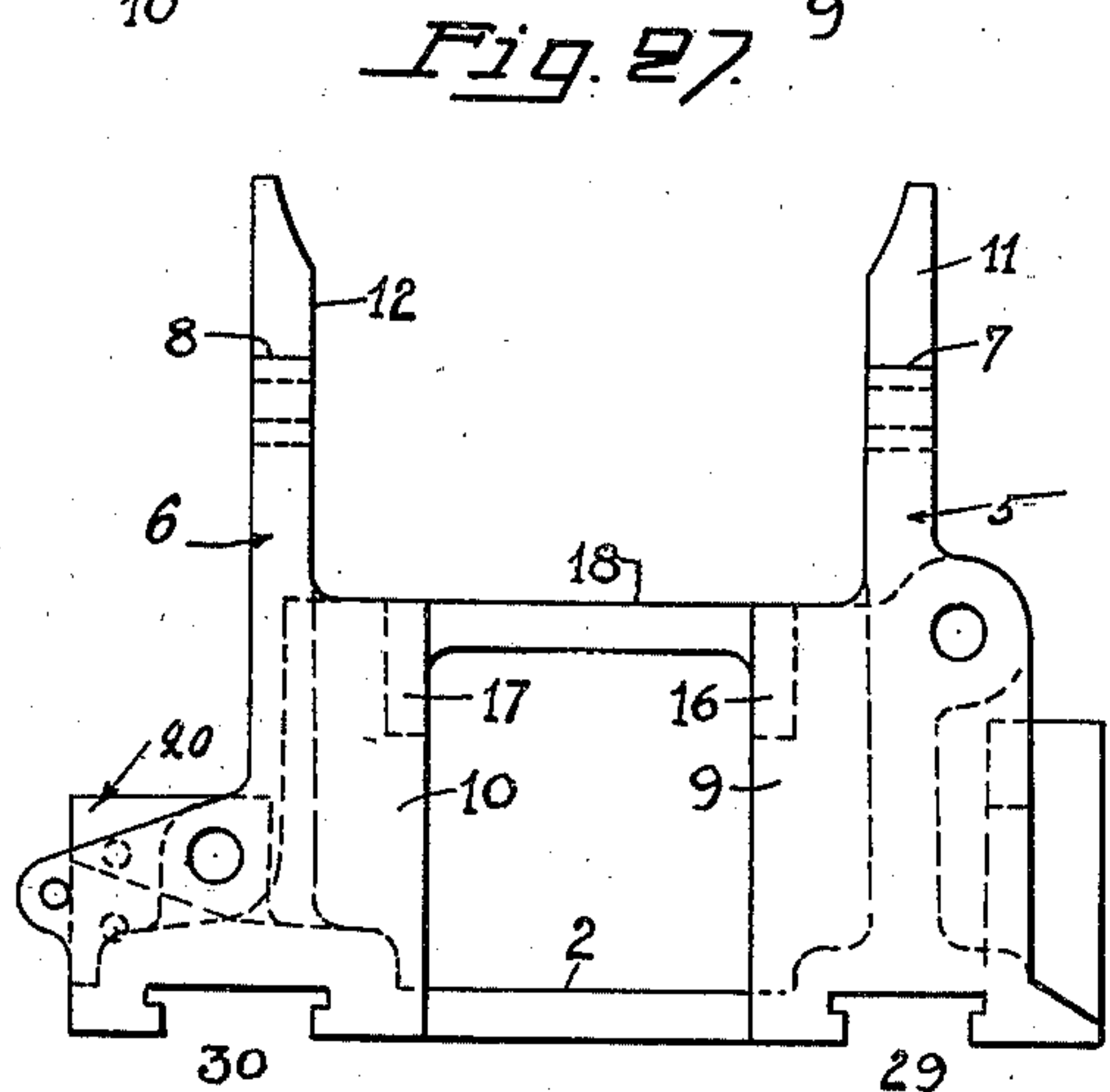
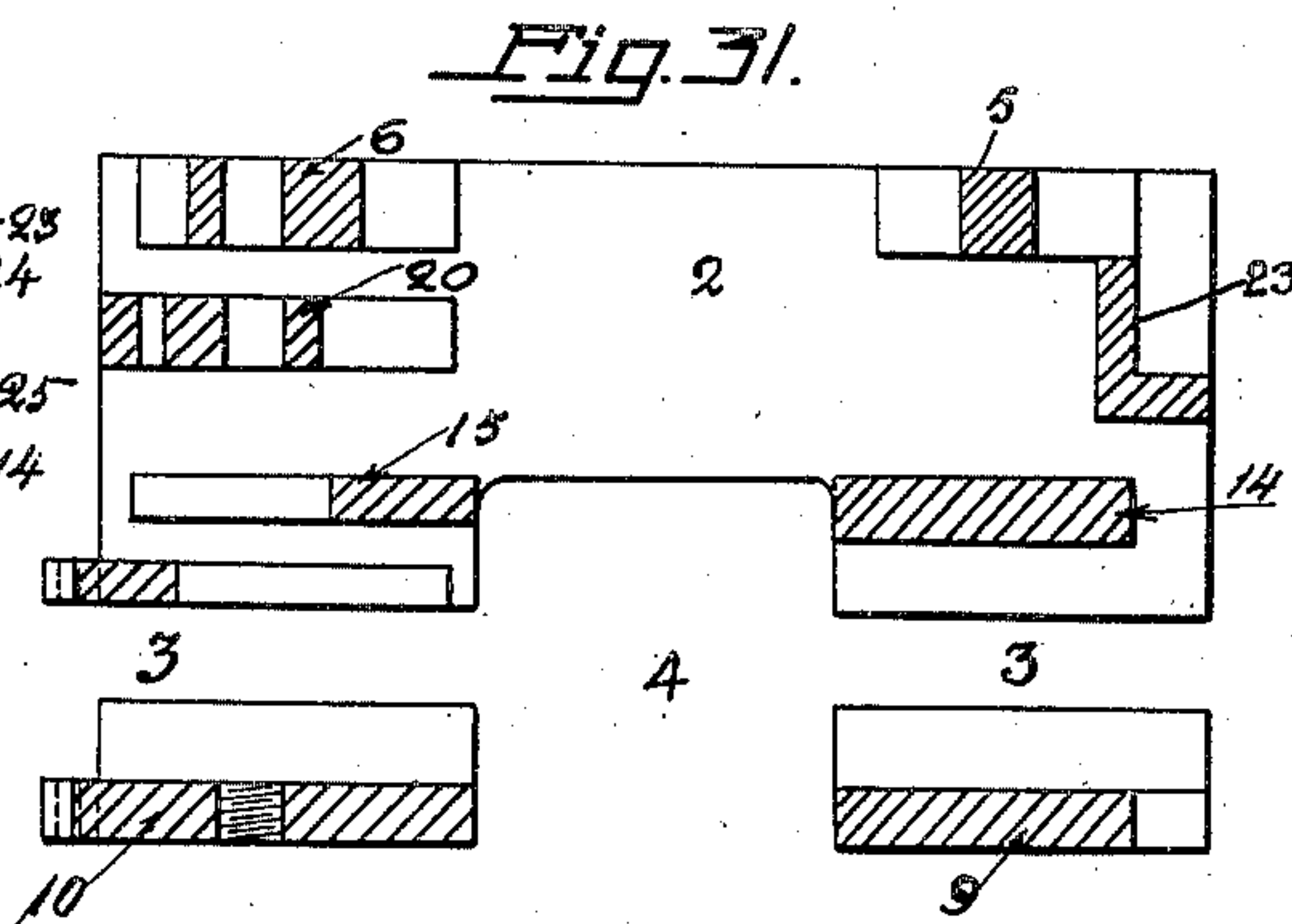
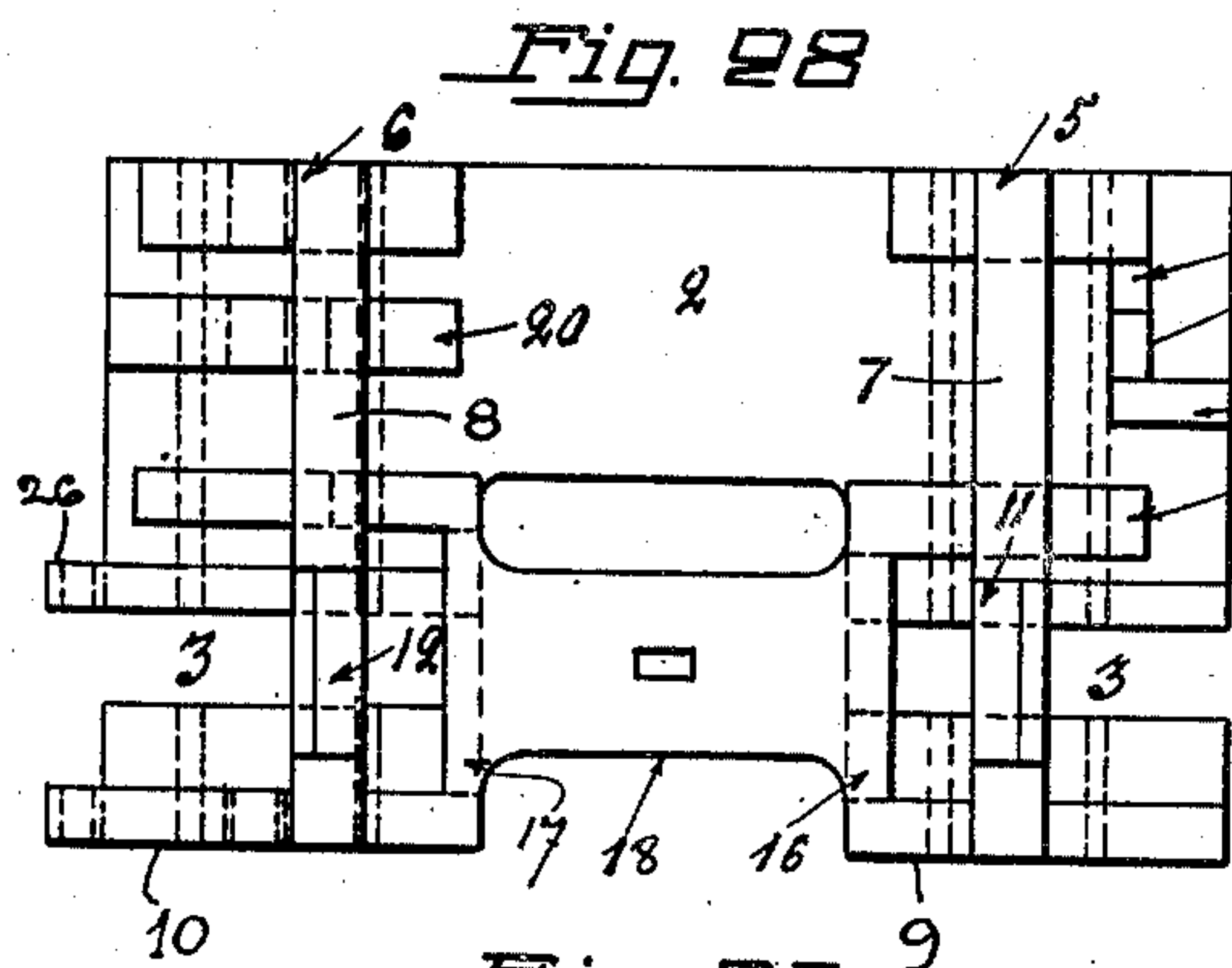
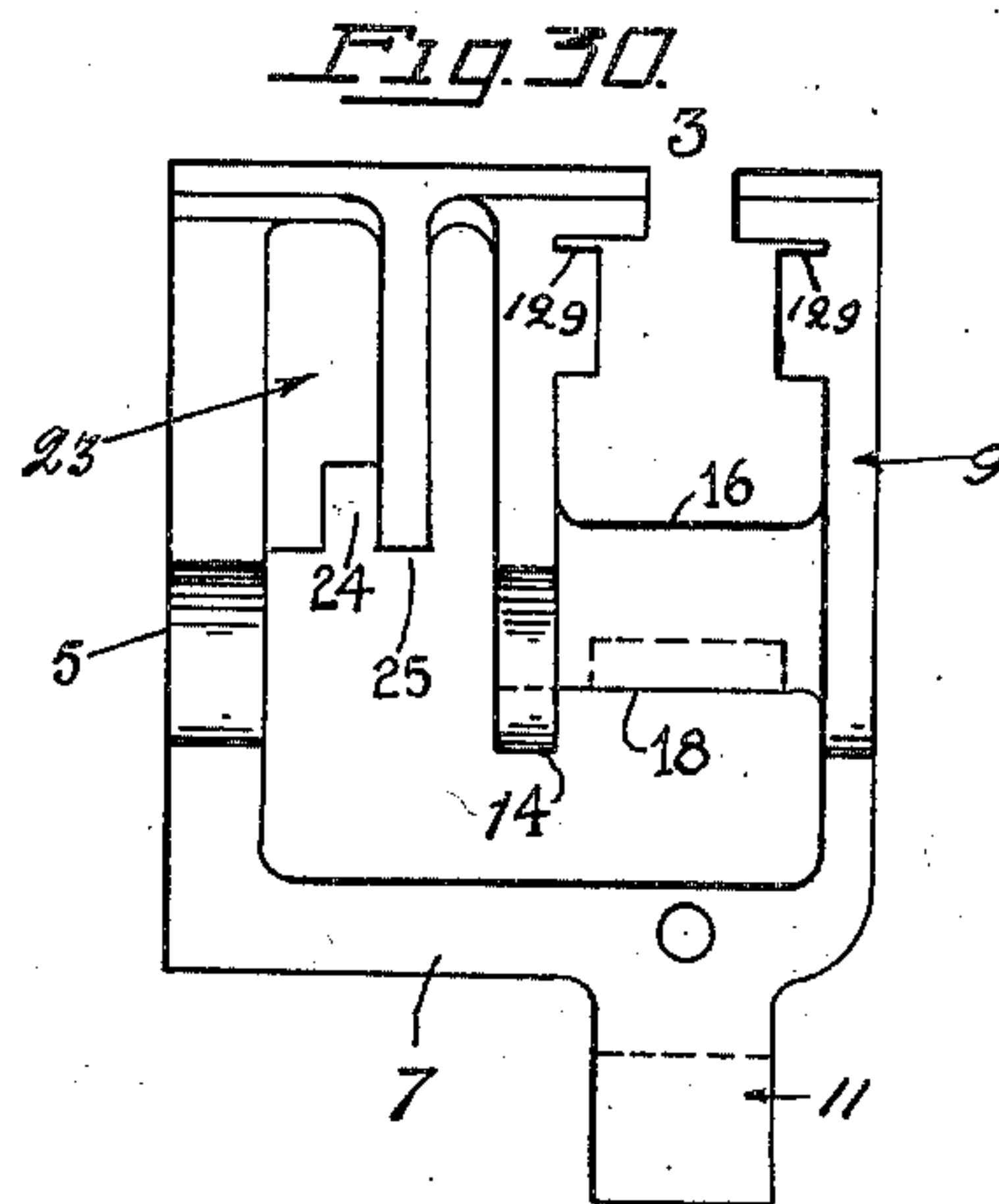
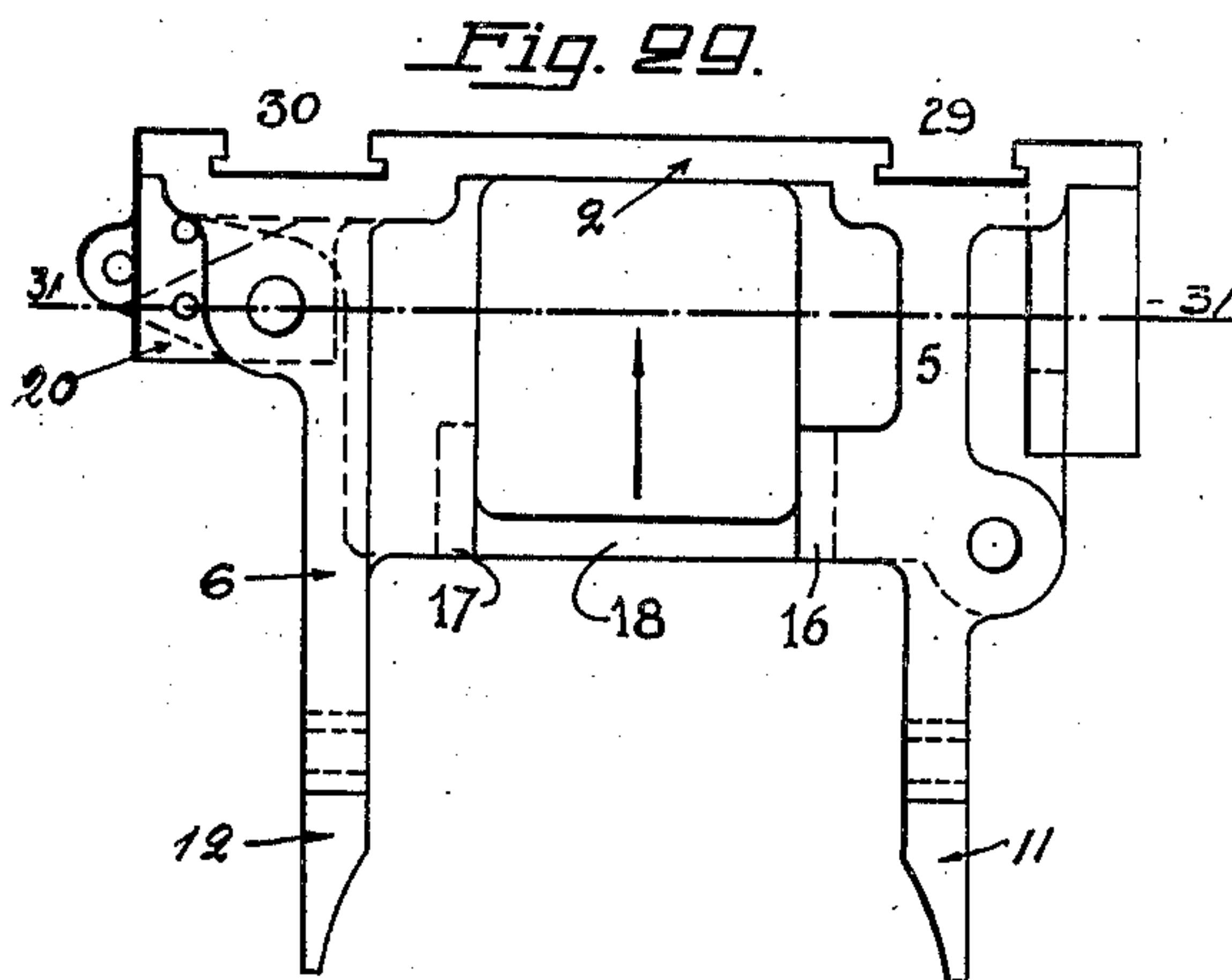
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PACKAGE STRAPPING MACHINE

Filed Nov. 14, 1929

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INVENTOR:

William Erastus Williams

**May 9, 1933.**

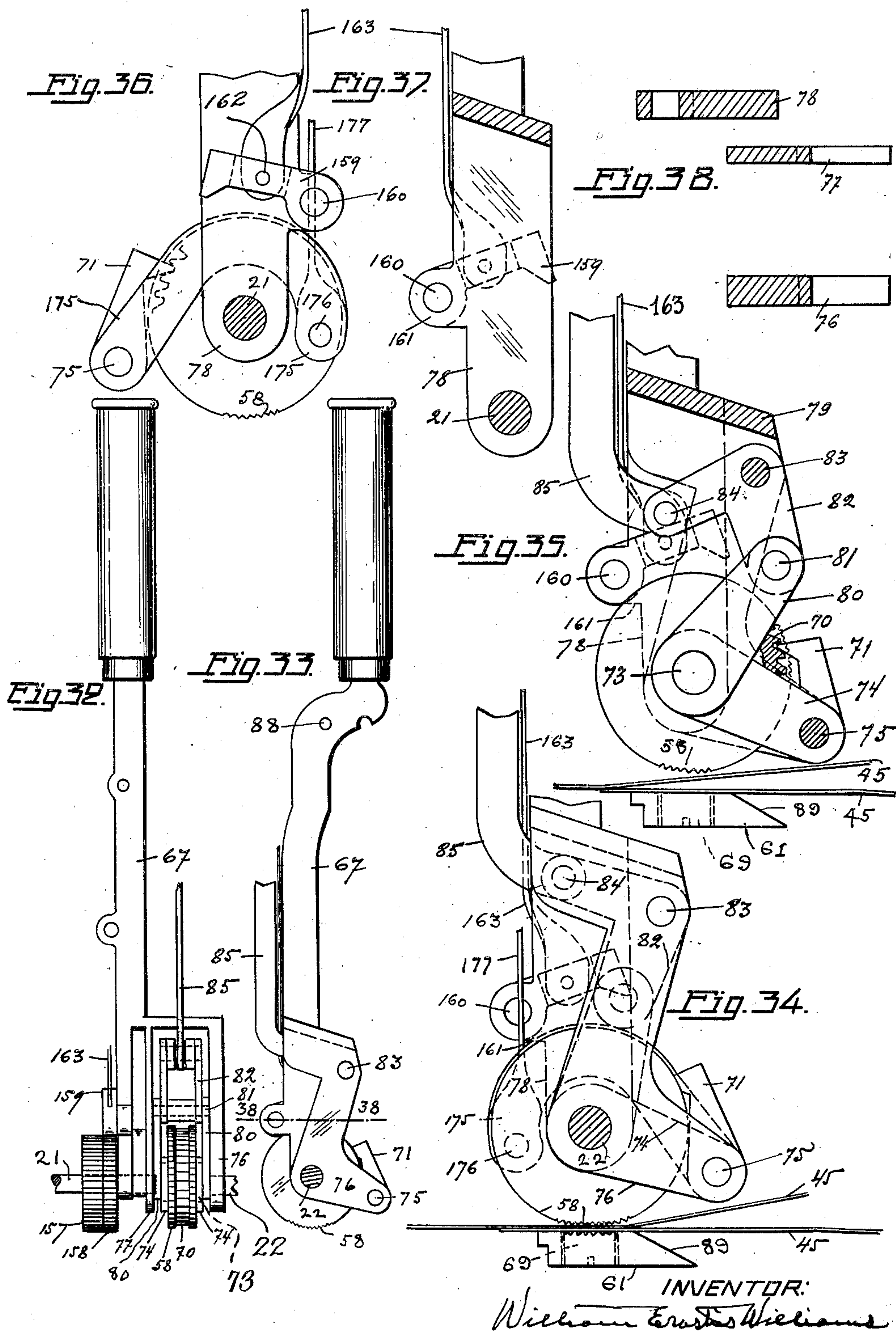
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PACKAGE STRAPPING MACHINE

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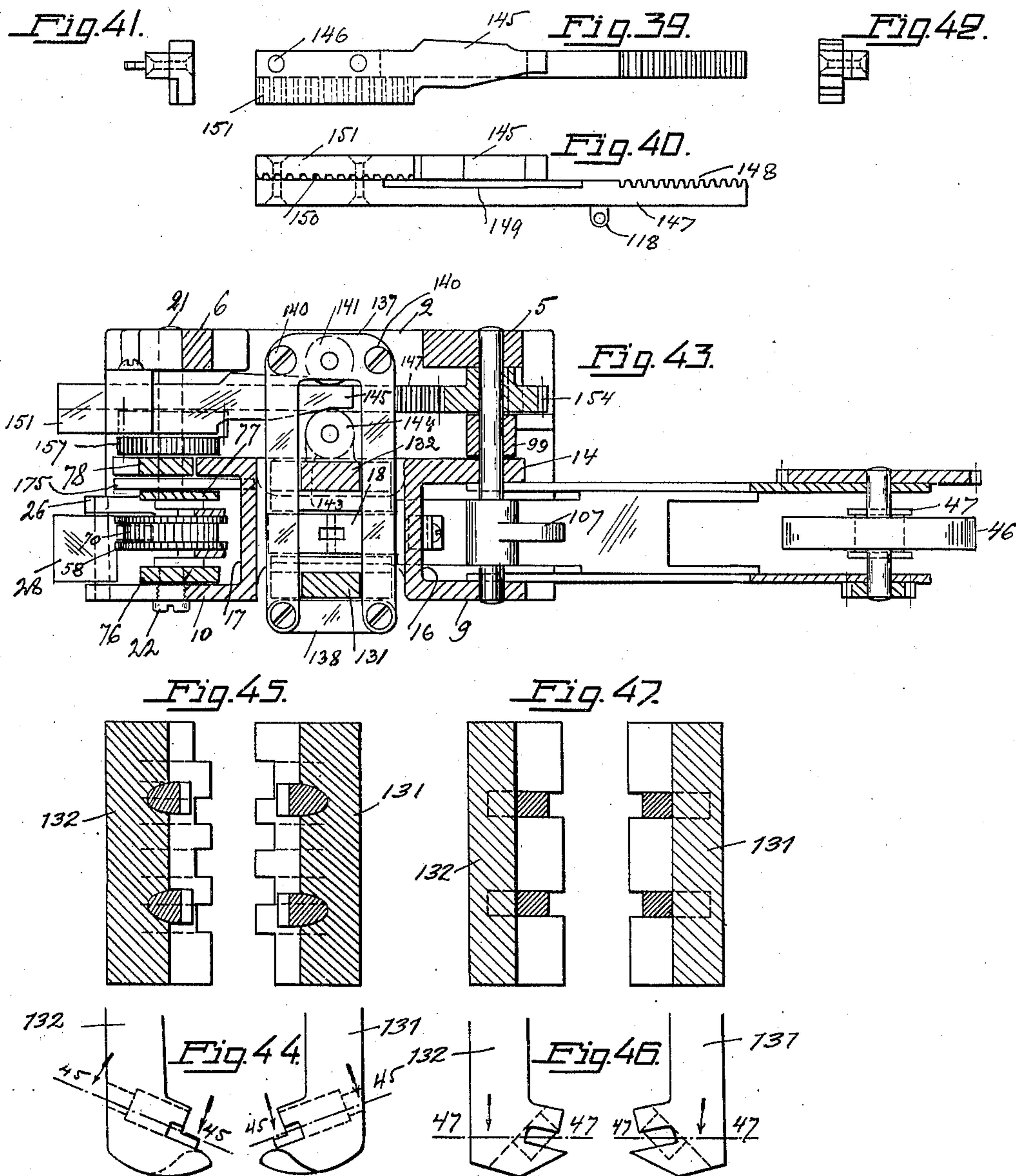
W. E. WILLIAMS

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PACKAGE STRAPPING MACHINE

Filed Nov. 14, 1929

9 Sheets-Sheet 9



Inventor

William Ernest Williams



# UNITED STATES PATENT OFFICE

WILLIAM ERASTUS WILLIAMS, OF PALO ALTO, CALIFORNIA, ASSIGNOR TO SIGNODE STEEL STRAPPING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

## PACKAGE STRAPPING MACHINE

Application filed November 14, 1929. Serial No. 407,123.

My machine relates to that class of machines that are used to seal metal bands or straps about packages to hold them securely for handling and shipping.

5 The object of my invention is to make a light, cheap, efficient, small machine for sealing metal straps around packages and while I show it as being hand operated it may be operated by power mechanism when suitable mechanical connections are made to operate the handles by power.

10 A further object of the invention is to provide in a small machine means for making a seal from a strip of seal material and placing the same on overlapped ends of the strap on the package and sealing the seal and overlapped ends together.

15 A further object of the invention is to provide sealing dies for joining the overlapped ends of the strap that may by slight changes of form in the working faces be made to seal the ends of the strap together by using an extra seal clip or without such a clip as may be desired making the three known styles of joint as shown in Figures 1, 2, 3, 4, 5, and 6 in the drawings.

20 A further object of the invention is to provide in a hand operated machine mechanism for producing the sealing pressure by hand levers that are so arranged that the load is distributed over a larger arc of hand movement than is commonly the case with hand sealing tools now in use.

25 Other objects will be described more in detail in the body of the specification.

30 Reference will be had to the accompanying drawings in which Fig. 1, Sheet 1, is a plan view and Fig. 2 an edge elevation of a seal joint made by the mechanisms shown in the drawings generally.

35 Fig. 3 is a plan and Fig. 4 an edge elevation of a type of seal that may be made with this machine with slight changes in the sealing dies.

40 Fig. 5 is a plan and Fig. 6 an edge view of a seal that may also be made with this machine by modifying the shape of the sealing die faces.

45 Fig. 7 is a front elevation of the machine.

Fig. 8, Sheet 2, is a similar view to that of Fig. 7 but with parts in section.

Fig. 9 is a sectional view of the clip forming die holding lever arm.

Fig. 10 is a bottom plan view of what is 55 shown in Fig. 9.

Fig. 11 is a sectional view taken generally on line 11—11 of Fig. 9 with the roller in elevation.

Fig. 12 is a section on line 12—12 of Fig. 9. 60

Fig. 13 is a perspective view of the female die block that forms the seal clip.

Fig. 14 is a perspective view of the male die block that forms the seal clip.

Fig. 15 is a perspective diagram showing 65 the steps of forming the seal clip.

Fig. 16, Sheet 3, is a left end elevation of the machine.

Fig. 17, Sheet 4, is a rear elevation of the machine. 70

Fig. 17—A is an elevational view of the rack portion.

Fig. 18 is a plan of the cross bar at the left of the machine.

Fig. 19 is an edge view of what is shown 75 in Fig. 18.

Fig. 20 is a cross section on line 20—20 of Fig. 18.

Fig. 21 is a plan of the right cross bar.

Fig. 22 is an edge view of what is shown 80 in Fig. 21.

Fig. 23 is a cross section on line 23—23 of Fig. 21.

Fig. 24, Sheet 5, is an elevational view from 85 the right of the machine on line 24—24 of Fig. 7.

Fig. 25, Sheet 6, is a transverse central sectional elevation looking from the left side toward the right of the machine. 90

Fig. 26, Sheet 7, is a left end elevation of the frame.

Fig. 27 is a front elevation of the frame.

Fig. 28 is plan of the frame.

Fig. 29 is a rear elevation of the frame, the 95 top of the figure being the bottom of the frame.

Fig. 30 is an end elevation of the left end of the frame the top of the figure being the 100 bottom of the frame.



Fig. 31 is a plan sectional view on line 31—31 of Fig. 29.

Fig. 32, Sheet 8, is an elevation of the left operating lever looking towards the right from its position in the machine.

Fig. 33 is a front elevation of the left operating lever.

Fig. 34 is a front elevation of the lower end of the left operating lever, showing details connected to the lever.

Fig. 35 is a similar view to that of Fig. 34 but with parts in section.

Fig. 36 is a back view of the back side of the lower end of left operating lever.

Fig. 37 is a front view of what is shown in Fig. 36.

Fig. 38 is a section of the left operating lever on line 38—38 of Fig. 33.

Fig. 39, Sheet 9, is a plan of the cam and rack bar as a unit.

Fig. 40 is a side elevation of what is shown in Fig. 39.

Fig. 41 is an end elevation of the left end of Fig. 40.

Fig. 42 is a right end elevation of what is shown in Fig. 40.

Fig. 43 is a plan sectional elevation of the machine on line 43—43 of Fig. 8.

Fig. 44 is an edge view of the dies of the sealing jaws for the seal shown in Figs. 1 and 2.

Fig. 45 is a plan section on line 45—45 of Fig. 44.

Fig. 46 is an edge view of the dies of the sealing jaws for the type of seal shown in Figs. 3 and 4.

Fig. 47 is a plan section on line 47—47 of Fig. 46.

The machine is provided with a peculiar frame, see Figs. 26 to 31 inclusive, Sheet 7, ordinarily made of a casting of an aluminum alloy for lightness and all other parts are likewise so made in so far as such alloys are adapted to the service required.

The frame is composed of a base plate member 2 cut through at bottom for the strap passageway 3 and open at the area 4 wherein the sealing jaws are located. Extending upward from the base plate at the back are posts 5 at the right and 6 at the left. The posts 5 and 6 at their tops merge into cross girder beams 7 at the right and 8 at the left which are integral with the front vertical post 9 at right and 10 at the left.

Extending upward from the bodies of the cross girder beams 7 and 8 is a projection 11 at the right and 12 at the left which support the seal strip cup 13.

A projection 14 at right and 15 at left from bed-plate are connected across by beams 16 at right and 17 at left to the front vertical posts 9 at right and 10 at left; and these cross beams 16 and 17 are connected to each other by a flat horizontal beam 18 that bridges over

the open space 4 in the bed-plate but up above the sealing position of the sealing jaws.

The front post 9 and projection 14 and back post 5 furnish bearings for the right operating handle shaft 19.

A projection 20 at the left and the back post 6 furnish a bearing for a short shaft 21 which together with a plug pintle 22 in front post 10 furnish the bearings for the left operating handle.

A projection 23 at right furnishes a seat 24 for a horizontal rack bar and also furnishes by its top 25 a stop for the bottom or lower position of the right operating handle.

A projection 26 at the left together with the front post 10 furnish bearings for the shaft 27 upon which is mounted the relay pawl 28 for the ratchet of the strap tightening roll.

Across through the bed-plate of the frame at the bottom there is a guideway 29 at the right and guideway 30 at the left into which guideways there slide cross reciprocating clamp bars 60 at right and 61 at the left.

The several posts and projections that are located in part above the cross guideways 29 and 30 extend at their bases over the said guideways to connect the outer ends of the base plate member 2 with the central body portion thereof.

The frame of the machine is supplemented by the seal strip cup 13, see Fig. 7, Sheet 1, fastened in the aforesaid projections 11 and 12 of the frame and this cup is made of thin metal and is open at the front and closed at the rear and provided with an outward projecting flange 33.

At the right side of the cup and fastened at the back of the cup and at the flange 33 in the front are two secondary frame members 34 at front and 35 at rear which extend out and down to the main frame fastened to the front frame post 9 and projection 14 by screws 36, see Fig. 7.

The strip of metal 40 from which the seal clip is made is provided in the form of a flat strip in a small ribbon coil 37 of sufficient width to form a channel shaped seal adapted to embrace the desired width of strap band and this coil is placed bodily sidewise into the cup 13 and the end is then trained out of the cup 13 at the right through a slit 41 in the wall of the cup 13 and over to and between the upper feed roll 38 and lower feed roll 39, see Fig. 24, Sheet 5, and it then passes down the curved guideway 42, see Fig. 8, Sheet 2, to position of the seal clip forming dies over male die 43 and underneath the female die 44, whereat it lies over the strap for banding the package.

The strap 45 for banding the package is provided in the form of a coil of strap not shown but entered in between a large feed roll 46 and a small flanged feed roll 47, see also Fig. 43, Sheet 9, by means of which rolls



the operator may feed the strap through the machine by a crank 48, see Fig. 7, Sheet 1, on a shaft 50 on which is a gear 51 which engages and drives a gear 52 on the shaft 53 of feed roll 46. The small feed roll 47 is provided with a gear 54 on its shaft 55 for the purpose of making a positive drive for both rolls 46 and 47. The strap 45 is fed over the male die 43 through the seat 56 and over the top portion 57 of die 43 under the strip of seal stock 40 and under the slack take-up feed roll 58 and out at the left side of the machine whereat the operator takes hold of the end of the strap with one hand while the other hand operates the aforesaid crank 48 and passes the strap around the package upon which the machine is placed and then tucks the end of the strap in at the right side of the machine in the passage 59 below the die 43 and under the body of the strap under the slack take-up roll 58. During this placement of the strap through the machine and around the package the passageway 3 is open at the bottom and allows the strap to be fed freely over the top of the package through the machine but on the completion of the placement of the strap as above described the passageway 3 is closed at two points by the cross clamping bar 60 at the right and 61 at left which bars are mounted in the guideways 29 and 30 and are connected at the rear of the machine to arms 62 on a rocker shaft 63 carried in bearings 64 at back side of the frame and the shaft 63 is provided with a handle 65 by which the operator moves the cross bars 60 and 61 to close the passageway 3. The ends of cross clamping bars 60 and 61 are tapered at 66 to cause them to pass under and lift the strap from the top of the package and bring the free end and body of the strap up under the slack take-up feed roll 58 at the right of the machine and over the left cross bar 61, and at the same time the cross bar 60 lifts the strap up tightly to and under the male die block 43 and thus clamps the end portion of the strap against withdrawal back from the machine. When the bars 60 and 61 are closing the passageway 3 and the strap is around the package, the operator reverses the movement of the crank 48 and by the feed rolls 46 and 47 draws back the loose slack of the strap and brings the strap in contact with the package, whereupon the operator by rocking downward toward the left the left operating lever 67 tightens the strap to any desired tension on the package. The clamping of the strap 45 by the bar 60 acting against the under side of die 43 is assisted by a steel insert file surfaced piece 68 in the cross bar 60, see Fig. 21, Sheet 4, and the bar 61 is provided with a steel plug 69 screwed into the body of the cross bar 61 and provided with sharp upstanding teeth to engage the end of the strap to prevent its slipping

back when the slack take-up feed roll 58 presses down the overlapped body of the strap and pushes or draws the strap tightly on the package, see Figs. 34 and 35, Sheet 8.

The slack take-up feed roll 58 is provided with two side flanges having teeth adapted to cut into and engage the surface of the strap 45 and move it as desired and this roll is revolved by means of ratchet teeth 70 of smaller diameter than the toothed flanges of roll 58 and located between the said flanges and moved by a pawl 71 and prevented from back movement by a delay pawl 28.

The slack take-up feed roll 58 is mounted in and carried by the left operating lever 67, by means of a short shaft 73 fixed in the roller and held in bearings in links 74 hinged to shaft 75 upon which pawl 71 is fixed, see Figs. 32 to 38. Shaft 75 is hinged in the front leg 76 of left operating lever 67 and into the middle leg 77 of said lever 67. This middle leg 77 is thinner than the front leg 76 and the rear leg 78 but shaft 75 has no bearing in the rear leg 78.

The legs 76, 77, and 78 of lever 67 are connected to the main body of the lever by an inclined cross web 79.

The slack take-up feed roll 58 with its shaft 73 is raised and lowered in the legs 76 and 77 of lever 67 about the shaft 75 as a hinge pin for links 74 by means of links 80 hinged at 81 to rocker shaft links 82 hinged on a shaft 83 in the said legs 76 and 77 of lever 67 and said rocker shaft links 82 are connected by a hinge pin 84 to a connecting rod 85 connected at 86 to a side hand piece 87 hinged at 88 to operating lever 67, see Fig. 7, Sheet 1, wherein the hand piece 87 is closed to cause the slack take-up feed roll 58 to clamp the strap as shown in Fig. 34, Sheet 8. In Fig. 17, Sheet 4, a rear elevation, the hand piece 87 is open and in this position the slack take-up roll 58 is in the position shown by Fig. 35, Sheet 8, where the roll 58 is above and clear of contact with the strap.

While it is desirable to have the strap passageway 3 clear at the bottom and not crossed or closed by the cross bars 60 and 61 at the time the strap is passed through and around the package the bars 60 and 61 may be closed when the strap is so passed and the transverse inclined surfaces 89, see Figs. 18 to 23 inclusive, Sheet 4, in the bars 60 and 61 facilitate the passage of the end of the strap which is from the right side towards the left; however, when this takes place the insert steel file surface clamping piece 68 on bar 60 must be removed to permit the passage of the end of the strap underneath the die block 43.

The feed rolls 38 and 39 (Fig. 24) for the seal clip stock are geared together by gears 90 on shaft of roll 38 and 91 on shaft of roll 39, and the roll 39 is carried in arms 92 connected across by a yoke 93, see Fig. 8, Sheet 2, through which passes an adjusting screw 94



which bears on a cross bar 95 between the secondary frame members 34 and 35. The arms 92 are hinged in 34 and 35 by hinge bolt 96, and the roll 39 thus may be clamped by the screw 94 to hold the strip 40 tightly between the rolls 38 and 39 for feeding purposes. The face of the gear 90 on the shaft of roll 38 is wider than the gear 91 and is engaged and driven by a segment of a curved rack 97 which is carried on a slidable sleeve 98 on the right operating handle lever 99 which is fixed on the shaft 19 in the frame before mentioned.

The sleeve 98 on the right operating lever 99 is held in uppermost position by a flat spring 100 pressing against a hand piece 156, see Fig. 24, Sheet 5, and Fig. 25, Sheet 6, hinged at 101 to a projection on lever 99 and connected by a pin 102 onto a block on the sleeve 98. Thus in the position of the figures, the curved rack segment 97 is such that as the right operating hand lever 99 is revolved from upright position downward to the right of Fig. 7, Sheet 1, the curved rack segment 97 evolves the feed rolls 38 and 39 one revolution which feeds the seal strip 40 a sufficient length for a single seal and this takes place on the first part of the downward movement of the operating lever 99.

To insure that the gear 90 on shaft of roll 38 will stop at one revolution there is provided on the gear 90 a plate 103, see Fig. 17, Sheet 4, which is engaged by a short smooth surface 106 on the curved rack segment 97 which surface is located behind the lever 99 at the end of the rack. In Fig. 17—A rack 97 is illustrated free from the sleeve 98 and in the position when the rack 97 has passed downwardly completing the one revolution of the gear 90 and the plate 103 has come to rest on the flat space 106 of curved rack bar 97. On the further movement downward of the rack 97, as indicated by the arrow in Fig. 17—A, the rack 97 will entirely clear the plate 103.

To insure the accurate meshing of the rack teeth of the segment 97 with the teeth of gear 90 there is provided a big tooth 104 on the rack 97 which engages a big tooth 105 on the gear 90 at the beginning of the downward stroke of the handle 99 as will readily be seen from Fig. 17.

The shaft 19 upon which is fixed the right operating lever 99 has fixed thereon a cam block 107, see Fig. 8, Sheet 2. The cam surface of the block 107 engages a roll 108 in a die holding lever arm 109, said arm 109 being hinged at 110 in the frame pieces 34 and 35. This hinge pin 110 carries also two arms 111 which carry the shaft 55 of small feed roll 47, and the arms 111 are connected at 112 by a yoke 113 connected by an adjusting screw 115 to a cross bar 114 between the frame pieces 34 and 35 by means of which screw 115 the

roll 47 may be clamped to roll bar 46 for feeding the strap.

The die holding lever arm 109 is lifted upward when not held down by cam block 107, by a spring 116 on a rod 117 bearing against the horizontal frame member 18 and connected by a pin 118 in said lever arm 109.

The female die block 44 is secured by screws and pins to arm 109, see Fig. 9 and Fig. 10, Sheet 2.

To prevent the bent over edges of the formed clip seal piece 124 in the female die 44 from sticking in the die 44 on the raising of the die 44 from the die 43 there is provided a stripper finger 133 secured to the frame member cross beam 16 and extending down through lever arm 109 through the slot 134 in both the arm 109 and die 144, see Figs. 8 to 13 inclusive on Sheet 2. Clearance below the lower end of the finger permits the seal strip and strap to pass under the finger. On the outer end of lever arm 109 there is fixed by screws or other suitable means a cut off die block 119 having the cutting edge 120 which coacts with a cutting edge 121 of male die 43, Fig. 14, Sheet 2, in cutting off both a channel shaped seal clip 122 and the body of the strap from the stock of strap at 123, see diagrammatic view Fig. 15, Sheet 2, wherein 124 indicates the edges of seal strip 40 bent down after being cut at 125 by the flanges 126 of die 44 coacting with the cutting edges 127 of die block 43. When the lever arm 109 is depressed by the cam block a clip 122 is cut off by the cutting edges 120 and 121. Simultaneously or immediately thereafter the flanges 126 and the cutting edges 127 shear through the edges of the seal strip at 125 and the continued downward movement of the female die turns down said edges as shown at 124.

The die block 43 is provided with the supporting flanges 128 which fit into slots 129 in the right side of the frame and the block 43 is held in place by screws 130 screwed in from the bottom of the frame, see Fig. 24, Sheet 5.

As the seal clip 122, Fig. 8, Sheet 2, is cut off it is pushed down by the die 119 astride the cut off end of the strap to and over the other end of the strap in the position between the sealing dies of the sealing jaws, see Fig. 25, Sheet 6, ready for the said jaws to operate in pressing the seal clip 122 and ends of the strap to form the joint. The operation of forcing the jaws to form the seal is performed jointly by both operating levers 67 and 99 on the upstroke from down position to upright position. The down stroke of right lever 99 feeds the clip stock, forms the clip, cuts it off and cuts off the main strap 45 and places the clip seal over the overlapped ends of the strap in between the sealing jaws. The arrangement of the curved rack segment 97 and the shape



of the cam surface of the cam block 107 and the right operating lever 99 is such that the clip strip is fed first, before the cam block acts to cut and form the channel seal clip.

The dies for the sealing jaws are shown in Figures 44 to 47 inclusive, in Sheet 9, and as they are the dies now in use commercially in small hand tools to form the several types of seal shown in Figs. 1 to 6 inclusive, Sheet 1, they will not be described in detail; but they are mounted in or are a part of jaws 131 at the front of the machine and 132 at the back.

The jaws 131 and 132 are hinged together at their upper ends by hinge pins 135 which also pass through the cross girder frame pieces 7 and 8. The upper ends of jaws 131 and 132 are divided into arms 136 spread apart to aid in resisting thrusts parallel to the strap alignment and also permit the location of the seal strip cup 13 to be lower down to the base of the machine.

The bodies of the jaws 131 and 132 are notched out in which to carry a cross yoke made of clevis form having top and bottom U shaped pieces 137 and connected across at the front by a bar end piece 138 fastened between the bars 137 by screws 139. At the back side or rear end of the yoke the bars 137 are held apart and fastened together by screws 140 passing through separating thimbles on the screws and between the bars 137 and at this end of the yoke there is mounted between the bars 137 a roller 141. On the back side of jaw 132 there are lugs 144 which carry a roller 143 in between the yoke bars 137 in the plane of the roller 141.

A wedge shaped ended flat cam bar 145 extends between the yoke bars 137 and between the rollers 141 and 143, see Figures 39 to 43 inclusive, Sheet 9, which acts to spread apart the rollers 141 and 143 and thus draw together in the sealing operation. The cam bar 145 is fastened by rivets 146 to a rack bar 147 having rack gear teeth 148 at its right end and cut away at 149 to pass under the lower yoke bar 137. At its left hand end the rack bar 145 carries a part 151 which extends forwardly from the rack bar 147 and on the bottom side it is provided with rack gear teeth 150. The two bars 145 and 147 are as a unit piece and at the right side of the machine the right end of the bar 147 is carried in a notch or seat 24 in projection 23 of the frame, see Fig. 30, Sheet 7, and at the other end of bar 147 it rests on projection 20 of the frame and is held thereon by a keeper bracket 152 fastened by screws 153 to projection 20, see Fig. 16, Sheet 3.

At the right end of the machine a gear 154 is loosely mounted on the operating lever

shaft 19, and this gear is in constant engagement with the rack gear teeth 148 of rack bar 147.

On the lower end of sleeve 98 mounted on the operating handle lever 99 there are teeth 155 adapted to engage the teeth of gear 154 when desired by the operator who when the handle 99 is down 90 degrees to the right from vertical position clasps the hand piece 156 and brings the teeth 155 into engagement of gear 154 and on the up stroke of lever 99 moves the rack bar 147 toward the right. The operator may use the left operating handle lever 67 simultaneously to assist the right hand lever 99 in moving the rack bar 147 and cam bar 145 by means of a gear 157 loosely mounted on short shaft 21, and gear 157 is at all times in engagement with the rack teeth 150 of portion 151 of cam bar 145; and gear 157 is secured to or is a part of a gear 158 outside of the rack portion 151 of bar 145. Gear 158 and cam bar 145 are moved by operator when desired by means of operating handle lever 67 through the medium of a pawl 159 hinged at 160 to a projection 161 on rear leg 78 of lever 67, see Fig. 36 and Fig. 37, Sheet 8. Pawl 159 is connected at 162 to a flat connecting rod 163, see Fig. 16, Sheet 3, extending along the side of lever 67 and connected by a slot 164 on a pin 165 in a projection 166 of a finger handle 168 hinged at 167 to lever 67. Normally the finger handle 168 is held in position of Fig. 16 by a spring 169 connected to the rear end of a pin 170 on lever 67 and connected to an arm 171 of finger handle 168. The spring 169 is stronger and can overcome a spring 172 connected at the front end of pin 170 and connected to a pin 173 in connecting rod 163. Thus normally the pawl 159 is held out of engagement with the gear 158; but when the operator closes the finger handle 168 up to contact with the main hand hold 174 of lever 67 then the spring 172 causes the pawl 159 to engage gear 158 and thus engaged to move the cam bar 145 by the lever 67, through the gears 158 and 157.

The pawl 71 is fixed on shaft 75, see Fig. 35, Sheet 8, and other figures on Sheet 8, and is raised and lowered in relation to ratchet teeth 70 of stock take-up roll 58, by means of a curved arm 175 fixed on shaft 75 and extending over the shaft 21 and is connected by a pin 176 to a flat connecting rod 177 extending up on the side of operating lever handle 67 and connected by a slot 178 to a pin 179 in projection 180 of finger handle 168. A spring 181 connected to lever 67 at pin 170, is connected to a pin 182 in connecting rod 177 whereby the pawl 71 is held into engagement with the ratchet teeth 70, and the spring 181 permits the pawl 71 to ride over the teeth 70 on the back stroke of lever 67; likewise the spring 172 of pawl 159 permits the pawl to



ride over the teeth of gear 158 on the back stroke.

The cam bar 145 and its companion 147 are retracted to position shown in Fig. 43, 5 Sheet 9, and Fig. 17, Sheet 4, by a spring 183, see Fig. 17, Sheet 4, connected to bar 147 by a stud 184 in bar 147 and the other end of spring 183 is connected to a bolt 185 in projection 20 of the frame, see Fig. 16, Sheet 3. 10 This retracting movement by the spring 183 takes place after the sealing operation is completed and the operator releases the finger lever 168 of lever 67 and the springs 169 and 181 return 168 to position of Fig. 16, Sheet 15 3; and also after operator has released hand piece 156 on lever 99 permitting spring 100 to release teeth 155 from gear 154, thus freeing the gears from the handles 67 and 99.

In the operation of the machine the operator first uses the operating hand lever 67 to make taut the strap on the box through the mechanism as before described by downward movement of the handle 67; ordinarily only one stroke of 90 degrees being sufficient but 25 he may vibrate the handle as needed for this purpose. Then when the right tension of the strap on the package is secured he draws in the lever 67 down to the bottom, if it is not already in that position and closes the 30 finger handle 168, whereupon the dog or pawl 159 engages gear 158 ready for the sealing up stroke. In the meantime the operator has moved the right hand lever 99 down making and placing the seal clip and when down 35 closes the hand piece 156 and thus engages the teeth 155 with the gear 154, so as to drive the gear during the up-stroke of the hand lever 99 in harmony with the up-stroke movement of the lever 67. Thus the sealing operation which requires the most power is accomplished by both hands of the operator in a wide swing movement of 90 degrees. The initially operative portions of the cam surfaces of the wedge shaped cam bar 145 are 45 relatively steep so as to move the sealing jaws rapidly into engagement with the clip. The cam surfaces of the bar 145 which operate during the final part of the upstroke movement are relatively slightly inclined so as 50 to provide considerable leverage during the actual sealing operation.

The jaws 131 and 132 are spread apart, when the wedge cam bar 145 permits, by springs 186, see Fig. 25, Sheet 6, working 55 against the rod 117 and held in place by studs 187.

It will readily be understood that the machine described above may be readily adapted to form any kind of seal which can be produced by sealing jaws. The jaws shown 60 in Figs. 44 and 45 are adapted to produce the known type of seal shown in Figs. 1 and 2. In this seal a clip is employed and the clip and overlapping ends are deformed so 65 as to prevent the tension of the strap from

pulling the ends apart. The jaws illustrated in Figs. 46 and 47 are adapted to produce a joint of the type illustrated in Figs. 3 and 4. In this form of joint a clip is employed and intermediate portions of the clip together 70 with overlapping portions of the strap are slit through and the resulting tongues depressed out of their initial plane. In Figs. 5 and 6 I have illustrated a known type of joint which does not require a clip. This 75 form of joint can be made by suitably shaped jaws which may be mounted upon the machine described above.

In places in the drawings where gears are shown it is not thought necessary to draw 80 in all the teeth of the gear but indicating only a few teeth as representing the whole gear.

When the operating hand levers 99 and 67 are vertical as shown in the drawings they are held stable in that position by spring 85 blades 188 secured by a bolt 189 in the top of cup 13; and the ends of the blades 188 enter into small notches in the levers 99 and 67.

What I claim is:

1. In a machine of the class described, 90 mechanism for feeding a strap of metal from a reel of binding strap through guideways into position under a secondary strip of flat seal stock strip, and to and underneath dies 95 for forming a seal from said flat strip, and to and between forming die jaws, and to and underneath a slack take-up feed roll, mechanism for feeding a strip of seal stock to and over the aforesaid strap band in said position 100 and in between dies for forming the end of said seal strap into a channel shaped seal; in combination with dies for forming a channel shaped seal and cutting the same free from its stock strip and for placing the seal thus 105 formed upon the said strap in the said position, and with die sealing jaws adapted to act in lateral movement upon the said seal and strap, in combination with a feed roll adapted to take up the slack of the strap upon 110 the package and said dies for forming the seal and said die sealing jaws and said slack take-up feed roll operated by hinged lever handles moving through arcs of approximately ninety degrees. 115

2. In a machine of the class described, a frame having a passageway for a strap over a package to be strapped, a guideway for a strap in the said frame adapted to sit astride 120 a strap on a package, said guideway open at the bottom and adapted to be closed at the bottom at two points by clamping bars, clamping bars adapted to move across and close the bottom of said guideway and clamp 125 the strap in said guideways, a slack take-up feed roll for the strap, sealing jaws adapted to seal the ends of the strap together in position within the said guideway.

3. In a machine of the class described, a frame having a passageway for a strap over 130



a package to be strapped, a guideway for a strap in the said frame adapted to sit astride a strap on a package, said guideway open at the bottom and adapted to be closed at the bottom at two points by clamping bars, clamping bars adapted to move across and close the bottom of said guideway and clamp the strap in said guideways, a slack take-up feed roll for the strap, sealing jaws adapted to seal the ends of the strap together in position within the said guideway, operating levers for moving the said slack take-up feed roll and the said sealing jaws.

4. In a machine of the class described, a frame provided with a guideway open at the bottom for the admission and removal of a binding strap, removable closures for the bottom of the said guideway, a slack take-up feed roll for the strap mounted on the upper side of one of said removable closures when the latter is in a position of closure of the strap guideway and said feed roll operated by a lever handle hinged substantially concentric with the axis of said feed roll.

5. In a machine of the class described, a guideway for a strap, a slack take-up feed roll for acting upon the said strap in said guideway and said slack take-up feed roll supported on an axis supported by an operating lever, an operating lever for said feed roll hinged in the frame of the machine and carrying said feed roll, means for raising and lowering said feed roll in relation to the hinge center of said operating lever, means for engaging and disengaging the operating lever with the said feed roll as to the revolution of the said roll by the said lever; sealing jaws for acting on the said strap, mechanism for operating said jaws and adapted to be engaged and disengaged to be operated by said operating lever.

6. In a machine of the class described, a slack take-up feed roll, an operating lever hinged in the frame of the machine and carrying said slack take-up feed roll, mechanism carried on said operating lever for moving the said slack take-up feed roll to and from the strap to be acted upon and for holding said slack take-up feed roll in a desired position.

7. In a machine of the class described, a slack take-up feed roll, a set of sealing jaws for sealing the ends of the strap together, mechanism for operating said jaws, an operating lever hinged in the frame of the machine, and carrying said slack take-up feed roll, and mechanism for connecting and disconnecting the said slack feed roll in relation to its being revolved by the said operating lever, and mechanism for connecting and disconnecting the operating mechanism of said jaws by the movement of said operating lever.

8. In a machine of the class described, a slack take-up feed roll, an operating lever for revolving said feed roll, feeding mechanism

for feeding a length of strip for a seal clip, an operating lever for actuating the said feeding mechanism for said seal clip, sealing jaws adapted to seal the ends of the strap together, mechanism for operating the said jaws detachably connected to be operated by both the said operating levers simultaneously.

9. In a machine of the class described, operating levers hinged at opposite ends of the frame of the machine sealing jaws located in the middle region of the machine, said jaws mounted to move transversely of the strap, the strap extending longitudinally of the machine, the said operating levers hinged to move in arcs lengthwise of the machine, mechanism detachably connected to the said levers for operating the said jaws for sealing purposes, said mechanism for operating the said jaws composed of a wedge cam bar mounted to wedge together the two said jaws and mounted to be driven lengthwise of the machine.

10. In a machine of the class described, operating levers hinged at opposite ends of the frame of the machine sealing jaws located in the middle region of the machine, said jaws mounted to move transversely of the strap, the strap extending longitudinally of the machine, the said operating levers hinged to move in arcs lengthwise of the machine, mechanism detachably connected to the said levers for operating the said jaws for sealing purposes, said mechanism for operating the said jaws composed of a wedge cam bar mounted to wedge together the two said jaws and mounted to be driven lengthwise of the machine through the medium of racks engaged by gears actuated by the said operating levers.

11. In a machine of the class described, mechanism for feeding a strip of metal from which to form a clip seal, mechanism in the form of male and female dies for cutting the edges of the said strip and bending downward the said edges to form a channel shaped clip seal, the top of said male die being adapted to receive a portion of the package strap, whereby the said edges of said seal are bent over, the said dies bending the edges of the seal to embrace the said strap and the said dies provided with cutting faces that cut the said seal clip free from its body strip and the strap simultaneously while the clip seal embraces the overlapped ends of the strap.

12. In a machine of the class described, mechanism for feeding a strip of metal from which to form a clip seal, mechanism in the form of male and female dies for cutting the edges of the said strip and bending downward the said edges to form a channel shaped clip seal, the top of said male die being adapted to receive a portion of the package strap, whereby the said edges of said seal are bent



over, the said dies bending the edges of the seal to embrace the said strap and the said dies provided with cutting faces that cut the said seal clip free from its body strip and the strap simultaneously while the clip seal embraces the overlapped ends of the strap; in combination with sealing jaws located on each side of the strap ends in the locality where the clip seal and strap are cut from their respective stock strips.

13. In a machine of the class described, dies for forming a clip seal, said dies having a male die block provided with a seat in which the strap for the package is held and over which is placed the flat metal strip from which the clip seal is formed and said male die block having cutting edges on each side of the location of the strap seal and also a cutting edge at the forward end of the said male die block whereat the clip seal and strap are simultaneously cut off from their respective strips, and a female die punch provided with cutting flanges for the edges of the clip seal strip and a cutting edge for the body portions of the seal strip and for the strap strip.

14. In a machine of the class described, dies for forming a clip seal, said dies having a male die block provided with a seat in which the strap for the package is held and over which is placed the flat metal strip from which the clip seal is formed and said male die block having cutting edges on each side of the location of the strap seal and also a cutting edge at the forward end of the said male die block whereat the clip seal and strap are simultaneously cut-off from their respective strips, a female die punch provided with cutting flanges for the edges of the clip seal strip and a cutting edge for the body portions of the seal strip and for the strap strip, and a cam means for operating the said dies.

15. In a machine of the class described, dies for forming a clip seal, said dies having a male die block provided with a seat in which the strap for the package is held and over which is placed the flat metal strip from which the clip seal is formed and said male die block having cutting edges on each side of the location of the strap seat and also a cutting edge at the forward end of the said male die block whereat the clip seal and strap are simultaneously cut off from their respective strips, a female die punch provided with cutting flanges for the edges of the clip seal strip and a cutting edge for the body portions of the seal strip and for the strap strip, and a cam means for operating the said dies, said cam means composed of a cam block mounted upon and revolved by a shaft upon which is fixed an operating lever by which said cam is operated.

16. In a machine of the class described, dies for forming a clip seal, said dies having a male die block provided with a seat in which the strap for the package is held and over

which is placed the flat metal strip from which the clip seal is formed and said male die block having cutting edges on each side of the location of the strap seat and also a cutting edge at the forward end of the said male die block whereat the clip seal and strap are simultaneously cut off from their respective strips, and a female die punch provided with cutting flanges for the edges of the clip seal strip and a cutting edge for the body portions of the seal strip and for the strap strip, said female die mounted on a block hinged to the frame of the machine and operated in its movement by an operating lever hinged in the frame of the machine.

17. In a machine of the class described, operating levers mounted on shafts at each end of the machine and adapted to be worked through an arc of ninety degrees in a plane lengthwise of the machine the lever at one end of the machine in the movement from vertical position down to horizontal position actuating mechanisms for making and placing a clip seal on the overlapped ends of the strap, and the other lever at the other end in its movement downward from vertical position actuating mechanism for tightening the strap on the package and on the upward or return joint movement of both operating levers actuating the mechanism that seals the strap ends together.

18. In a machine of the class described, sealing jaws astride the position of the overlapped ends of the strap and mounted to be moved transversely of the strap in sealing action by a wedge cam bar, said wedge cam bar having wedging faces relatively abrupt for a quick take-up of the clearance slack of said jaws in relation to the overlapped ends of the strap to be sealed, and relative slight-inclining wedging faces for actuating said sealing jaws in the final heavy stress of the sealing of the strap ends, a yoke extending across the bodies of the jaws, said wedge cam bar adapted to wedge against one jaw and the yoke and, by means of the yoke, draw the other jaw toward the first mentioned jaw.

19. In a machine of the class described, clip seal forming dies, means for supplying a predetermined length of clip strip to said dies, said dies comprising cutting edges adapted to shear through the lateral portions of the strip in the transverse direction, and cooperating means adapted to upset the lateral edges of the clip strip between the shearing positions.

20. In a machine of the class described, sealing jaws adapted to be operated to seal the ends of a strap together, clip seal forming dies, means for supplying a predetermined length of clip strip to said dies, said dies comprising cutting edges adapted to shear through the lateral portions of the strip in the transverse direction, cooperating means adapted to upset the lateral edges of the clip strip between the shearing positions,



and means for transferring the sheared-off clip seal to the overlapping ends of the binding strap and between said sealing jaws.

Signed at Palo Alto, in the county of Santa Clara and State of California this 2nd day of November, 1929.

WILLIAM ERASTUS WILLIAMS.

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