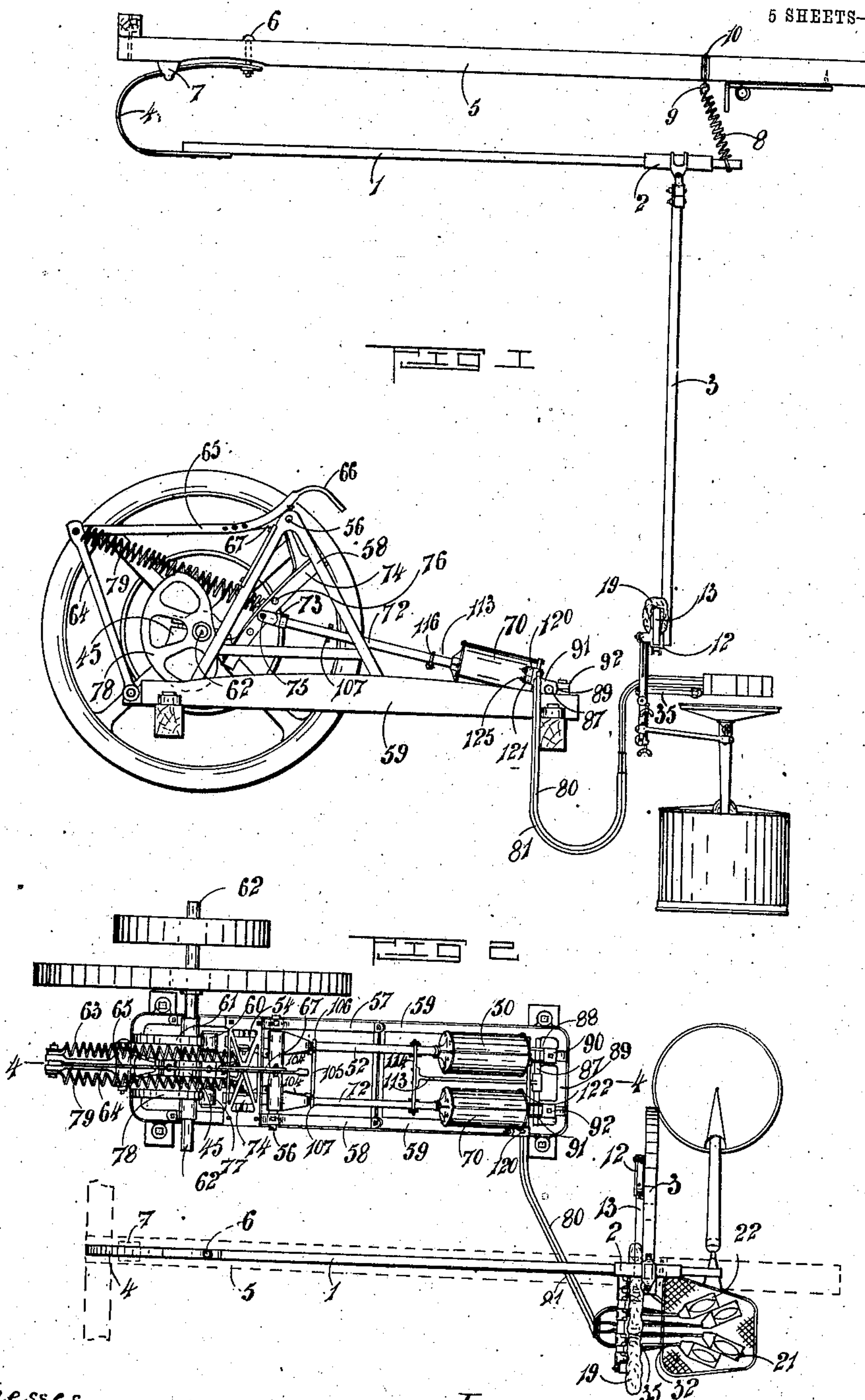


No. 827,311.

PATENTED JULY 31, 1906.

G. HUTCHINSON.
MILKING MACHINE.
APPLICATION FILED MAR. 5, 1906.

5 SHEETS—SHEET 1.



Witnesses
S. H. Higgs
O. M. Milner.

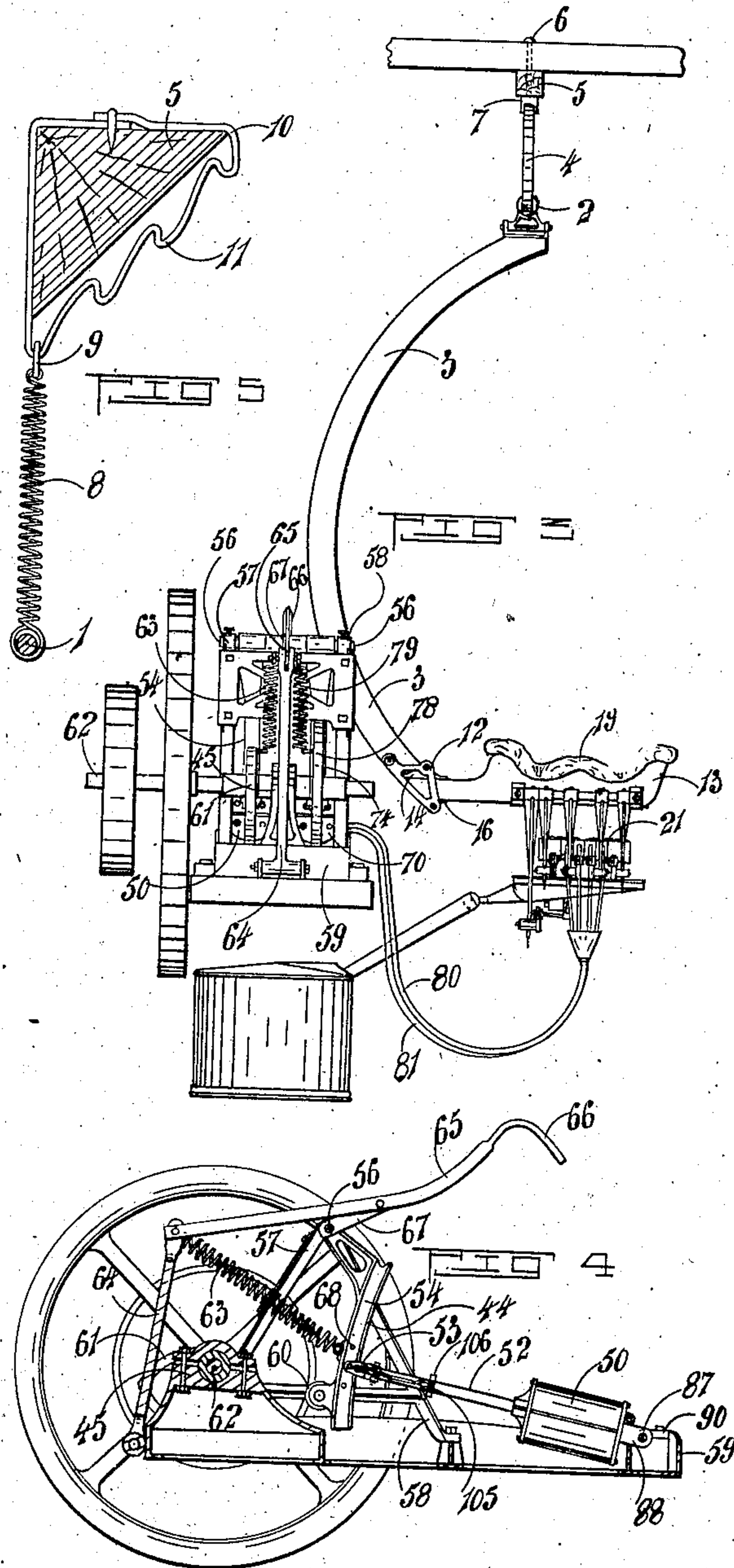
Inventor
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5 SHEETS—SHEET 2.



Witnesses

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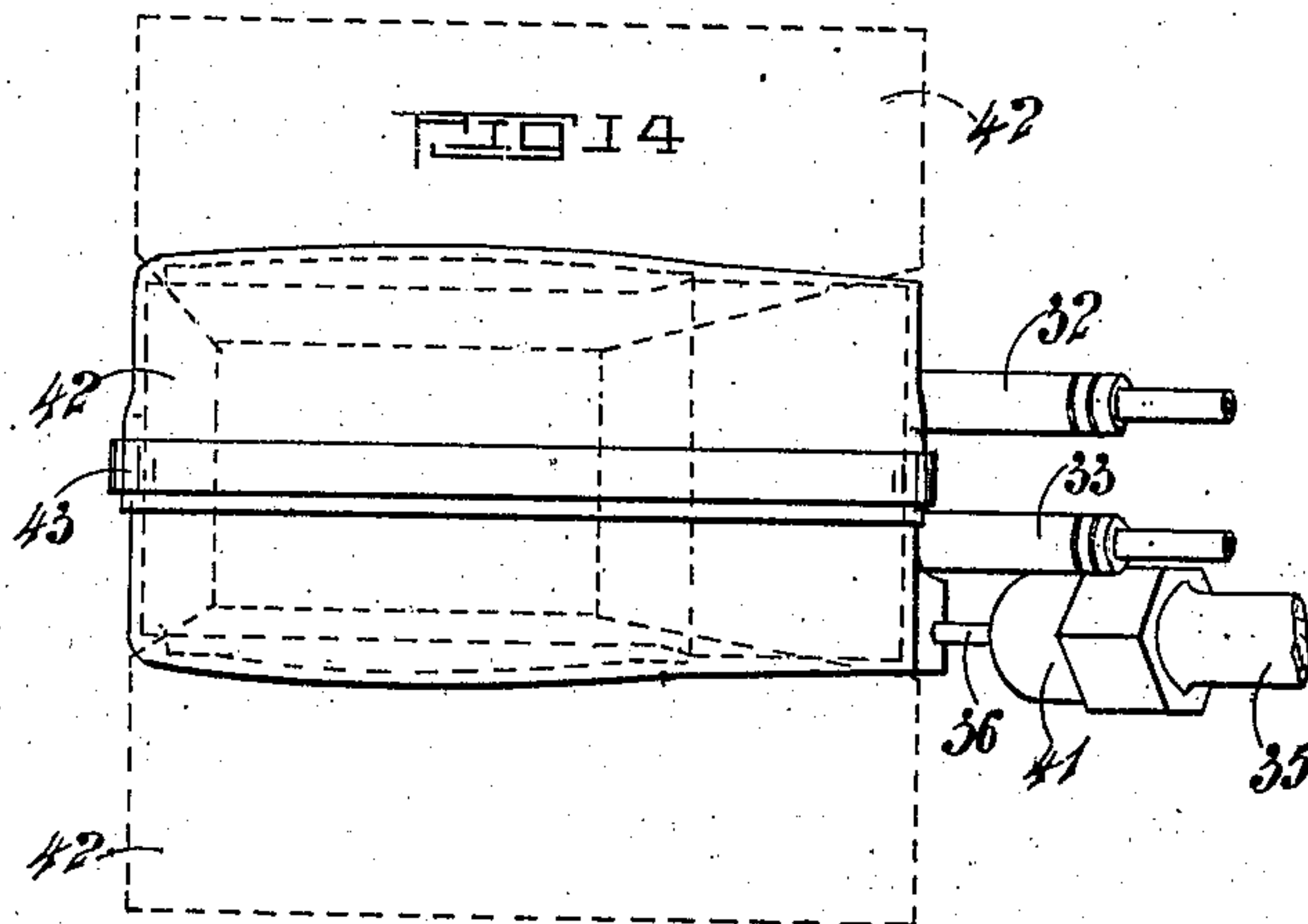
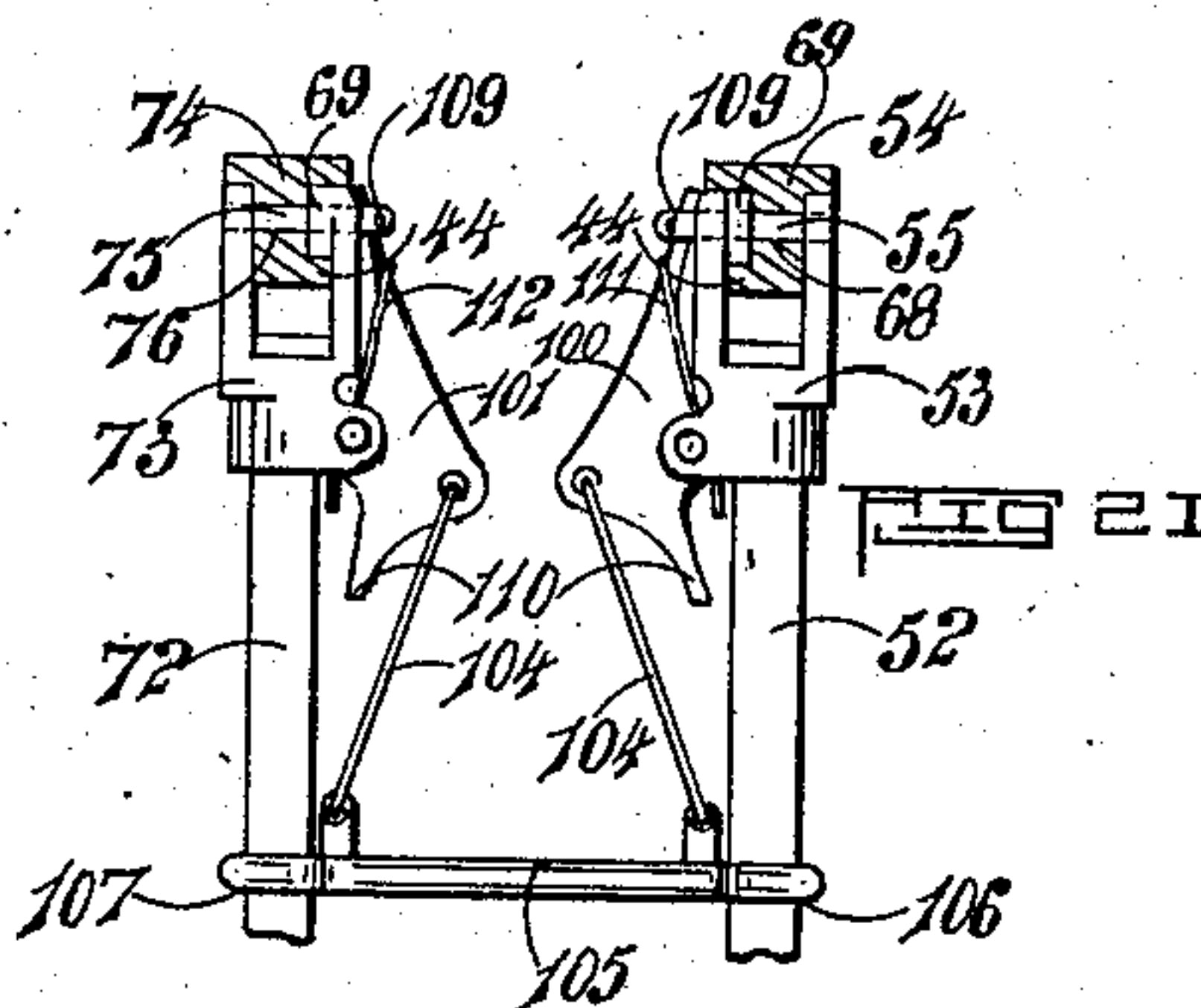
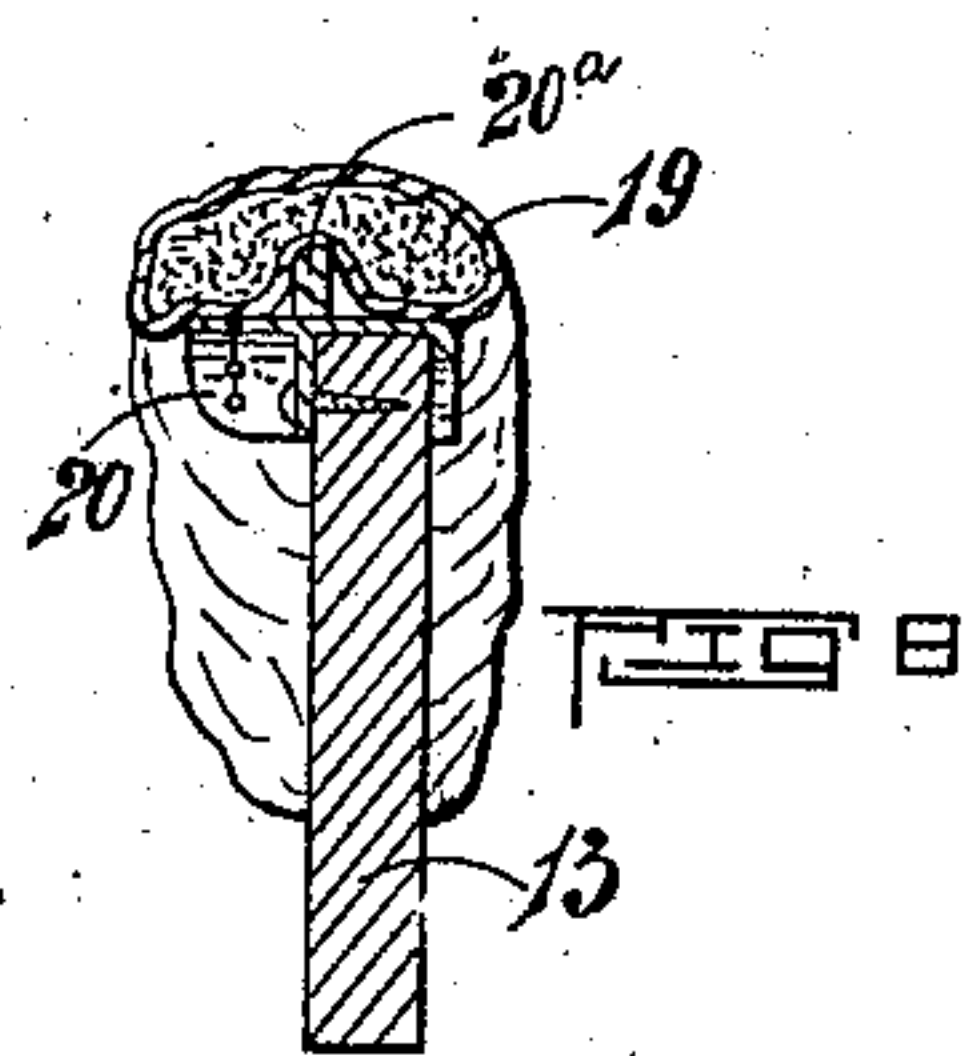
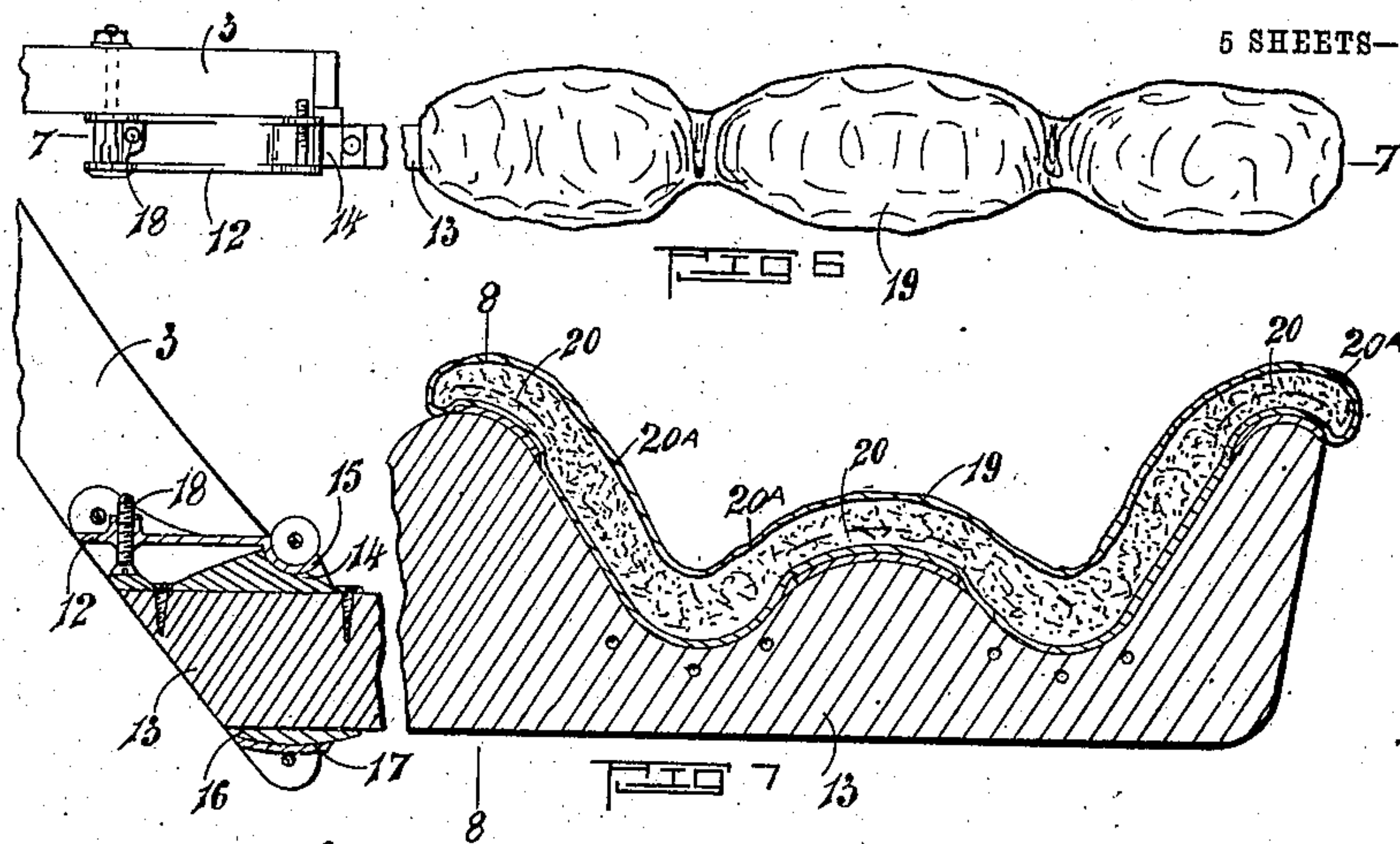
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5 SHEETS—SHEET 3.



Witnesses
S. H. Higgs
O. M. Milton

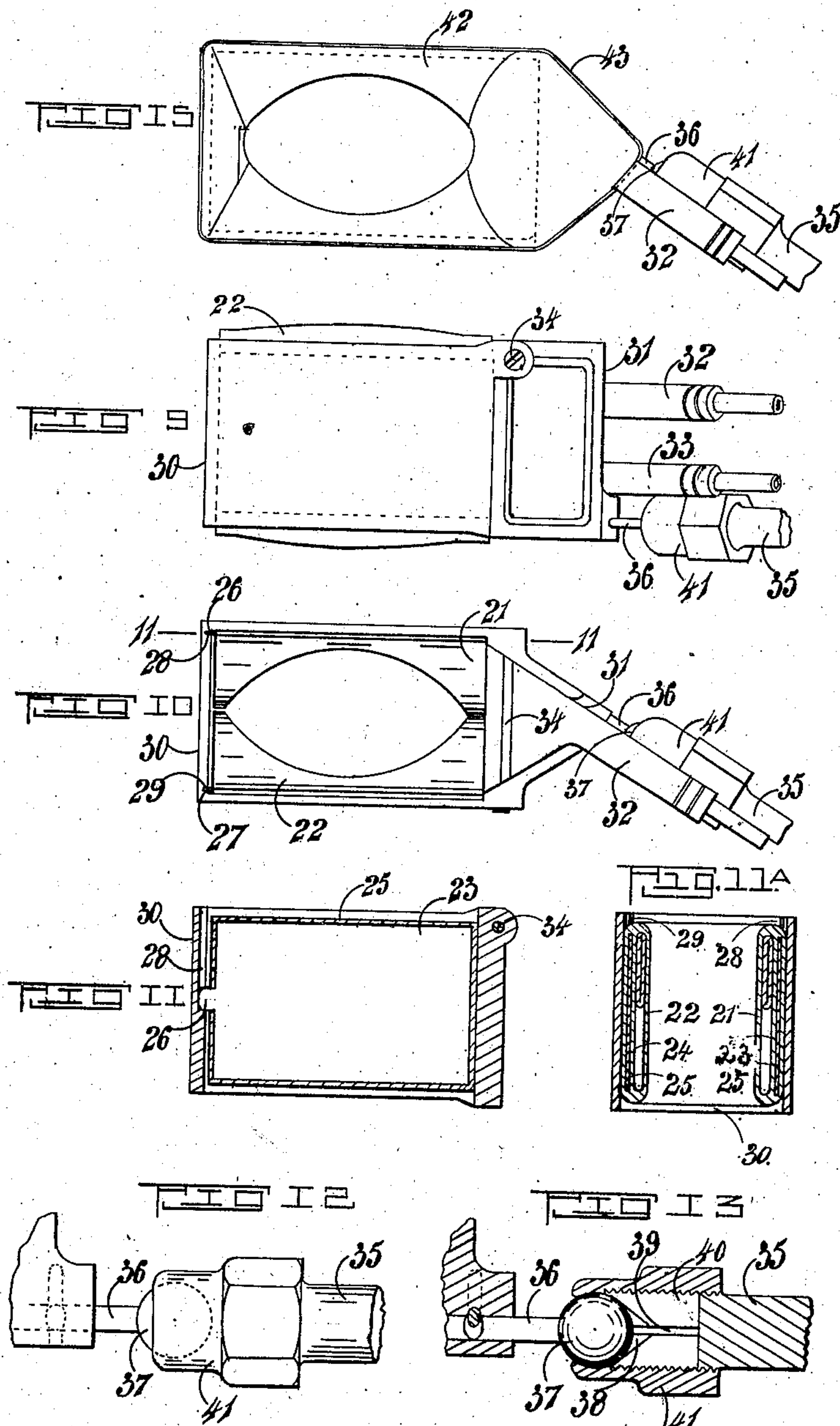
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5 SHEETS—SHEET 4.



Witnesses
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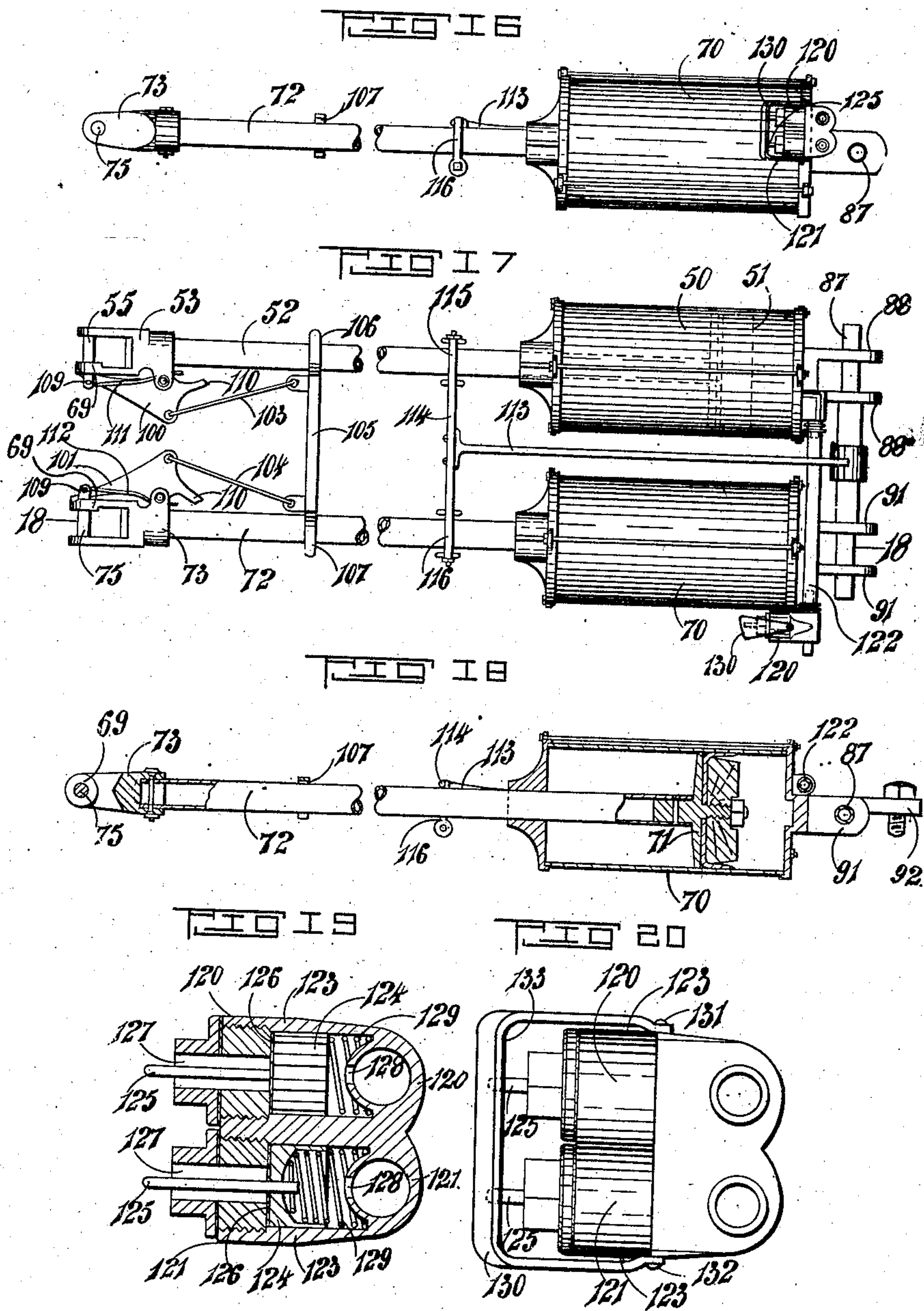
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5 SHEETS—SHEET 5.



Witnesses
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Henry B. Hayward

UNITED STATES PATENT OFFICE.

GEORGE HUTCHINSON, OF SEATOUN, NEW ZEALAND.

MILKING-MACHINE.

No. 827,311.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed March 5, 1906. Serial No. 304,322.

To all whom it may concern:

Be it known that I, GEORGE HUTCHINSON, a subject of His Majesty the King of Great Britain and Ireland, residing at Seatoun, Wellington, in the Colony of New Zealand, have invented certain new and useful Improvements in Milking-Machines, of which the following is a specification.

This invention relates to milking-machines in which fluid under pulsative pressure is used within teat-presses to express milk from the teat of the animal.

The present invention provides improvements as follows: first, in gear for supporting the teat-presses; second, in the construction of the teat-presses; third, in apparatus for producing pulsative pressure, air being the fluid employed. These improvements are hereinafter fully described and are illustrated in the drawings, wherein—

Figure 1 is a side elevation of a milking-machine. Fig. 2 is a plan thereof. Fig. 3 is a corresponding front elevation. Fig. 4 is a sectional elevation on 4 4, Fig. 2, but showing the working parts in another position. Fig. 5 is an end sectional elevation of an overhead beam and suspending-bracket and spring. Fig. 6 is a plan, and Fig. 7 a sectional elevation on 7 7, Fig. 6, of the lower part of a body-bow with under arm connected. Fig. 8 is an enlarged transverse sectional elevation on 8 8 Fig. 7. Fig. 9 is a side elevation of a teat-press. Fig. 10 is a plan thereof; Fig. 11, a section on 11 11, Fig. 10; Fig. 11^a, a section on 12 12, Fig. 11. Fig. 12 is a side elevation, and Fig. 13 a central sectional elevation, of a ball-and-socket joint connecting a press to its carrying-arm. Fig. 14 is a side elevation, and Fig. 15 a plan, of a teat-press fitted with a tubular protector. Fig. 16 is an enlarged side elevation of the pulsating pumps. Fig. 17 is a plan thereof. Fig. 18 is a sectional elevation on 18 18, Fig. 17. Fig. 19 is a side sectional elevation, and Fig. 20 a corresponding elevation, of air-inlet valves and device for holding same open. Fig. 21 is a plan of piston-rod ends with levers in section.

Similar figures of reference indicate the same parts throughout the figures.

Referring first to Figs. 1, 2, 3, and 5, the pole 1, of springy wood, upon which slides the socket 2, carrying the body-bow 3, is secured upon one end of a bow-spring 4, the opposite end of said bow-spring being connected to the overhead beam 5 by a bolt 6

and the bow-spring bearing against a guide-block 7, secured to the under side of the beam. To the other end of the pole is removably connected a tension-spring 8, (see Fig. 5,) having a loop 9 threaded upon a wire bracket 10, which is secured to a beam 5 and has steps 11, in one or other of which the loop 9 may be placed to regulate to requirements the pull of the spring 8 upon the end of the pole.

Referring now to Fig. 3, and more particularly to Figs. 6 and 7, the body-bow 3 has fixed upon its lower end the bracket 12 to receive the end of the under arm 13. The end of the under arm has an arc-shaped recess 14, which fits a correspondingly-shaped projection 15 in the upper part of the bracket 12. Beneath the under arm is a curved projection 16, formed to a radius struck from the same center from which is struck the arc of the recess 14. The projection 16 fits a correspondingly-curved recess 17 in the bracket, and a set-pin 18 in the bracket bears upon the end of the under arm and can be screwed or unscrewed to adjust the position of the under arm in relation to the body-bow so that it is horizontal when in use. By this arrangement the under arm is held thoroughly secure, as its end cannot leave the bracket until its outer end is raised. A pad 19, of leather stuffed with horsehair, is carried upon the end of the under arm, which is shaped so that the pad fits against the body of the animal. The pad is sewed to metal brackets 20, screwed upon, and, as clearly shown in Fig. 8, each bracket has a fin 20^a, which projects upwardly in the middle of the pad and causes it to maintain its shape and retain its position laterally.

Referring now to Figs. 9, 10, and 11, the teat-press according to my present invention resembles in principle those which have previously been patented by me in so much that it has superposed inflatable pouches, the upper of which are made to squeeze the teat and prevent the upward passage of milk, while the lower pouches express it from the teat.

My present invention provides an improved mode of connecting the pouches to the outer wall of the teat-press, whereby they are readily removable for cleaning and the like. The pouches 21 upon one side of the press have a metal plate 23, which is secured to the side of the pouches by a piece of rubber-coated fabric 25, cemented over it. The op-

posing pouches 22 have a plate 24 secured to them in a similar manner. Each of these plates has a projecting ear 26 and 27, respectively, which take into grooves 28 and 29, formed for their reception in the inner face of the end 30 of the outer wall of the teat-press. The projections fitting the grooves hold the sides of the pouches against the outer wall and as said grooves extend only about half the depth of the wall prevent the pouches from going too far down when passed into position from the top of the press. The outer wall has a gap 31 at its forward end to admit the tubes 32 and 33, conveying the pulsating fluid to the upper and lower pouches, respectively, and a screw-pin 34, passing through one side of the outer wall and screwing into the other side, prevents the pouches from rising up and ties the opposite side of the outer wall together.

The teat-press is connected to the end of a jointed adjustable arm 35 (one arm being employed for each press, as clearly shown in Fig. 1) by the improved form of ball-and-socket joint. (Shown in Figs. 12 and 13.) From the outer wall of the press projects a pin 36, upon the end of which is a steel ball 37. This ball fits a conical recess 38 in the end of the arm 35, which is divided by saw-cuts 39 and 40 at right angles to each other. A socket 41, receiving the ball, screws upon the threaded end of the arm and by pressing the ball into the recess expands the four sections of the end of the arm, so that a very firm connection is made between the screwed socket and the arm and the ball can be moved in adjusting the teat-press without unscrewing the socket.

Referring now to Figs. 14 and 15, the teat-press is fitted with a removable tubular sleeve 42, of sheet-rubber or the like, which, as shown in dotted lines in Fig. 14, is bell-mouthed at each end to enable it to be folded over the top and bottom of the press, its ends being secured in position by a rubber band 43.

Referring now to Figs. 1 to 4, inclusive, and Figs. 16 to 21, inclusive, the air-pump cylinder 50 is fitted with a piston 51 upon a rod 52, upon the end of which is fixed a jaw 53, having a disk-shaped boss 69, fitting over a bead 44 (see Fig. 21) on the side of an oscillating lever 54, a draw-pin 55 in said jaw passing through one or other of a plurality of holes 68 in said lever, which oscillates upon a bar 56, fixed in the standards 57 and 58, extending upwardly from the foundation-frame 59. A friction-roller 60, revolubly mounted upon the back of the lever, engages the face of a cam 61, fixed upon the shaft 62, journaled in bearings 45 in the foundation-frame 59 and revoluble from any convenient source of power. A spiral spring 63, connected to the lever at one end and at its opposite end to a rocking standard 64, tends to keep the fric-

tion-roller in contact with the cam. The rocking standard at its lower end is pivoted upon the foundation-frame 59 and at its upper end has pivoted upon it an arm 65, which has a handle 66 at its opposite end and is pivotally connected to one end of a short arm 67, which is journaled at its other end upon the bar 56. Similarly the cylinder 70 is fitted with a piston 71 upon a rod 72, having a jaw 73 fitting over a curved oscillating lever 74, a pin 75 in said jaw passing through one or other of a plurality of holes 76 in said lever, which oscillates upon the bar 56. A friction-roller 77, revolubly mounted upon the back of the lever, engages the face of a cam 78, fixed upon the shaft 62. A spiral spring 79, connected to the lever 74 at one end and at the opposite end to the rocking standard 64, tends to keep the friction-roller in contact with the cam. The bottom of the cylinder 50 is connected by a tube 80 with all the upper pouches of the teat-presses forming a milking set, and the cylinder 70 is connected by a tube 81 with all the lower pouches of the same series of presses, and it is arranged by the shaping of the cams that the air from the cylinder 50 is forced into the upper pouches slightly in advance of the forcing of the air into the lower pouches; but the air is withdrawn from the upper and lower pouches simultaneously. The cylinders 50 and 70 have a spindle 87 at right angles to their axes and fixed in bearing-lugs 88 upon cylinder 50 and similar lugs 91 upon cylinder 70. This spindle fits into open bearings 89 in the foundation-frame 59. The lugs 88 and 91 are shaped so that in passing the spindle into the bearings 89 they clear plates 90 and 92, extending across the frame at the rear of the bearings. When the axes of the cylinders are out of the vertical, then these plates by coming in contact with the lugs prevent the spindle from rising in the bearings 89. The draw-pins 55 and 75 slide horizontally through the jaws 53 and 73 and are simultaneously operable to release them from the holes in the oscillating levers and to adjust their position thereon by the following mechanism: Bell-crank levers 100 and 101, (see Fig. 21,) one for each of the draw-pins 55 and 75, are pivoted upon the respective jaws 53 and 73 and are connected by the links 104 with a transverse handle 105, extending between the piston-rods 52 and 72 and having openings 106 and 107, one at each end, each opening receiving one of said rods. Each of the bell-cranks passes through a slot formed for its reception in the draw-pin it operates, a split pin 109 passing through the draw-pin behind the end of the bell-crank lever to prevent the bell-crank leaving the slot. Tailpieces 110, one upon each bell-crank, limit their vibration by coming into contact with the respective piston-rods, and wire springs 111 and 112 normally tend to project

the pins through the jaws. An arm 113, journaled upon the spindle 87, extends parallel with and between the piston-rods 52 and 72 and has a cross-bar 114, having loops 115 and 116, one at each end, each loop receiving one of the piston-rods, which has free play therein. The cross-bar serves as a handle for removing the cylinders out of the frame and in adjusting the jaws upon the oscillating levers. Each of the pistons forces air into and draws air out of the teat-presses to which it is connected. The levers 54 and 74 are formed to a radius struck from the center of the spindle 87, upon which center the cylinders 50 and 70 oscillate. The levers are so suspended from the bar 56 that no matter what position the jaws may occupy thereon the pistons reach the bottoms of the cylinders at the end of each stroke. The length of stroke of the pistons, and consequently the compression of air in the pouches, is regulated by altering the position of the jaws upon the levers, the maximum stroke being obtained when the jaws are at the bottoms of their respective levers. Each of the cylinders 50 and 70 has an air-inlet valve through which air may be drawn, according to the length of stroke of the pistons. As shown in the drawings, particularly in Figs. 16, 17, 19, and 20, the air-valve 120 of the cylinder 50 is connected to the similar valve 121 of the cylinder 70, a flexible tube 122 connecting the valve 120 with its cylinder. The two valves are similarly constructed, as clearly shown in the sectional view, Fig. 19, of the drawings, and the same reference-figures are used to indicate the corresponding parts. Each valve has a casing 123, which receives the fluted plunger 124, having a stem 125. Upon the stem is threaded a leather washer 126, which closes a port 127, through which air is admitted to the air-passage 128 in communication upon the one side with the pump-cylinder and upon the other side with the tube leading to the pouches of the teat-presses. A spring 129 tends to keep the valve closed. In order to keep the valves down and the ports open for the purpose of easily removing the jaws from the oscillating levers, a hood 130, pivoted at each end upon the valve-casing at 131 and 132, is shaped so that its under face 133 is inclined as regards the valve-stems 125 and can be turned over the tops of said stems in order to force down the valves against the action of the springs 129.

When the machine is in operation, the arm 65, before referred to, is in such position that the point of connection between it and the short arm 67 is below a line drawn from the center of the bar 56 to the point at which the arm 65 is connected to the end of the rocking standard 64, and as the under side of the end of the arm 65 is supported by the bar 56 the springs are held extended. When it is desired to stop the action of the machine, the

arm 65 is raised by its handle, with the result that the upper end of the rocking standard 64 is moved rearwardly and the tension of the springs is released. At the same time the hood 130, above referred to, is operated so that the cylinders and pouches exhaust their charges of air. The levers thereupon fall away from the cams and the pistons cease to be operated.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In suspensory apparatus of milking-machines in combination, a pole, a bow-spring at one end thereof by which it is connected to an overhead beam, a tension-spring at the opposite end of said pole and a notched bracket upon said beam from which the tension-spring is supported, substantially as specified.

2. The means for connecting the under arm to the body-bow comprising in combination, the body-bow, a bracket secured upon the end thereof adapted to receive the end of the under arm, a curved recess upon the upper edge and a curved projection upon the under edge of the end of said arm and a curved projection and a curved recess in said bracket to receive and engage respectively with the projection and recess in the end of the arm and a set-pin screwing through the bracket engaging with and regulating the position of the said arm, substantially as specified.

3. In combination the under arm shaped at its end to the contour of the body of the animal, a stuffed pad fitting such shaped portion and a fin upon the upper edge of the under arm for maintaining said pad in position substantially as specified.

4. The combination in means for connecting a teat-press to a carrying-arm of a ball upon a stem projecting from the teat-press, a recess in the end of the arm to receive the ball, saw-cuts in said recessed end, and a socket screwing upon said end substantially as specified.

5. A teat-press having rigid outer walls integrally formed, collapsible pouches within said walls, a recess in one of said walls to receive the tubes conveying air to the pouches, and a screw-pin passing through one wall and screwing into the opposite wall or holding the pouches in position, substantially as specified.

6. In a teat-press the combination with the collapsible pouches of metal plates secured to said pouches adapted to coincide with walls of the press and a projection from each plate adapted to take into a corresponding channel in one of the walls, substantially as specified.

7. In a teat-press the combination therewith of a tubular sleeve passing through the press between the opposing collapsible pouches and having its ends folded over the top and bottom of the press and an elastic band securing said ends, substantially as specified.

8. In a milking-machine in combination teat-presses having upper and lower collapsible pouches within a rigid outer wall, air-pumps connected one to the upper and one to the lower of said pouches, and means for reciprocating the pistons of said air-pumps substantially as specified.

9. In combination teat-presses having independent upper and lower collapsible pouches, air-pumps connected one to the upper and the other to the lower of said pouches, means for reciprocating the pistons of said pumps and valves to admit air to said pumps substantially as specified and illustrated.

10. In combination teat-presses having independent upper and lower collapsible pouches, air-pumps connected one to the upper and the other to the lower of said pouches, means for adjusting the stroke of the pistons of said air-pumps to regulate the pressure in said pouches, means for reciprocating said pistons and valves to admit air to said pumps when required by the variation of the stroke of the pistons substantially as specified and illustrated.

11. In combination teat-presses having upper and lower collapsible pouches, air-pumps connected one to the upper and one to the lower of said pouches, a trunnion-spindle carried in lugs projecting from said cylinders, a foundation-frame and bearings thereon receiving said spindle, a piston reciprocable within each cylinder, a rod for each piston and a jaw with a draw-pin upon each rod, oscillating levers depending from a bar fixed in said foundation-frame, the levers having holes to receive said draw-pins, a shaft journaled in the foundation-frame, cams upon said shaft one for each lever, a friction-roller upon each lever, springs adapted to draw the rollers into contact with the cams, a rocking standard pivoted upon the frame to which the said springs are connected, an arm connected to the rocking standard, a lever pivoted upon a fixed bar pivotally connected to said arm, the arm extending rearwardly and engaging with said bar to hold

the springs extended substantially as specified.

12. In combination teat-presses having upper and lower collapsible pouches, air-pumps connected one to the upper and one to the lower of said pouches, a trunnion-spindle carried in lugs projecting from said cylinders, a foundation-frame and bearings thereon receiving said spindle, a piston reciprocable within each cylinder, a rod for each piston and a jaw with a draw-pin upon each rod, oscillating levers depending from a bar fixed in said foundation-frame, the levers having holes to receive said draw-pins, a shaft journaled in the foundation-frame, cams upon said shaft one for each lever, a friction-roller upon each lever, springs adapted to draw the rollers into contact with the cams and means for throwing out of action the said springs substantially as specified.

13. In a milking-machine in combination teat-presses having upper and lower collapsible pouches, oscillating air-pumps connected one to the upper and one to the lower of said pouches, oscillating levers for reciprocating the pistons of said air-pumps, means for actuating said levers and means for connecting the ends of the rods of said pistons to said levers, substantially as specified.

14. In a milking-machine in combination teat-presses having upper and lower collapsible pouches, oscillating air-pumps connected one to the upper and one to the lower of said pouches, jaws one upon the piston-rod of each pump, a draw-pin slidable in each jaw and means for operating said draw-pins, oscillating levers to which the jaws are adjustably connected and means for oscillating said levers, substantially as specified.

In testimony whereof I have signed my name to this specification, in the presence of two witnesses, this 21st day of December, 1905.

GEORGE HUTCHINSON.

Witnesses:

HENRY JOHN PRIOR,
ERNEST SMITH BALDWIN.