

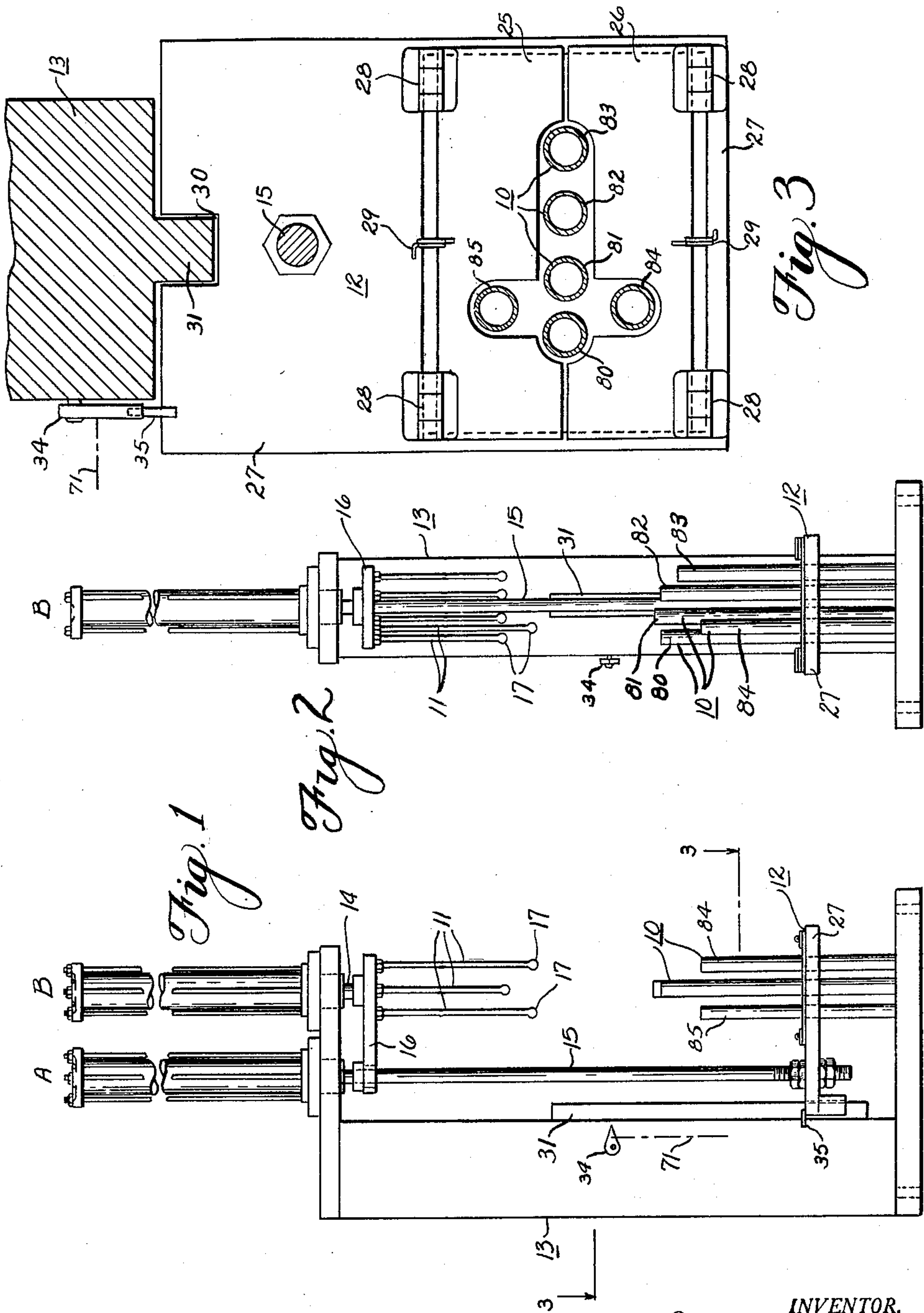
Feb. 6, 1951

R. E. BECKER
GLOVE TURNING MACHINE

2,540,503

Filed Feb. 4, 1947

3 Sheets-Sheet 1



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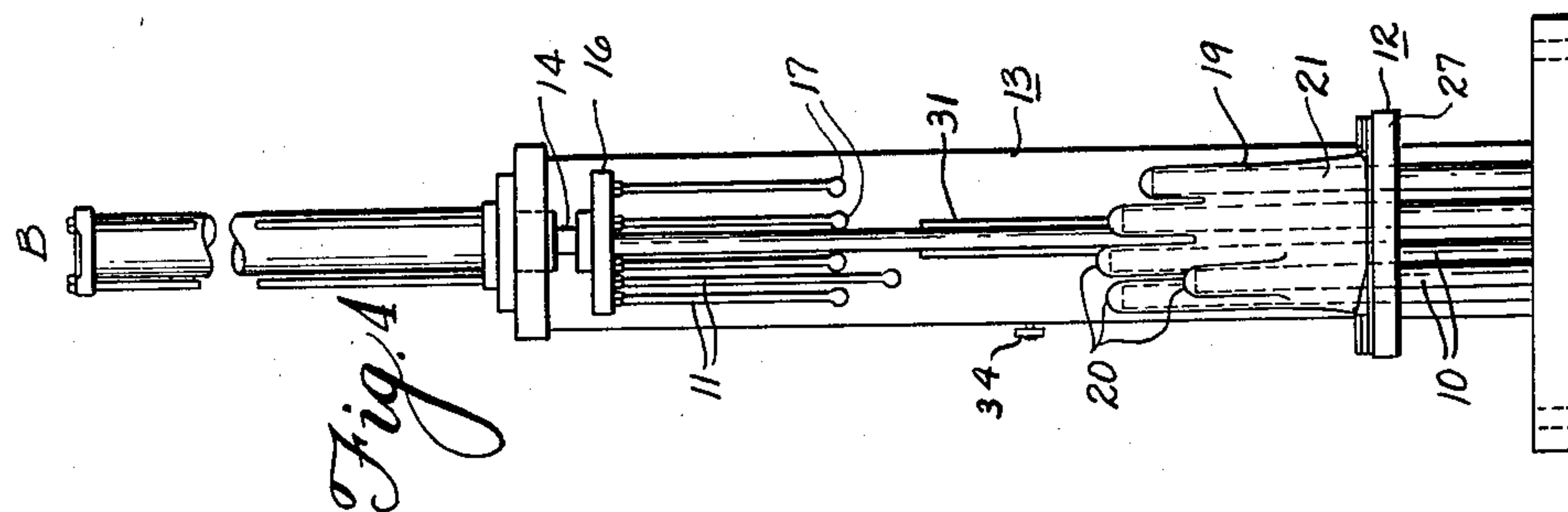
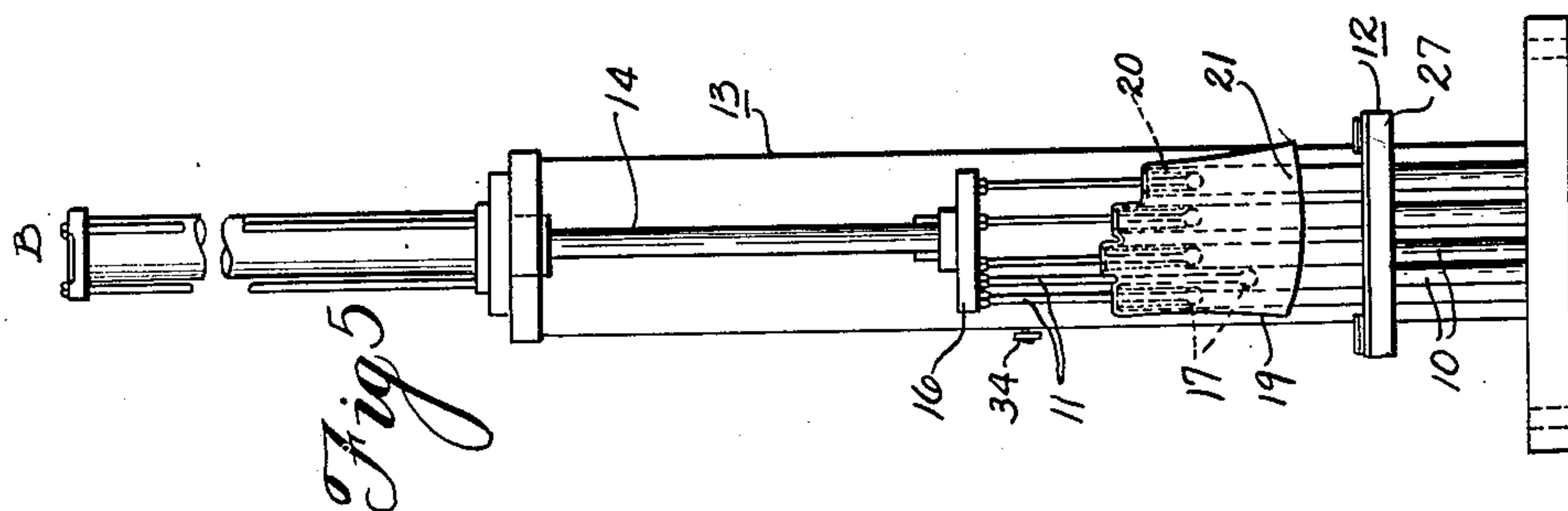
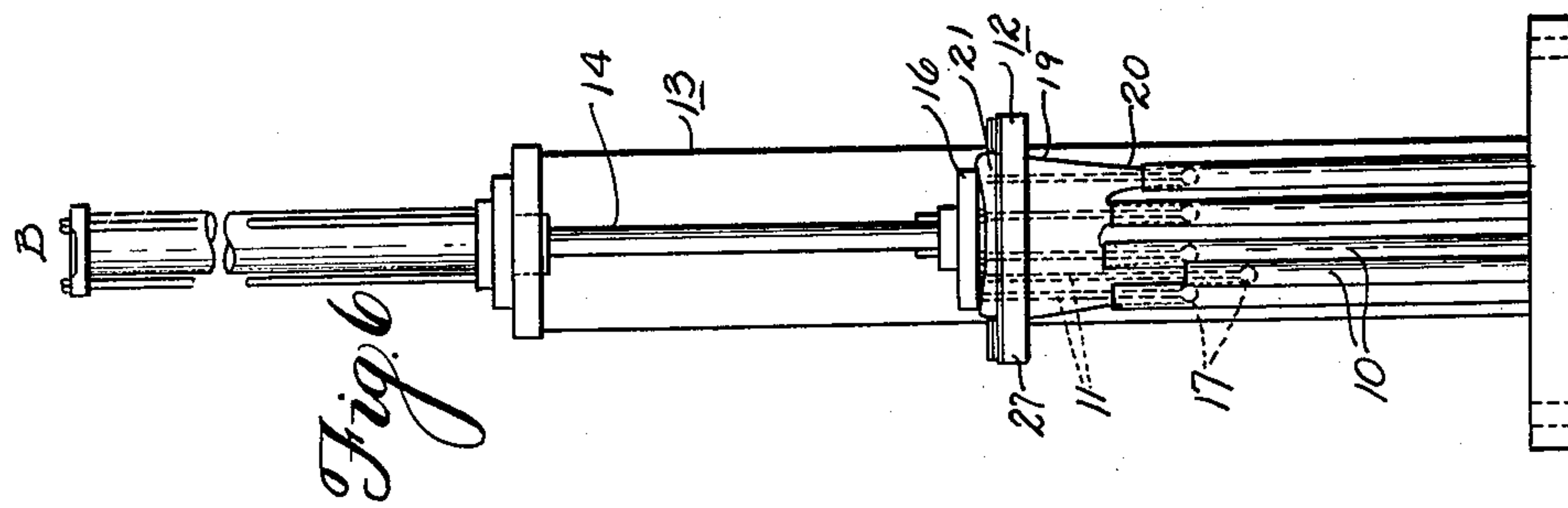
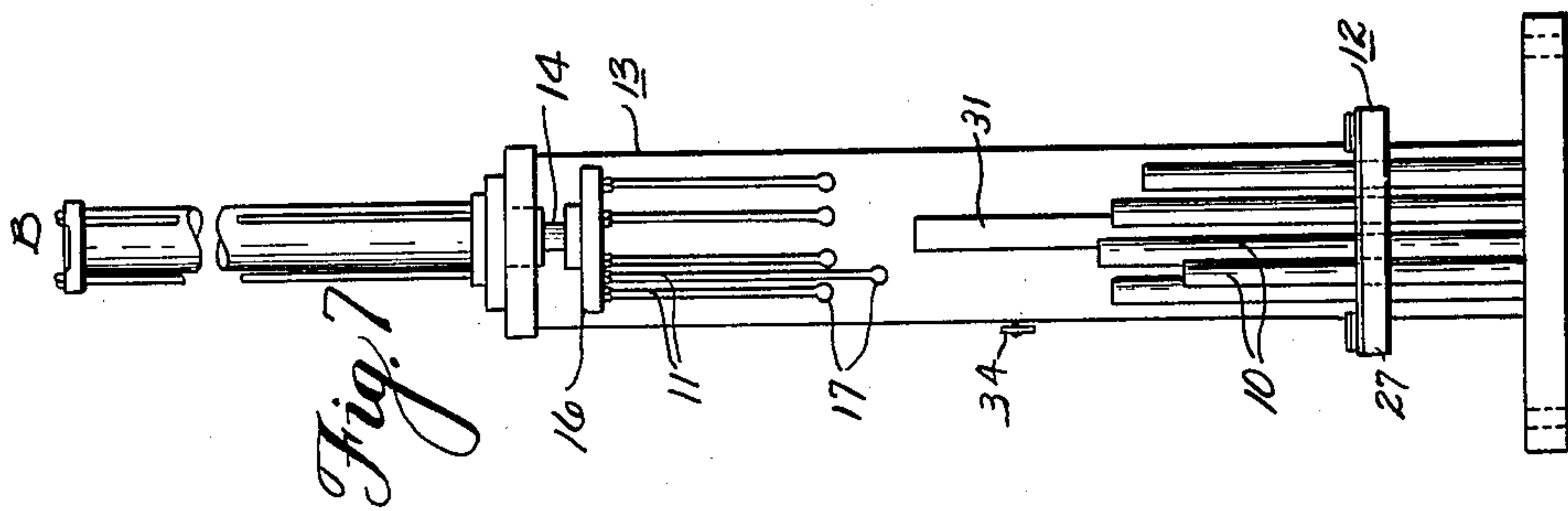
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Filed Feb. 4, 1947

3 Sheets-Sheet 2



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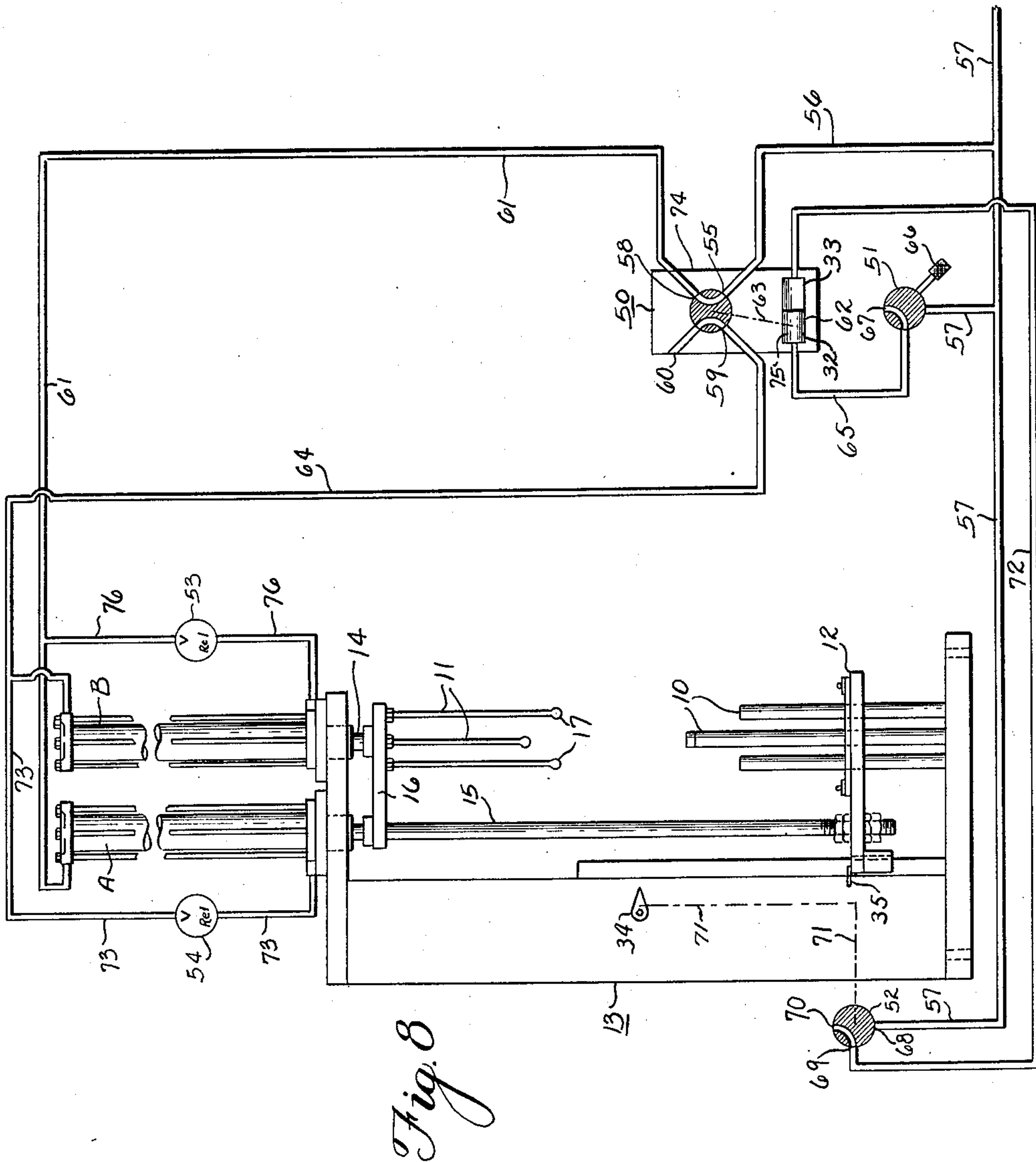
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,540,503

GLOVE TURNING MACHINE

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Application February 4, 1947, Serial No. 726,352

11 Claims. (Cl. 223—40)

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My invention relates in general to a machine for turning gloves inside out and to a pressure system for operating the glove turning machine.

One of the objects of my invention is the provision of a glove turning machine for turning a glove inside out.

Another object of my invention is the provision of a glove turning machine which turns the fingers of the glove inside out and then turns the wrist body portion of the glove inside out.

Still a further object of my invention is the provision of a glove turning machine which is operated by a pressure system.

Still a further object of my invention is the provision of a glove turning machine to turn a glove inside out which is operated by an air pressure system with the sequence of operation of the glove turning machine automatically controlled by valves in the air pressure system.

A further object of my invention is the provision of a glove turning machine in which the machine is operated by air pressure cylinders with the admittance of air to the cylinders automatically controlled by valve means.

Yet another object of my invention is the provision of a glove turning machine having cylinders with the sequence movement of the pistons in the cylinders controlled by the cooperation of the movement of the pistons with valve means in the pressure system connected to the cylinders.

Another object of my invention is the provision of a pressure circuit for operating a pair of cylinders in which valve means cause the piston of one cylinder to reciprocally move in one direction and then in the other direction while the piston in the other cylinder is in one position.

Another object of my invention is the provision of a mechanism having a first and second element, each movable reciprocally in a first and second direction with a pressure system for moving the elements, and valve means in the pressure system for regulating the sequence of movement of the elements.

Other objects and a fuller understanding of my invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

Figure 1 of my drawings is a side elevational view of my glove turning machine;

Figure 2 of my drawings is a front elevational view of my glove turning machine;

Figure 3 is an enlarged cross-sectional view taken along the line 3—3 of Figure 1;

Figure 4 is a view illustrating the position of a glove placed over the finger tubes;

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Figure 5 is a view illustrating the position of the glove with the fingers turned inside out;

Figure 6 is a view illustrating the position of the glove with the wrist body portion of the glove turned inside out;

Figure 7 is a view illustrating the glove turning machine just after the glove has been turned inside out and removed from the machine and with the machine in readiness for another glove; and

Figure 8 is a schematic diagram of the air pressure system including valves for operating my glove turning machine.

My glove turning machine, the preferred design of which is illustrated in my drawing, comprises finger tubes 10, finger rods 11 and a stripper plate 12 normally disposed about the finger tubes 10. The finger rods 11 are reciprocally movable in a first direction into the ends of the finger tubes 10 and in a second direction out of the finger tubes 10. The stripper plate 12, which is normally disposed about the finger tubes 10 is also reciprocally movable in the first and in the second direction of movement of the finger rods 11. The stripper plate 12 moves from its normal position in the second direction to a position about the finger rods 11 and then in the first direction to its normal position.

The finger rods 11 are reciprocally moved in the first and second direction by an air pressure operated cylinder, designated in my drawings by the letter B. The stripper plate 12 is similarly moved reciprocally in the first and in the second direction by an air pressure operated cylinder, designated by the letter A in my drawings. The finger tubes 10, and the cylinders A and B may be supported in cooperative relationship by a suitable framework 13.

The finger rods 11 are carried by a piston rod 14 which extends from and is actuated by the cylinder B. The finger rods 11 and the finger tubes 10 are constructed of a length whereby they may cooperate to turn the fingers 20 of the glove 19 inside out without ripping the glove. The stripper plate 12 is carried by a piston rod 15 which is actuated by the cylinder A. The finger rods 11 are kept in alignment by an alignment guide arm 16. This arm fastens the finger rods 11 to the piston rod 14 of cylinder B and is reciprocally movably mounted on the piston rod 15 of cylinder A. The stripper plate 12 is kept in alignment by slot means 30 which engage a slide projection 31 of the framework 13.

It is to be understood that although I describe the parts of the structure of my preferred glove

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turning mechanism with a certain degree of particularity, numerous changes and details may be incorporated therein without departing from the scope of my invention.

The finger tubes 10 and finger rods 11 in my preferred glove turning machine are placed in a position to accommodate either a left-handed glove or a right-handed glove, as is best illustrated in Figure 3. The finger tubes 10 comprise individual finger tubes 80, 81, 82 and 83 placed in a straight line with a thumb tube 84 placed between the end finger tube 80 and the next adjacent and finger tube 81 of this line of tubes and in front of this line of tubes. For a glove for the opposite hand the thumb of the glove is placed over a thumb tube 85 located directly behind the line of finger tubes 80, 81, 82 and 83.

The actual turning of a glove inside out may be best explained by referring to the Figures 4, 5, 6 and 7 of my drawings. I designate a glove 19 as having fingers 20 and a wrist body portion 21. To turn the glove 19 inside out the operator places the glove 19 over the finger tubes 10. A finger tube 10 extends into each and every one of the fingers 20 of the glove 19. The wrist body portion of the glove extends toward the stripper plate 12 which is normally positioned about the finger tubes 10. When the operator has placed the glove 19 over the finger tubes 10, he merely has to move a lever 56 to start the operation of the glove turning machine which will completely turn the glove 19 inside out.

The finger rods 11 are moved in the first direction into the finger tubes 10. As each individual finger rod moves into its respective finger tube, it engages the end of the finger which is over that tube and pulls the finger into the tube, thus turning the finger inside out. The position of the glove 19 on my glove turning machine just after the fingers have been pulled into the tubes is illustrated in Figure 5.

The next step in the operation of my glove turning machine to turn the glove 19 completely inside out is to move the stripper plate 12 in the second direction from its normal position about the finger tubes 10 to a position about the finger rods 11. The finger rods 11 are held in the finger tubes 10 to hold the fingers 20 of the glove therein while the stripper plate 12 is moved in the second direction to turn the wrist body portion 21 of the glove 19 inside out. Figure 6 of my drawings best illustrates the position of the finger tubes 10, the finger rods 11, and the stripper plate 12, just as the stripper plate has stopped moving in the second direction to turn the wrist body portion 21 of the glove 19 inside out.

The stripper plate 12 must now be moved in the first direction past the glove 19 to its normal position about the finger tubes 10. To permit the stripper plate 12 to move past the glove 19 without catching the wrist body portion 21 thereof and bunching the glove up or ripping it, I have constructed the stripper plate 12 with two half portions 25 and 26. These half portions 25 and 26 are normally disposed to lie substantially in a plane to form a flat surface with the center portion cut out whereby they may extend about the finger tubes 10. The half portions 25 and 26 may be fastened to a perimetrical support means 27 by hinges 28. The perimetrical support 27 extends about the finger tubes 10 and is carried by the piston rod 15 extending from cylinder A. The half portion 25 is hingedly fastened on one side of the finger tubes 10, and the half por-

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tion 26 is hingedly fastened on the opposite side of the finger tubes 10. As shown, springs 29, fastened by welding or other suitable means to the support 27, hold the half portions 25 and 26 in substantially a flat surface. It is understood that any suitable perimetrical support 27 and hinge 28 together with a spring 29 may be employed for the purpose of normally holding these half portions 25 and 26 in a substantially flat plane to produce the stripper plate 12.

As this stripper plate 12 moves in the first direction past the glove 19 and to its normal position about the finger tubes 10 after turning the wrist body portion 21 of the glove 19 inside out, the half portions 25 and 26 separate to increase the distance therebetween to permit the stripper plate 12 to travel over the glove 19. As soon as the stripper plate 12 has traveled past the glove 19, the springs 29 cause the stripper plate half portions 25 and 26 to return to their normal positions constituting substantially a flat plane. This hingedly separating of the half portions 25 and 26 of the stripper plate 12 prevents the stripper plate from ripping or damaging the glove 19 as it travels in the first direction to its normal position about the finger tubes 10.

When the stripper plate 12 has again reached its normal position about the finger tubes 10, and the glove is completely turned inside out, the finger rods 11 move in the second direction out of the finger tubes 10 and to their original position, as is illustrated in Figure 7 of my drawings. The operator may remove the glove from the glove turning machine after the finger rods 11 have moved in the second direction from the finger tubes 10 to their original position.

The finger rods 11 are terminated in ball-shaped knobs 17 which engage the ends of the fingers 20 of the glove 19. The knob provides for a large end of the finger rod to engage the end of the finger without the finger rod filling up the tube and thus prevent injury or damage to the glove finger as it is being pulled into the finger tube. The finger of the glove may partially crumple about the finger rod above the knob as it is being pulled into the tube.

The pressure system for operating the cylinders A and B to cause the glove turning machine to turn the glove 19 placed thereon inside out may best be described by referring to Figure 8 of my drawings. Although other pressure systems, such for example oil pressure, may be used, I have found that air pressure is the most convenient and satisfactory for my glove turning machine. This air may be supplied by an air pressure supply line 57 from any suitable air pressure unit.

My preferred air pressure control system which operates the cylinders A and B, comprises in general a master control valve 50, a valve 51, a trip valve 52, a first sequence valve 53 and a second sequence valve 54, all of which are connected by suitable conduits to form the system. I have illustrated my preferred control system for the air operated cylinders A and B symbolically in Figure 8 of my drawings. The master control valve 50, illustrated symbolically in my drawings, has an inlet opening 55 connected by a conduit 56 to the air pressure supply line 57. The master control valve 50 also has outlet openings 58 and 59 and an exhaust port 60. The valve may be said to be a two-position valve. When the valve is in the first position, the inlet opening 55 is connected with the outlet opening 58, and the outlet opening 59 is connected with the exhaust port 60.

When the valve is in the second position, the inlet opening 55 is connected with the outlet opening 59, and the outlet opening 58 is connected with the exhaust port 60. A conduit 61, connected to the top of cylinder A and to the outlet opening 58 of the master control valve 50, transmits air therebetween. A conduit 64 connects the outlet 59 of the master control valve 50 to the top of the cylinder B.

An air pressure operated valve positioner 62 is connected by suitable mechanical means, as illustrated by the dash-dot line 63, to the master control valve 50 to position the master control valve 50 in the first or in the second position. The valve positioner 62, which positions the master control valve 50, is illustrated in my drawings as a cylinder with a suitable piston 75 movable endwise therein. The piston is mechanically connected, as is symbolically shown by the dash-dot line 63, to the control portion 74 of the master control valve 50 for positioning the control portion 74 in either the first or the second position. In actual practice, the master control valve 50 and the valve positioner 62 may be constructed as a single unit.

The valve 51 has an inlet opening, an outlet opening and an exhaust port 67, and may be operated by the lever 66 or other suitable means. The inlet opening is connected to the supply line 57. The outlet opening is connected by conduit 65 to one end 32 of the valve positioner 62. When the valve 51 is not held in open position to connect the valve positioner 62 directly to the air pressure supply line 57, the valve connects the conduit 65 and thus the valve positioner 62 to the exhaust port 67.

The trip valve 52, also shown diagrammatically in my drawings, has an inlet opening 68, and an exhaust opening 70. The valve is operated through suitable mechanical means, illustrated in my drawings by dash-dot lines 71, the cam 34 and the boss 35, by the movement of the stripper plate 12 carried by the piston rod 15 extending from cylinder A. The boss 35 is fastened to the stripper plate 12, and the cam 34 is fastened to the framework 13. When the stripper plate 12 moves past the cam 34 the boss 35 moves the cam 34 to operate the trip valve 52. The inlet opening 68 of the trip valve 52 is connected directly to the air pressure supply line 57. The outlet opening 69 is connected by a conduit 72 to the opposite end 33 of the valve positioner 62.

The first sequence or relief valve 53 is connected by a conduit 76 between the top of cylinder A and the bottom of cylinder B. The second sequence or relief valve 54 is similarly connected by conduit 73 between the top of cylinder B and the bottom of cylinder A. These sequence or relief valves 53 and 54 may be any suitable relief valve which will permit air to pass through the valve only after the pressure of that air has reached a desired value. In my drawings, I have illustrated the valves symbolically and do not intend to limit the scope of my invention to the strict design of any particular valve used in my air pressure system.

In the operation of my glove turning machine, the operator places a glove 19 over the finger tubes 10 and raises the lever 66. The lever 66 operates the valve 51, permitting air to flow from the air pressure supply line 57 through the conduit 65 and into one end 32 of the valve positioner 62, thus moving the piston 75 endwise therein. The valve 51 may be restored to its normal position as shown in the drawing after

the valve 75 has moved endwise. When the piston 75 in the valve positioner 62 is moved endwise, the control valve portion 74 is moved to the second position, and thereby permits air to pass from the air pressure supply line 57 through the conduit 56, the inlet 55, and outwardly through the outlet 59 into the conduit 64 and the top of cylinder B. The pressure in the conduit 64 and also in the top of the cylinder B builds up, thus forcing the piston rod 14 downwardly or in the first direction to move the finger rods 11 into the finger tubes 10 for pulling the fingers 20 of the glove 19 therein.

The valve 51, upon being returned to its normal position, exhausts the conduit 65 and the one end 32 of the valve positioner 62 through its exhaust port 67. When the pressure in the cylinder B has built to a pressure substantially equal to the pressure of the air supply line 57, the second sequence or relief valve 54 operates to permit the air to enter the bottom of cylinder A through conduit 73. The air entering the bottom of cylinder A causes the piston rod 15 to move upwardly or in the second direction, thus causing the stripper plate 12 to move from its normal position about the finger tubes 10 and thereby turn the wrist body portion 21 of the glove 19 inside out.

In turning the wrist body portion of the glove inside out, the piston rod 15, after it reaches a predetermined elevation, causes the boss 35 on the stripper plate 12 to engage the cam 34 which operates through a suitable mechanical mechanism, illustrated by the dash-dot line 71, to move the trip valve 52 to connect the conduit 72 to the air pressure supply line 57. With the air valve 52 in this position, the air goes through the conduit 72 into the other end 33 of the valve positioner 62 to move the piston 75 back to its original position and thus move the master control valve 50 to its first position.

With the master control valve 50 in its first position, the top of cylinder A is connected through conduit 61 to the air pressure supply line 57. At the same time, the top of the cylinder B and the bottom of the cylinder A are connected through their respective conduits and through the master control valve 50 to the exhaust port 60 to exhaust the pressure from those conduits. The air moving into the top of cylinder A cause the piston rod 15 to move downwardly or in the first direction to return the stripper plate 12 to its normal position. As the piston rod 15 moves in this first direction, the trip valve 52 is again positioned to exhaust the conduit line 72 and the other end 33 of the valve positioner 62 through the trip valve 52 by means of its exhaust port 70.

When the pressure in the cylinder A is substantially equal to that in the air pressure supply line 57, the sequence relief valve 53 operates to permit air to travel through the conduit 76 and into the bottom of the cylinder B. This air, thus building up a pressure in the bottom of the cylinder B with the top of the cylinder exhausting through the control valve 50, moves the piston rod 14 in the second direction or upward to remove the finger rods 11 from the finger tubes 10 of the glove machine. After the finger rods have moved in the second direction, the glove 19 may be removed from the glove turning machine and another glove placed over the finger tubes 10 ready for another cycle of operation of the glove turning machine.

Although I have described my invention in its preferred form with a certain degree of particu-

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larity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A machine for turning inside out a glove having fingers and a wrist-body portion, said machine comprising tube means over which the glove is placed with the tube means extending into the fingers, rod means reciprocally movable in a first direction into said tube means and in a second direction out of said tube means, first pressure means for reciprocally moving said rod means, plate means disposed normally about said tube means and movable in said first and in said second direction, second pressure means for reciprocally moving said plate means in said first and in said second direction, said first pressure means moving said rod means in said first direction to pull the fingers of said gloves into said tube means and thereby turn the fingers inside out, said second pressure means moving said plate means in said second direction to engage and move the wrist-body portion of the glove from the tube means onto the rod means and thereby turn the wrist-body portion of the gloves inside out, said second pressure means moving said plate means past said glove and in said first direction to its normal position, and said first pressure means moving said rod means in said second direction to its original position whereby the turned glove may be removed from the machine.

2. A machine for turning inside out a glove having fingers and a wrist-body portion, said machine comprising tube means over which the glove is placed with the tube means extending into the fingers, first means reciprocally movable in a first direction into said tube means and in a second direction out of said tube means, second means disposed normally about said tube means and movable in said first and in said second direction, and pressure means for moving said first means and said second means in said first and in said second directions, said first means moving in said first direction to pull the fingers of said glove into said tube means for turning the fingers inside out, said second means moving in said second direction to move the wrist-body portion of the glove from the tube means for turning the wrist-body portion of the glove inside out, said second means then moving past said glove and in said first direction to its normal position after it has turned the wrist-body portion inside out, and said first means moving in said second direction to its original position whereby the turned glove may be removed from the machine.

3. A machine for turning inside out a glove having fingers and a wrist-body portion, said machine comprising tube means over which the glove is placed with the tube means extending into the fingers, first means for pulling the fingers of said glove into said tube means for turning the fingers inside out, and second means for moving the wrist body portion of the glove from the tube means for turning the wrist-body portion of the glove inside out, said first means holding said fingers within said tube means while said second means turns the said wrist body portion inside out.

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4. A machine for turning a glove inside out, said glove having fingers and a wrist-body portion, said machine comprising tube means over which the glove is placed with the tube means extending into the fingers, first pressure actuated means for pulling the fingers of said glove into said tube means for turning the fingers inside out, and second pressure actuated means for moving the wrist-body portion of the glove from the tube means and past the fingers for turning the wrist-body portion of the glove inside out.

5. In a glove turning machine having hollow glove support means and rod means movable in a first direction into the support means and in a second direction out of the support means, the provision of separable plate means alignable in a plane at a starting position extending about said support means and movable therefrom in said second direction to turn the wrist portion of the glove onto the rod means, and then movable in the first direction over the turned glove to its starting position.

6. In a glove turning machine having tube means and having rod means movable in a first direction into said tube means and in a second direction out of said tube means, the provision of separable plate means alignable in a plane at a starting position extending about said tubes and movable in said second and then in said first direction, and means to move said separable plate means in said second direction to push the glove from the tube means and onto the rod means and then in said first direction over the glove to its starting position while said rod means is disposed in the tube means.

7. In a glove turning machine having tube means and having rod means movable in a first direction into said tube means and in a second direction out of said tube means, the provision of separable plate means alignable in a plane at a starting position extending about said tubes and movable in said second and then in said first direction, and pressure actuated means moving said separable plate means in said second direction to push the glove from the tube means and onto the rod means and then moving said plate means in said first direction over the glove to its starting position while said rod means is disposed in the tube means, and valve means to control the movement of the pressure actuated means.

8. In a glove turning machine having tube means and having rod means movable in a first direction into said tube means and in a second direction out of said tube means, the provision of separable plate means alignable in a plane at a starting position extending about said tubes and movable in said second and then in said first direction, and pressure actuated means moving said separable plate means in said second direction to push the glove from the tube means and onto the rod means and then moving said plate means in said first direction over the glove to its starting position while said rod means is disposed in the tube means, said separable plate means comprising half portions hingedly fastened to said pressure actuated means and hingedly separable when moved over the turned glove to the starting position, and valve means to control the movement of the pressure actuated means.

9. A glove turning machine for a glove having fingers and a wrist body portion, said machine comprising hollow support means over which the glove is placed with the support means

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extending into the fingers, rod means movable into said support means to pull the fingers of the glove therein, a pressure actuated piston carrying said rod means, separable plate means alignable in a plane at a starting position extending about said support means and movable therefrom in a first direction to a position about said rod means, pressure actuated means to move said separable plate means and the wrist body portion therewith in said first direction and then to move said separable plate means over the turned glove to its starting position, and valve means responsive to the movement of said rod means to control the movement of the plate means.

10. In a glove turning machine having hollow finger receiving means and finger holding means movable in a first direction into the finger receiving means and in a second direction out of the finger receiving means, the provision of stripper means alignable in a plane at a starting position extending about said support means and movable therefrom in said second direction to turn the wrist portion of the glove onto the finger holding means, and then movable in the first direction over the turned glove to its starting position.

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11. In a glove turning machine having hollow finger receiving means and finger holding means in said finger receiving means to hold the fingers of a glove therein, the provision of stripper means movable from a starting position next adjacent said finger receiving means and outwardly beyond said finger receiving means to turn the wrist portion of a glove while the fingers thereof are held in the finger receiving means by the finger holding means.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|-----------|----------|----------------|
| 881,155 | Robinson | Mar. 10, 1908 |
| 978,434 | Crosby | Dec. 13, 1910 |
| 993,937 | Abbott | May 30, 1911 |
| 1,348,077 | Baum | July 27, 1920 |
| 1,735,688 | Lowry | Nov. 12, 1929 |
| 2,233,098 | Hodnett | Feb. 25, 1941 |
| 2,427,933 | Summers | Sept. 23, 1947 |