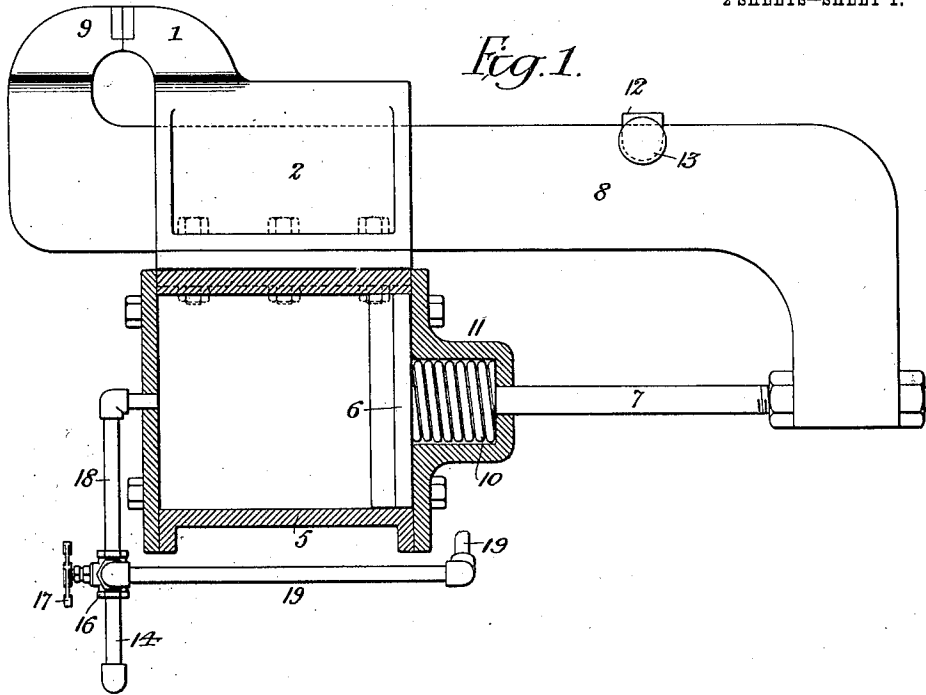
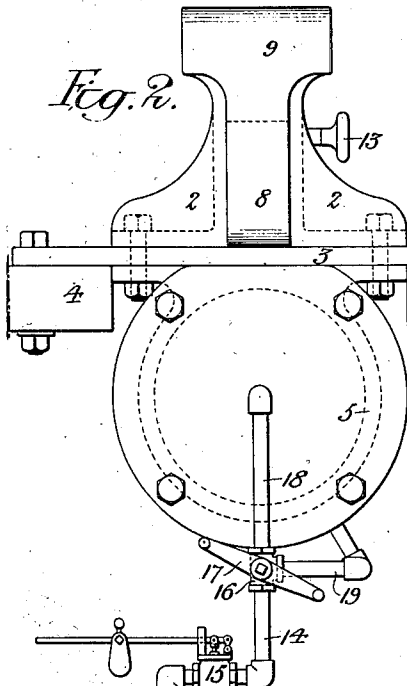
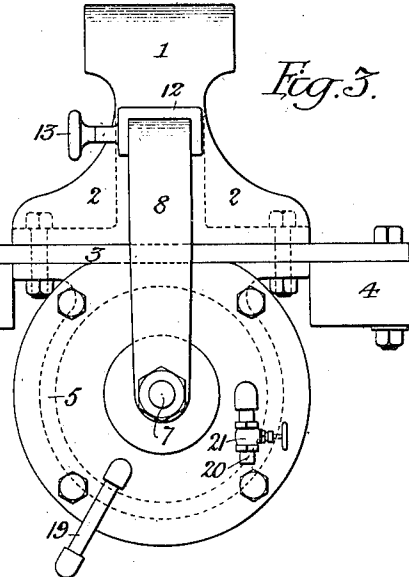


No. 884,548.

PATENTED APR. 14, 1908.

T. F. WARWICK.
FLUID ACTUATED VISE.
APPLICATION FILED MAR. 1, 1904.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 6.

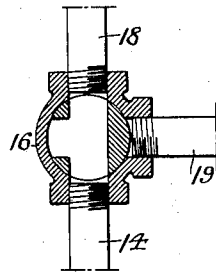


Fig. 7.

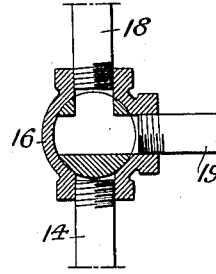


Fig. 8.

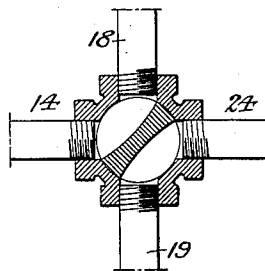


Fig. 9.

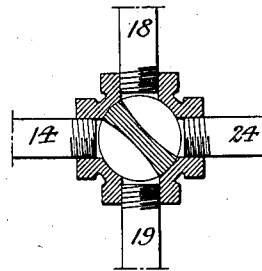
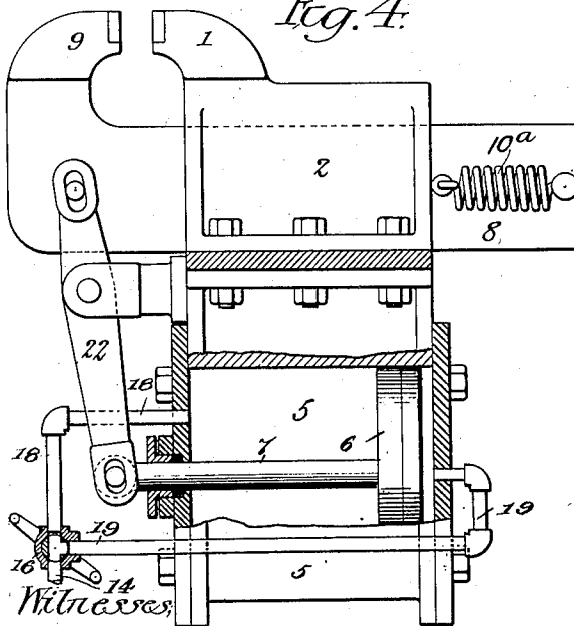
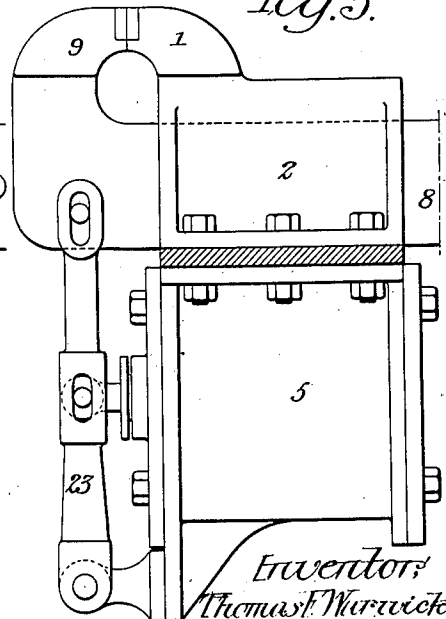


Fig. 4.



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Fig. 5.



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UNITED STATES PATENT OFFICE.

THOMAS F. WARWICK, OF METTER, GEORGIA.

FLUID-ACTUATED VISE.

No. 884,548.

Specification of Letters Patent.

Patented April 14, 1908.

Application filed March 1, 1904. Serial No. 196,102.

To all whom it may concern:

Be it known that I, THOMAS F. WARWICK, a citizen of the United States, and a resident of Metter, Georgia, have invented certain Improvements in Fluid-Actuated Vises, of which the following is a specification.

The object of my invention is to provide a quick-acting and powerful vise operated by fluid pressure, whereby the hands of the workman are left free to manipulate the work, no manual operation of the movable jaw of the vise being required.

In the accompanying drawing: Figure 1, is a view, partly in side elevation and partly in section of a fluid-pressure-actuated vise constructed in accordance with my invention: Fig. 2, is a front view of the same; Fig. 3, is a rear view; Figs. 4 and 5, are views illustrating two forms of the vise; Figs. 6 and 7, are enlarged sectional views of a valve forming part of the operating mechanism of the vise; and Figs. 8 and 9, are views of a modified form of valve.

In the drawing, 1 represents the fixed jaw of the vise which is secured to or forms part of a structure 2, suitably secured to the worktable or bench, the means of attachment shown in the present instance being a bar 3, which crosses a gap in the bench 4 and also has secured to it a cylinder structure 5, provided with a piston 6, having a rod 7, which projects through the rear head of the cylinder and is attached to the depending rear end of the stem or shank 8 of the movable jaw 9 of the vise, said stem or shank 8 being suitably guided longitudinally in the structure 2 which carries the fixed jaw 1 of the vise, so that it is free to move back and forth through said structure.

Outward movement of the movable jaw 9 of the vise is effected by means of a coiled spring 10, which is contained within a pocket 11 on the rear head of the cylinder and acts upon the forward face of the piston 6 to force the same forwardly in said cylinder, such outward movement being restricted, either by contact of the piston 6 with the front head of the cylinder or by contact with the structure 2 of a gage block 12, which is adjustably mounted on the stem 8 of the movable jaw 9 and can be secured in any position of longitudinal adjustment thereon by means of a clamp screw 13, hence, by a proper adjustment of this gage block, the stoppage of the outward movement of the jaw 9 can be effected at any desired point when said

movement is less than the full stroke of the piston 6.

A pipe 14 communicates with any available supply of air, water, gas, or other fluid under pressure, said pipe being provided with a regulating valve 15 whereby the pressure of fluid through the same can be readily governed in accordance with the desired amount of pressure which it is intended to exert by the movable jaw of the vise.

The pipe 14 communicates with the chest 16 of a three-way valve, whose stem is provided with a two-armed lever 17, the ends of which are intended to be connected to a suitable treadle or treadles so that the valve may be turned by the pressure of the foot to either of its two extreme positions.

When in the position shown in Fig. 6, the valve opens communication between the pipe 14 and a branch 18 extending through the forward head of the cylinder 5, and, when in its other position, shown in Fig. 7, the valve opens communication between the pipe 18 and a branch 19 which extends to and through the rear head of the cylinder. Said rear head of the cylinder is also provided with an outlet pipe 20 having a valve 21 whereby the area of escape from said rear end of the cylinder can be readily regulated.

In Figs. 4 and 5 I have not shown the valved pipes in connection with the cylinder 5, but it should be understood that said cylinder is intended to be equipped with the same arrangement of pipes and valves as the cylinder shown in Figs. 1, 2 and 3.

The normal position of the parts is with the movable jaw of the vise open and the piston 6 forced forwardly in the cylinder 5 by the action of the spring 10, but if the valve of the chest 16 is adjusted so as to open communication between the pipes 14 and 18, as shown in Fig. 6, fluid under pressure will enter the forward end of the cylinder 5 and will force the piston 6 rearwardly therein so as to move the jaw 9 of the vise towards the fixed jaw 1 and clamp the work between them, the speed of closing movement of the jaw being determined partly by the resistance offered to the rearward movement of the piston 6 by the spring 10, and partly to the freedom of escape of the air from the rear end of the cylinder 5 through the valved pipe 20, hence, by the proper adjustment of this valve, the speed of closing movement of the jaw 9 can be accurately governed.

When the valve in the chest 16 is moved

so as to open communication between the pipes 18 and 19 and cut off communication with the pipe 14, as shown in Fig. 7, the pressure in both ends of the cylinder 5 will be equalized and the spring 10 will therefore be free to act so as to again force the piston 6 forwardly in the cylinder and open the movable jaw 9 of the vise, this movement being a quick movement since it is not restricted by the rate of flow through the valved pipe 20.

If the power exerted by the piston of the power cylinder 5 is not sufficient to impart the desired pressure to the work held between the jaws of the vise a power-multiplying lever, such, for instance, as shown at 22 in Fig. 4 may be inserted between the piston rod 7 and the movable jaw 9, or, in case the stroke of the power cylinder is less than the desired opening movement of the movable jaw of the vise, a lever, such for instance as shown at 23 in Fig. 5, may be inserted between the piston rod 7 and the movable jaw of the vise for thus increasing the movement of the latter.

Many modifications of the vise may be devised within the scope of my invention, for instance, the movable jaw of the vise may be opened by means of a spring acting upon the sliding stem or shank of the same, as shown for instance at 10^a in Fig. 4, or the piston 6 of the power cylinder may be moved by fluid pressure in both directions, either end of the cylinder being open to exhaust when the other end is open to pressure. Such result can be effected by the use of a four-way valve, such as shown in Figs. 8 and 9, fluid being directed from the pipe 14 to the pipe 18 and from the pipe 19 to the exhaust pipe 24 when the valve is in the position shown in Fig. 8, and fluid being directed from the pipe 14 to the pipe 19 and from the pipe 18 to the exhaust pipe when the valve is in the position shown in Fig. 9.

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

1. The combination of the fixed jaw structure of the vise, a movable jaw structure having a stem or shank horizontally slidable through the fixed jaw structure and guided so as to be incapable of turning therein, and a power cylinder connected to the fixed jaw structure and located directly beneath the same with its axis substantially parallel to

the line of movement of the slidable jaw, said cylinder having a piston and a piston rod operatively connected to said stem or shank of the movable jaw, substantially as specified.

2. The combination of the fixed jaw structure of the vise, a movable jaw structure having a non-rotatable stem or shank horizontally slidable through an opening in the fixed jaw structure, a power cylinder located directly beneath the fixed jaw of the vise and having a piston and piston rod, with a lever connected to transmit the movement of the said piston rod to the rigidly guided stem of the movable jaw of the vise, and a spring attached to the rear part of the fixed jaw structure and to that part of the stem or shank which projects to the rear of said fixed jaw structure so as to tend to open the vise, substantially as specified.

3. The combination of the fixed and movable jaws of the vise, a power cylinder having a piston with a rod operatively connected to the movable jaw, means for admitting fluid under pressure to one end of the cylinder and for cutting it off from the source of supply while placing the two ends of the cylinder in connection with each other, a fluid pressure escape from one end of the cylinder, and resilient means for moving the piston in the cylinder when its two ends are in connection with each other, substantially as specified.

4. The combination of the fixed and movable jaws of the vise, a power cylinder having a piston with rod for acting upon said movable jaw, a fluid pressure pipe having branches communicating both with the front and rear ends of the cylinder, a valve whereby pressure may be directed to one end of the cylinder and cut off from the opposite end, or the ends of the cylinder may be put in communication with each other and cut off from the pressure pipe, and means for moving the jaw of the vise under the latter conditions, substantially as specified.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

THOMAS F. WARWICK.

Witnesses:

A. J. TRAPNELL,
P. H. PERKINS.