A. J. SUTCH.

CLAMPING DEVICE.

APPLICATION FILED FEB. 12, 1913.

1,077,652.

Patented Nov. 4, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

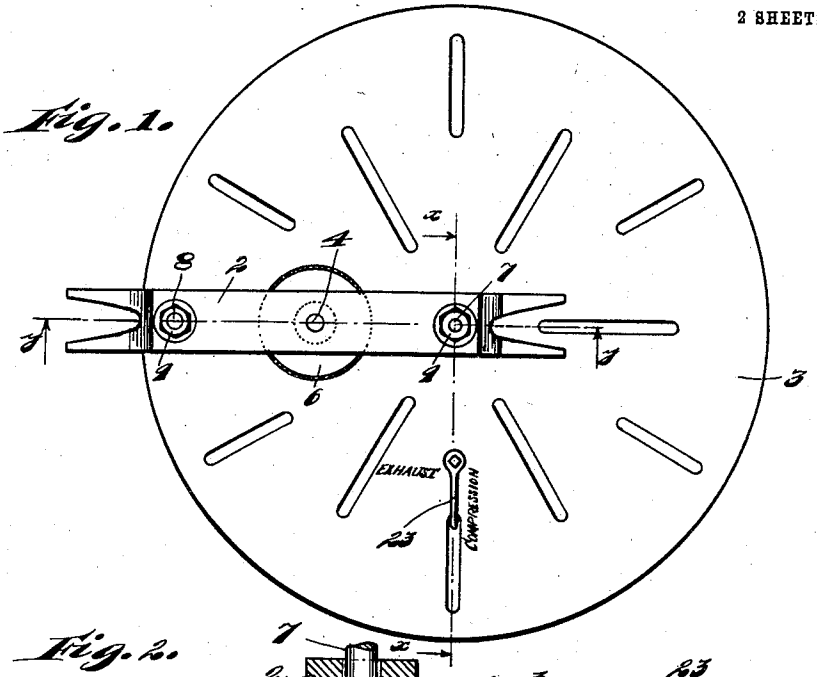
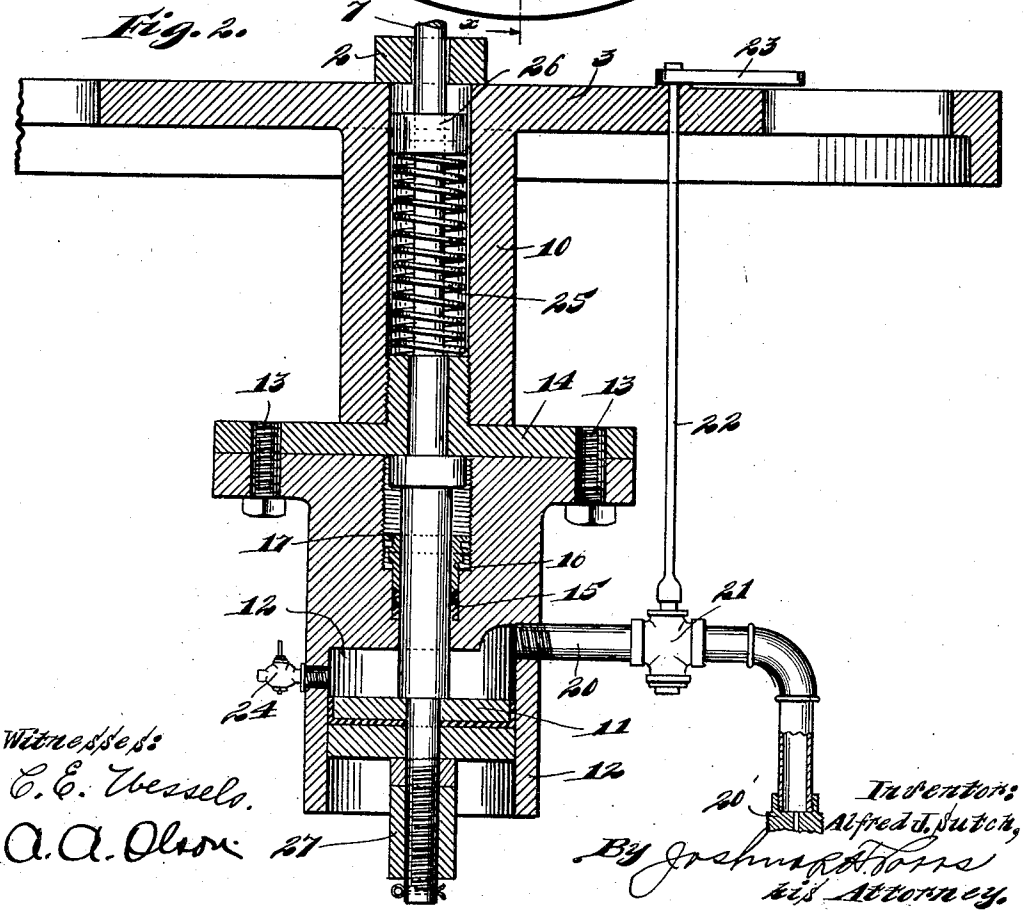


Fig. 2.



Witnesses:

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COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 3.

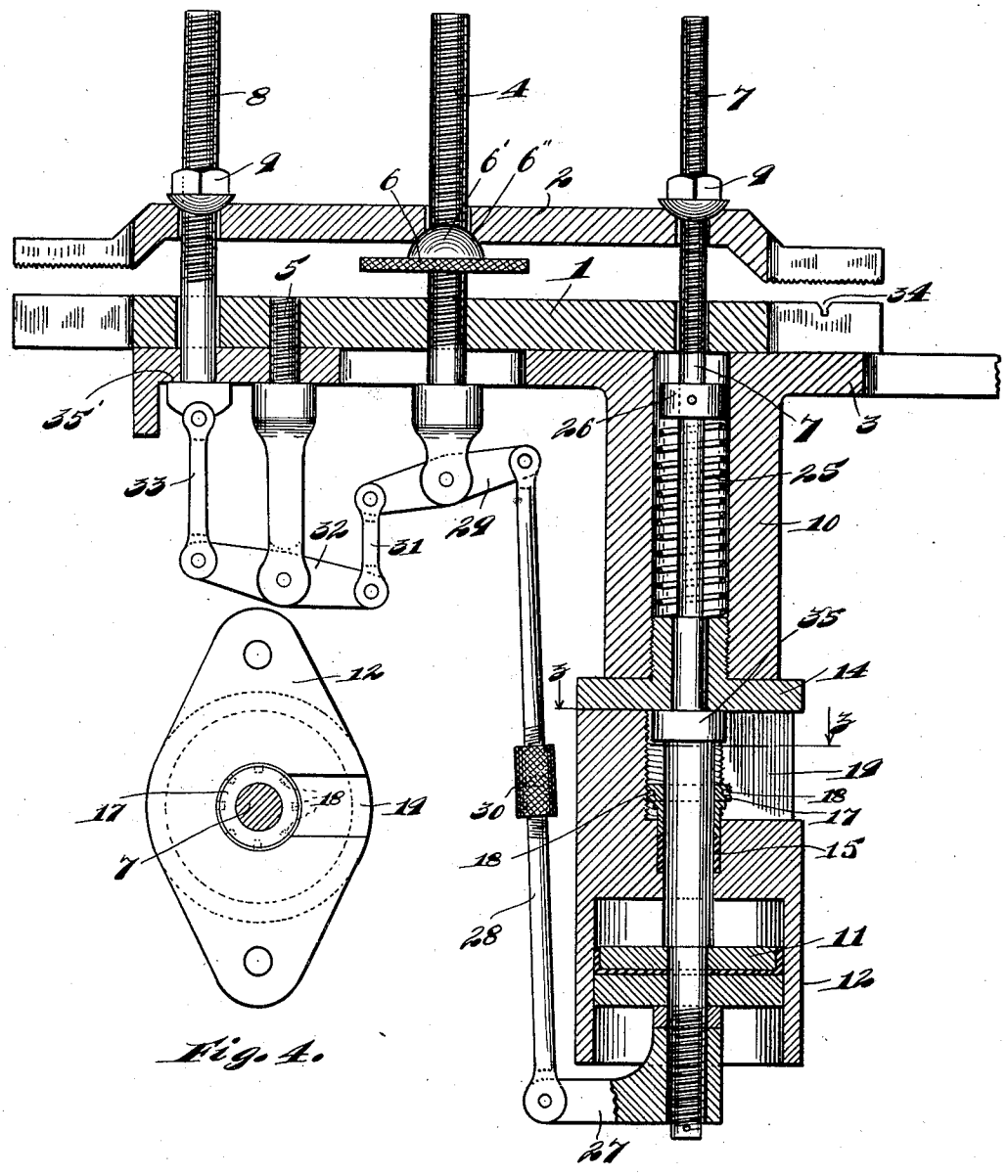


Fig. 4.

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UNITED STATES PATENT OFFICE.

ALFRED J. SUTCH, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLIAM A. J. SMALE, OF CHICAGO, ILLINOIS.

CLAMPING DEVICE.

1,077,652. Specification of Letters Patent. Patented Nov. 4, 1913.

Application filed February 12, 1913. Serial No. 747,950.

To all whom it may concern:

Be it known that I, ALFRED J. SUTCH, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Clamping Devices, of which the following is a specification.

My invention relates to improvements in clamping devices and more specifically to automatic clamping devices designed for use on drill presses and like machinery.

The object of my invention is the production of a clamping device of the character mentioned which will be of durable and economical construction, one which may be operated through the medium of compressed fluid, or manually if desired.

A further object is the production of a clamping device as mentioned which will be efficient in use.

Other objects will appear hereinafter.

With these objects in view, the invention consists in the combinations and arrangements of parts, all as will be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a top plan view of a clamping device embodying my invention, the same being shown arranged for use in conjunction with the bed of a drill press, Fig. 2 is an enlarged section taken on line *x—x* of Fig. 1, Fig. 3 is an enlarged section taken on substantially line *y—y* of Fig. 1, and Fig. 4 is a section taken on substantially line *z—z* of Fig. 3.

The preferred form of construction as illustrated in the drawings comprises a clamp consisting of superposed clamping members 1 and 2, the relatively stationary clamping member 1 being secured upon the upper side of the drill press bed 3 by means of screws or bolts 4 and 5. The relatively movable clamping member 2 is adjustably supported above the clamping member 1 by means of a nut 6 which is threaded upon the extended upper end of the screw 4, the periphery of said nut being knurled to facilitate turning. The upper side of the nut 6 is provided with a hemispherical extension 6′ which engages a correspondingly formed seat 6″ formed in the under side of the jaw 2, the arrangement being such that slight rocking movement of said jaw 2 is permitted.

Depression of the jaw member 2 in order to force the same into clamping relation with the work which it is desired to hold is effected by vertically movable pins or rods 7 and 8 upon the screw threaded upper ends of which are threaded nuts 9 adapted to engage with the upper side of said jaw 2. The contacting sides of the nuts 9 are formed the same as the upper side of the nut 6, and the adjacent portions of the upper side of the jaw 2 are provided with correspondingly formed seats, as shown, in order to permit of slight rocking movement of said jaw. The upper end portions of the nuts 9 are squared preferably instead of being knurled as the nut 6.

The pin or rod 7 projects loosely through the jaw member 1 and the tubular extension of bushing 10 formed upon the under side of the bed 3. Carried at the lower end of the member 7 is a piston 11 mounted for operation in a cylinder 12, the upper end of which is secured by screws 13 to a plate 14 which is threaded into the lower end of the portion 10, as clearly shown in Figs. 2 and 3. A packing 15 coöperates with the lower end of the pin or rod 7 to prevent leakage from the upper end of cylinder 12. A gland 16 cooperates with the packing 15 and a nut 17 threaded in the upper end of the cylinder 12 coöperates with said gland for holding the same in operative relation with the packing 15. The periphery of the nut 17 is provided with spaced laterally opening slots 18 which may be engaged by means of a key or other tool inserted through the laterally opening slot 19 for rotating said nut in adjusting the same into engagement with the gland 16.

Communicating with the upper end of cylinder 12 is a compressed air pipe 20 which communicates with any suitable source of compressed fluid supply. Provided in the pipe 20 is a three-way valve 21, the stem 22 of which projects upwardly through the bed 3, a handle 23 being provided at the upper end of said stem for operating said valve. The arrangement is such that, when the handle 23 is at the compression position as designated upon the bed 3, air will be admitted to the cylinder 12 for operation upon the piston 11 in order to force the pin or rod 7 downwardly

and hence the corresponding end of the jaw 2 into engagement with the work which it is desired to clamp. When the handle 23 is turned through ninety degrees or to the exhaust position as designated upon the upper side of bed 3, as shown in Fig. 1, the air in cylinder 12 will be exhausted therefrom through the valve 21 so as to permit of the pin or rod 7 being moved upwardly to its initial position. A reducer 20′ is interposed in the pipe 20 in order to throttle the compressed air admitted to the pipe 20 and prevent the air fed to the cylinder 12 passing thereinto too rapidly or suddenly, slamming being with this provision prevented. A drain cock 24 also communicates with the upper end of the cylinder 12 for use in cleaning the compression chamber of the cylinder when the device is not in use. When the compressed air is exhausted from the cylinder 12, as above mentioned, a helical compression spring 25 arranged in the portion 10 and which engages against the under side of a collar 26 secured to the member 7, will operate to move the member 7 upwardly and hence to release the corresponding end of the jaw 2.

Provided at the lower end of the pin or rod 7 is a fulcrum member 27 to the outer end of which is pivoted the lower end of a link 28 which is pivotally connected at its upper end with a lever 29 which is pivoted intermediate its extremities to the lower end of the screw 4. A turn buckle 30 is interposed into the pin 28 for longitudinal adjustment thereof. The lever 29 is connected by means of a link 31 with a lever 32 which is correspondingly mounted at the lower end of the screw 5, the lever 32 being connected by means of a link 33 with the lower end of the pin 8. An operative connection is thus established between the pin 8 and the piston 11, and so that in movement of said piston, the members 7 and 8 will be simultaneously moved, and so that if desired both ends of the clamping member or either end thereof may be utilized for clamping purposes. Ordinarily, however, but one end of the clamp is utilized, the nut 9 of the end which is not utilized, being in this case positioned at the upper end of the pin upon which the same is threaded, out of engagement with the clamping member 2.

With the arrangement disclosed it will be seen that the jaw member 2 may be adjusted through manipulation of the nuts 6 and 9 to adapt the clamp for engagement of work of any thickness within a limited range. The ends of the clamping members 1 and 2 are bifurcated to permit of the passage of the drill in the drilling operation and the upper side of the jaw 1 is preferably recessed as at 34 for the reception of cylindrical articles which it is desired to clamp.

The pins 7 and 8 are provided with shoulders 35 and 35′ adapted for engagement respectively against the under side of the plate 14 and the bed 3 to serve as stops to limit the upward movement of said pin in order that the clamp may be utilized without compressed air if desired. In the latter case the nuts 9 will be engaged by a wrench in order to turn the same to force the clamping jaw 2 into clamping relation with the work. With the construction set forth then, it will be seen that the device is adapted for operation with compressed air, when the latter may be had, and when not available, the clamp may be manually operated.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, the combination with a bed; a relatively movable jaw mounted above said bed for cooperation therewith; operating means; and an operative connection between said operating means and the respective ends of said movable jaw for moving either one or both of said ends of said jaw into and for holding the same in clamping position, substantially as described.

2. In a device of the class described, the combination with a bed; a relatively movable jaw mounted above said bed for coöperation therewith; operating means; a direct connection between said operating means and one end of said movable jaw; and a series of levers operatively connected with each other and connecting said operating means with the other end of said movable jaw whereby said ends of said movable jaw may be moved into and retained in clamping position, substantially as described.

3. In a device of the class described, the combination with a bed; a relatively movable jaw mounted above said bed for cooperation therewith; means engaging said movable jaw intermediate its extremities for supporting said movable jaw adjustably above said bed; means engaging the respective ends of said movable jaw for moving the same into clamping position; and means coöperating with said last mentioned means for operatively moving the respective ends of said movable jaw, substantially as described.

4. In a device of the class described, the combination with a bed; a relatively movable jaw mounted above said bed for co-

operation therewith; a vertically disposed guide pin arising from said stationary jaw and passing loosely through said movable jaw intermediate the ends thereof; a nut threaded upon said guide pin for adjustably holding said movable jaw; a pair of movable pins passing through the respective ends of said vertically movable jaw; stops arranged for vertical adjustment upon said last mentioned pins for engagement with the respective ends of said movable jaw to move the same downwardly when said pins are lowered; and means for simultaneously moving said movable pins downwardly, substantially as described.

5. In a device of the class described the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; a compressed air cylinder; a piston mounted for operation in said cylinder; and an operative connection between said piston and the respective ends of said movable jaw for moving either one or both of said ends of said jaw into and for holding the same in clamping relation with said stationary jaw, substantially as described.

6. In a device of the class described the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; a compressed air cylinder; a piston mounted for operation in said cylinder; a direct connection between said piston and one end of said movable jaw; and a series of levers operatively connected with each other and connecting said piston with the other end of said movable jaw whereby said ends of said movable jaw may be moved into and retained in clamping relation with said stationary jaw, substantially as described.

7. In a device of the class described the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; a compressed air cylinder; a piston mounted for operation in said cylinder; a direct connection between said piston and one end of said movable jaw; a series of levers operatively connected with each other and connecting said piston with the other end of said movable jaw whereby said ends of said movable jaw may be moved into and retained in clamping relation with said stationary jaw, said piston, when compressed air is admitted to said cylinder being adapted to move said movable jaw downwardly; and resilient means for normally moving said piston to release said movable jaw, substantially as described.

8. In a device of the class described, the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; means engaging said movable jaw intermediate its extremities for supporting said movable jaw adjustably over said stationary jaw; means engaging the respective ends of said movable jaw for moving the same into clamping relation with said stationary jaw; and compressed air operable means coöperating with said last mentioned means for operatively moving the respective ends of said movable jaw, substantially as described.

9. In a device of the class described, the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; a vertically adjustable nut engaging said movable jaw intermediate its extremities for supporting said movable jaw adjustably over said stationary jaw; means engaging the respective ends of said movable jaw for moving the same into clamping relation with said stationary jaw; and compressed air operable means coöperating with said last mentioned means for operatively moving the respective ends of said movable jaw, substantially as described.

10. In a device of the class described, the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; means engaging said movable jaw intermediate its extremities for supporting said movable jaw adjustably over said stationary jaw; vertically movable members; stops mounted for vertical adjustment upon said last mentioned members for engagement with the respective ends of said movable jaw for moving the same into clamping relation with said stationary jaw; and compressed air operable means coöperating with said vertically movable members for operatively moving the respective ends of said movable jaw, substantially as described.

11. In a device of the class described, the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw mounted for coöperation with said stationary jaw; means engaging said movable jaw intermediate its extremities for supporting said movable jaw adjustably over said stationary jaw; vertically movable members; stops threaded for vertical adjustment upon said last mentioned members, said stops being adapted for engagement with the respective ends of said movable jaw for moving the same into clamping relation with said stationary jaw when said vertically movable members are moved downwardly; and compressed air operable means adapted to move said vertically movable members downwardly, substantially as described.

12. In a device of the class described, the

combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw arranged over said stationary jaw for coöperation therewith; a vertically disposed guide pin arising from said stationary jaw and passing loosely through said movable jaw intermediate the ends thereof; a nut threaded upon said guide pin for adjustably supporting said movable jaw; a pair of vertically movable pins passing through the respective ends of said vertically movable jaw; stops arranged for vertical adjustment upon said last mentioned pins for engagement with the respective ends of said movable jaw to move the same downwardly when said pins are lowered; and compressed air operable means for simultaneously moving said vertically movable pins downwardly, substantially as described.

13. In a device of the class described, the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw arranged over said stationary jaw for coöperation therewith; a vertically disposed guide pin arising from said stationary jaw and passing loosely through said movable jaw intermediate the ends thereof; a nut threaded upon said guide pin for adjustably supporting said movable jaw; a pair of vertically movable pins passing through the respective ends of said vertically movable jaw; nuts threaded upon said vertically movable pins for engagement with the upper sides of the respective ends of said movable jaw for moving said ends of said jaw downwardly when said pins are correspondingly moved; compressed air operable means for moving said vertically movable pins downwardly; and resilient means for normally holding said vertically movable pins at their upper terminals of movement, substantially as described.

14. In a device of the class described, the combination with a bed; a relatively stationary jaw arranged thereon; a relatively movable jaw arranged over said stationary jaw for coöperation therewith; a vertically disposed guide pin arising from said stationary jaw and passing loosely through said movable jaw intermediate the ends thereof; a nut threaded upon said guide pin for adjustably supporting said movable jaw; a pair of vertically movable pins passing through the respective ends of said vertically movable jaw; stops arranged for vertical adjustment upon said last mentioned pins for engagement with the respective ends of said movable jaw to move the same downwardly when said pins are lowered; compressed air operable means for simultaneously moving said vertically movable pins downwardly; and means for limiting the upward movement of said vertically movable pins, substantially as described.

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

ALFRED J. SUTCH.

Witnesses:
ROBT. WILKIE,
F. J. ROBERTS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."