



April 1, 1924.

1,488,657

I. A. WEAVER

PRESS

Filed March 5, 1923

2 Sheets-Sheet 2

Fig. 4.

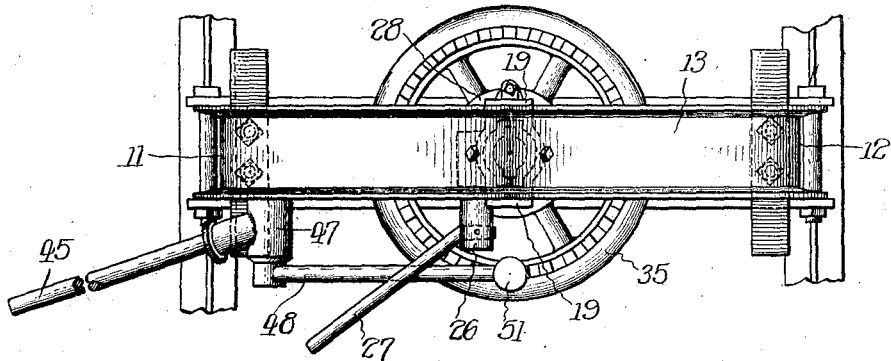


Fig. 5.

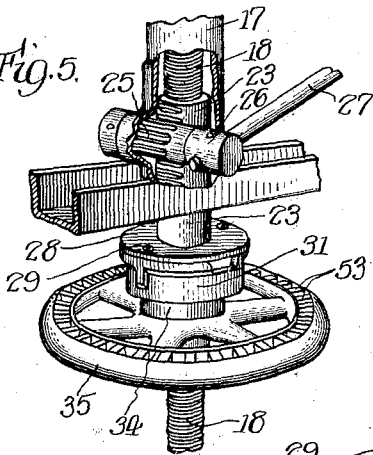


Fig. 6.

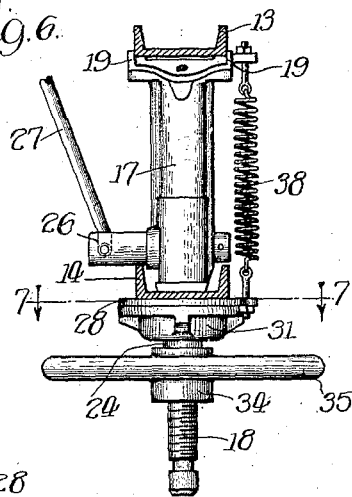
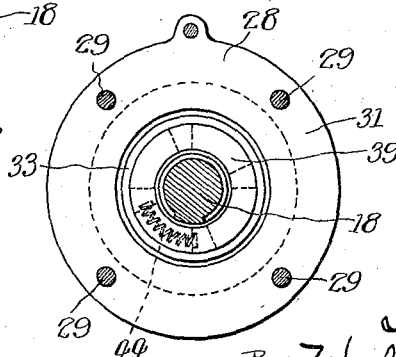


Fig. 7.



Witness:  
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# UNITED STATES PATENT OFFICE.

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PRESS.

Application filed March 5, 1923. Serial No. 622,772.

*To all whom it may concern:*

Be it known that I, IRA A. WEAVER, a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Presses, of which the following is a specification.

My invention pertains to presses or pressure-applying mechanisms of the general type and style set forth in my earlier United States Patent No. 1,180,896, granted April 25, 1916, the present improvements relating more particularly to the means for actuating the element which performs the pressing or forcing function.

With some classes of work, only a comparatively small pressure is required, whereas with other types of work a greater pressure alone is needed, and with other kinds of work a strong pressure is desirable at first, to be followed by a lesser pressure.

The new mechanism aims to meet all of these requirements, and, accordingly, a nut and screw means is provided to afford a great mechanical advantage when that is needed, and an associated pinion and rack is supplied to apply a lesser pressure when permissible with a more quickly operating mechanism.

In some cases, the two mechanisms are used in combination or conjunction, the screw being adjusted to the correct length to bring the handle which operates the pinion to the most favorable or advantageous position for action so that such handle or hand lever which works the pinion may be used to obtain a maximum amount of power, which is usually large or excessive when starting a mandrel or forcing a bushing.

The advantage of this combination over two separate presses of different capacities resides in the fact that should the workman attempt to operate on what he believes to be a job requiring a power within the force of the rack and pinion and a greater power where needed, the work would not have to be removed to a high-powered press, but the screw mechanism which is somewhat slower, but many times more powerful, could be brought into action to start the load, the job being finished with the screw or the lever operating the pinion and rack according to the judgment of the workman, making the

press very desirable for light work, as well as for jobs too heavy for the rack and pinion type of mechanism.

To enable those skilled in this art to have a full and complete understanding of the new device, both from structural and functional standpoints, I have illustrated a preferred embodiment of the invention in the accompanying drawings forming a part of this specification and throughout the several views of which like reference characters refer to the same parts. In these drawings:

Fig. 1 is a fragmentary elevation of the improved press;

Fig. 2 is an enlarged vertical section through the central part of the structure;

Fig. 3 is a horizontal section through the pinion and associated parts;

Fig. 4 is a fragmentary plan view of the entire press, with certain portions broken away;

Fig. 5 illustrates the operating mechanism in perspective;

Fig. 6 is a vertical cross-section through the central portion of the press; and

Fig. 7 is an enlarged horizontal section on line 7-7 of Fig. 6.

In this preferred embodiment of the invention, the frame comprises a bar of channel cross-section bent to provide a pair of spaced vertical legs 11 and 12 which at their upper ends are connected together by an integral inverted V-shaped portion or cross-member 13, the marginal flanges of such bar projecting outwardly, as is clearly illustrated.

At their lower ends, the legs have elongated feet (not fully shown) securely fastened thereto, and at their upper portions such legs are connected together by a horizontal cross channel-bar 14 with its flanges presented upwardly, the opposite ends of such bar being fastened to the inner faces of the two legs of the frame by angle brackets 15 and suitable rivets or bolts 16.

A hollow casting 17 of suitable shape for the reception of the upper portion of the vertical pressing screw 18 is interposed between the horizontal web of the cross-bar 14 and the apex of the main frame, and has an enlarged properly-shaped upper end 19 fastened to the latter.

The lower end of the hollow casting 17, as

is shown in Fig. 2, bears on the top face of the cross-bar 14 and has a cylindrical portion 21 extending down into a correspondingly shaped aperture 22 through the web of the element 14.

A hollow, cylindrical sleeve 23, having rack teeth 24 on one side, is mounted to slide vertically in the strut member 17, and it is designed to be actuated by a pinion 25, meshing with the rack, housed in the casting 17, the shaft 26 of which pinion at the front of the machine is supplied with a comparatively long, operating handle or lever 27.

Such sleeve slidably accommodates the vertical, pressure, screw-threaded shaft 18 through its hole, and the lower end of the sleeve which projects down through the opening 22 of the cross-bar carries a circular thrust plate 28 to which is fastened, by means of screws 29, 29, a centrally-apertured, inwardly-flanged, supporting member 31 affording by its flange a circular raceway for a plurality of balls 32 on which rests a disk or round plate 33 fastened by screws or otherwise to the top of the internally-threaded hub 34 of a ratchet hand or power wheel 35 which constitutes the nut for the screw-shaft 28 extending through the sleeve 23, the cross-bar 14, and the elements 28, 31, 33 and 34, the latter being the only one having a threaded connection therewith.

In order to permit the screw-shaft 18 to slide longitudinally without turning, a pin 36 is extended through the shaft with its two end portions slidably accommodated in vertical slots 37 of the member 17 so that, as the handle or wheel 35 turns, the screw-shaft may be forced down or raised depending on the direction of rotation of the handle.

In order to counterbalance such shaft and the parts carried by it, a coiled contractile spring 38 (Fig. 6) is fastened at its lower end to the plate 28, its upper end being secured to the top portion 19 of member 17.

In an appliance of this kind, it is desirable to incorporate means for securing a quick release of the operating parts upon removal of the load, and, in this particular mechanism, as also in the earlier patent, this result is accomplished by means of two co-operating washers or collars 39 and 41 having coacting inclined or spiral faces 42 and 43, respectively, of coarser opposite pitch than that of the screw-shaft 18, and in a suitable recess between these washers a relatively-light expansion spiral spring 44 is housed which is employed for the purpose of tending to force the spiral surfaces to slide on one another, that is, it tends to expand the structure or force the washers apart.

This quick release mechanism is substantially like that presented in my former United States Patent No. 1,188,896, the element 39 being positioned below the plate 28 and the part 41 being located just above the

member 33, both co-operating parts being housed in the element 31, as is clearly illustrated.

For work heavier than that which can be readily accomplished through the manipulation of handle 27 and the pinion and rack connection with the screw shaft, I fulcrum a vertically-operated bell-crank handle 45 on a stud 46 mounted on the under side of the cross-bar 14 and projecting forwardly therefrom.

The short arm 47 of such elbow lever or handle has an arm 48 hinged or pivoted thereto at 49, such latter arm at its free end having a vertically-apertured boss 51, accommodating a pawl 52 of the detailed construction presented in the patent referred to, the pawl co-operating with a circle or ring of ratchet teeth 53 on the upper face of the combined hand and power wheel 35.

The operation of the appliance takes place practically as follows:

For light work the screw 18 is quickly spun down by turning the hand-wheel 35 until the arbor engages the work, whereupon the workman, by means of handle 27 and the pinion and rack construction, forces the screw-shaft down to perform the pressing operation.

Upon release of the handle, due to the automatic lifting action of spring 38, it will swing back to normal position, and the thrust-collar 28 and the screw-shaft will rise until such collar engages the under face of the cross-bar, this being the neutral or natural position therefor.

This rack and pinion operating means saves much time in handling numerous jobs which do not require extreme pressure, and it is especially advantageous for delicate work, as the operator can easily feel when sufficient pressure has been exerted.

In case a greater initial pressure is needed to be followed by a lesser pressure, the arm 48 may be swung into position to bring its pawl into engagement with the ratchet-teeth of the combined hand and power wheel, thus converting it temporarily into a power wheel, and the screw-shaft may be fed down by step by vertical oscillation of the handle 45.

Then this action of the screw-shaft may be followed by further downward movement thereof brought about by swinging handle 27 and thus manipulating the pinion and rack mechanism.

Provided a greater pressure is required at all times than that to be secured through working handle 27, the handle 45 may be used alone, thus securing a great mechanical advantage.

It will be readily understood that work requiring either small or great pressure can be handled quickly without disturbing the work when it has once been placed in position under the screw.

Stated somewhat otherwise, those skilled in this art will appreciate the great convenience and saving of time afforded by being able to complete the job, whatever pressure is required, without having to move the work from a small arbor press to a heavier screw press, or vice versa, as is usually necessary.

When pressure on the screw is developed by turning the hand or power wheel, the two cam-faced thrust-washers 39 and 41 tend to climb against each other, but the pressure can be instantly relieved by one reverse stroke of the lever, which reverses their action regardless of the amount of pressure and permits the screw to be spun up quickly by the hand wheel.

This invention is not limited and restricted to the precise and exact details of structure presented, and it is susceptible of a variety of embodiments, all falling within the scope of the appended claims.

I claim:

1. In a press, the combination of a slidably-mounted apertured sleeve, a pinion and rack to slide said sleeve, a handle to actuate said pinion and rack, a screw-threaded shaft extended through said sleeve aperture, means to prevent said shaft from turning, and a revoluble nut mounted on said sleeve and having a threaded connection with said shaft, whereby the latter may be moved bodily longitudinally by the pinion and rack and may be adjusted lengthwise by said nut.

2. In a press, the combination of a frame having an apertured cross-bar, a sleeve slidable through said aperture and provided with a rack, a pinion in mesh with said

rack, a handle to rock said pinion and to slide said sleeve longitudinally through said pinion and rack connection, a thrust-collar on said sleeve adapted to bear against said cross-bar, a ratchet wheel revolubly supported on said thrust-collar, a quick release device between said ratchet wheel and thrust-collar, a screw-threaded shaft slidable in said sleeve and thrust-collar and having a threaded engagement with said ratchet wheel, the latter forming a nut for the shaft, means to prevent said shaft from turning whereby rotation of the ratchet wheel effects lengthwise movement of the shaft, a second handle, and a pawl connection between said second handle and said ratchet wheel.

3. In a press, the combination of a frame having an apertured cross-bar, a sleeve slidable through said aperture and provided with a rack, a pinion in mesh with said rack, a handle to rock said pinion and to slide said sleeve longitudinally through said pinion and rack connection, a thrust-collar on said sleeve adapted to bear against said cross-bar, a wheel revolubly supported on said thrust-collar, a quick-release device between said wheel and thrust-collar, a screw-threaded shaft slidable in said sleeve and thrust-collar and having a threaded engagement with said wheel, the latter forming a nut for the shaft, and means to prevent said shaft from turning whereby rotation of the wheel effects lengthwise movement of the shaft.

In witness whereof I have hereunto set my hand and seal.

IRA A. WEAVER. [L. s.]