Oct. 2, 1923.

1,469,689

J. S. PRIUS

HYDRAULIC PRESS

Original Filed Nov. 14, 1919 5 Sheets-Sheet 1

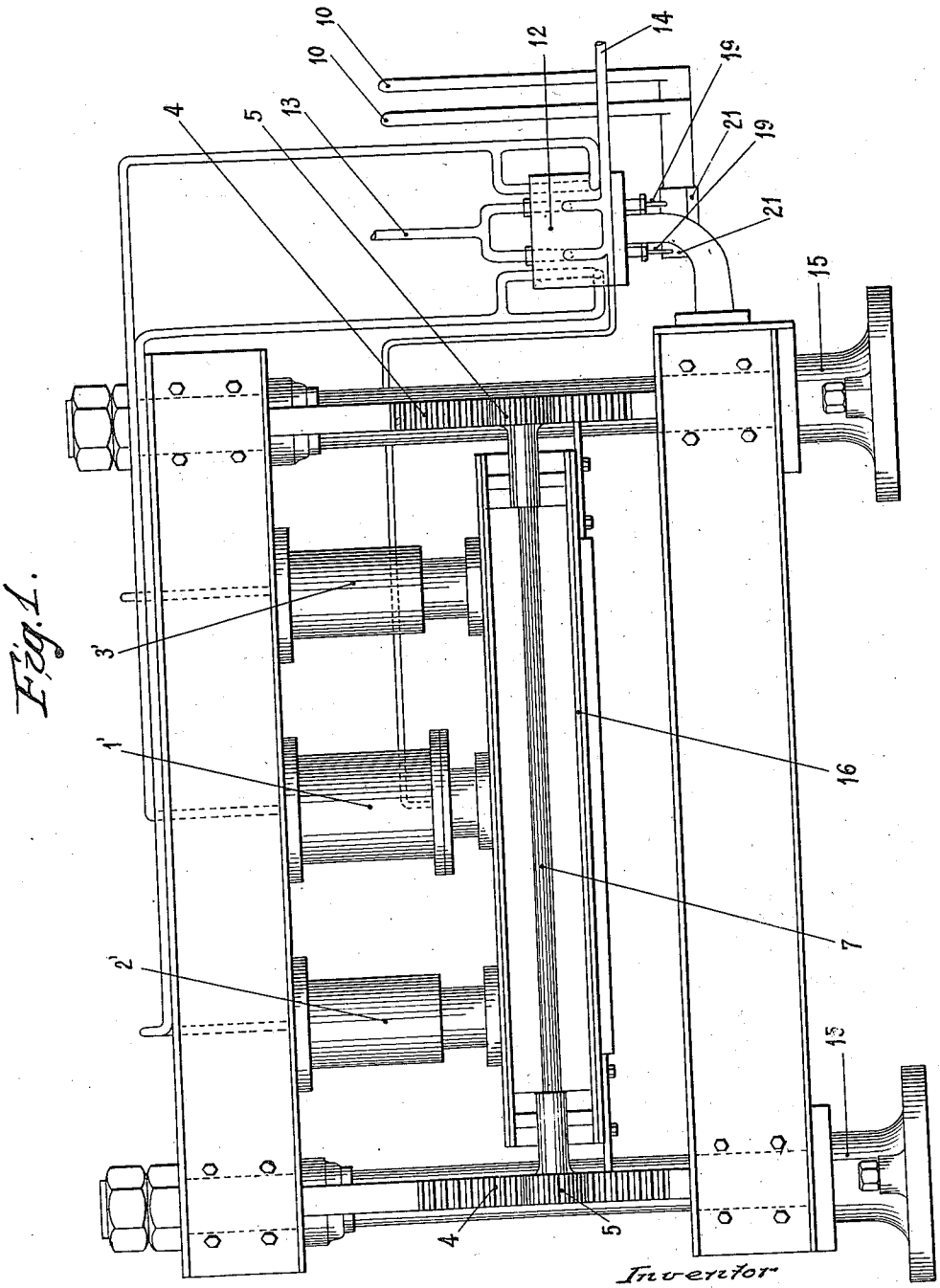


Fig. 1.

Inventor
J. S. Prius
By Joe Prius
His Atty.

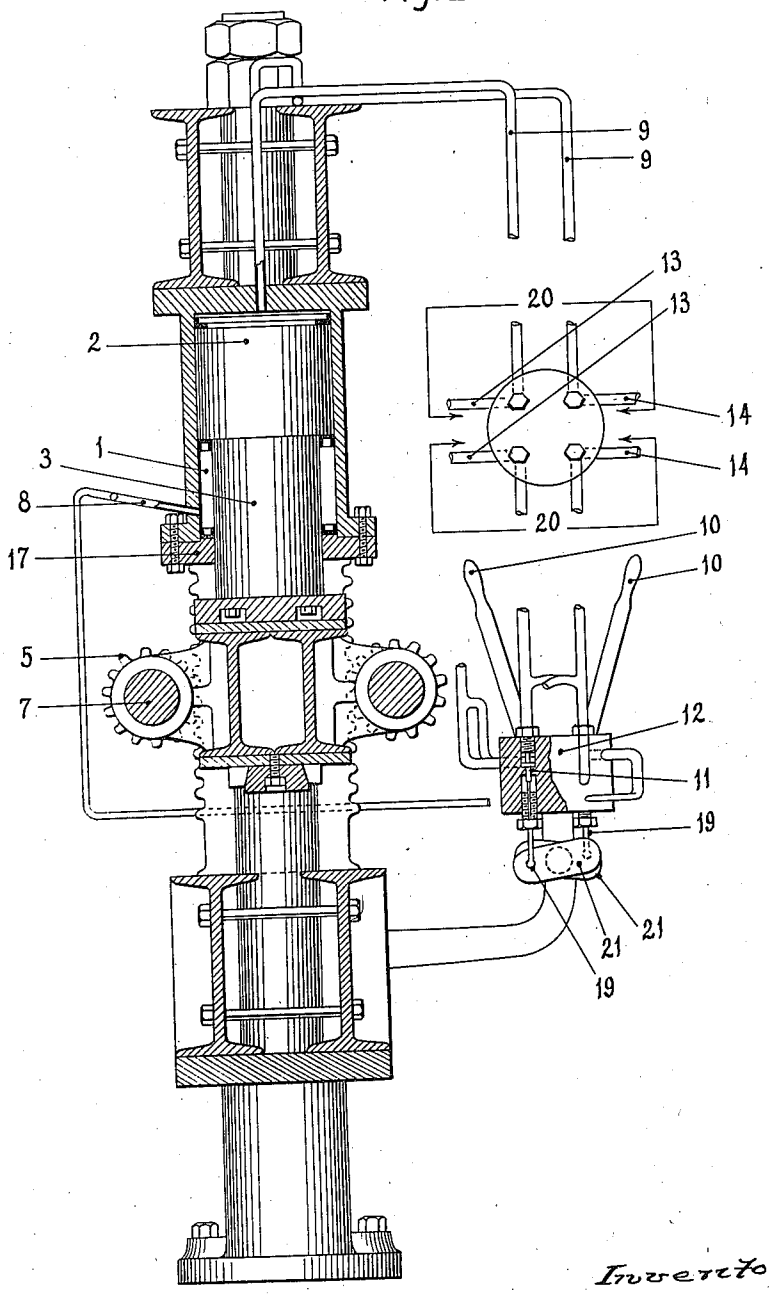
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Fig. 2



Inventor
J. S. Prius
By
His Atty

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J. S. PRIUS

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Fig. 3

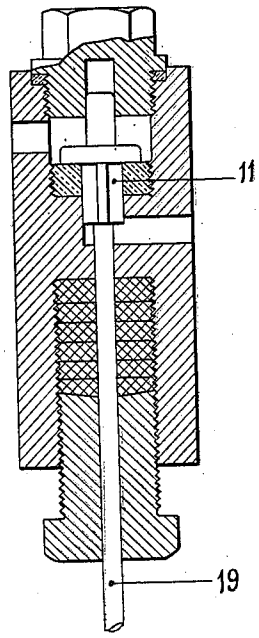
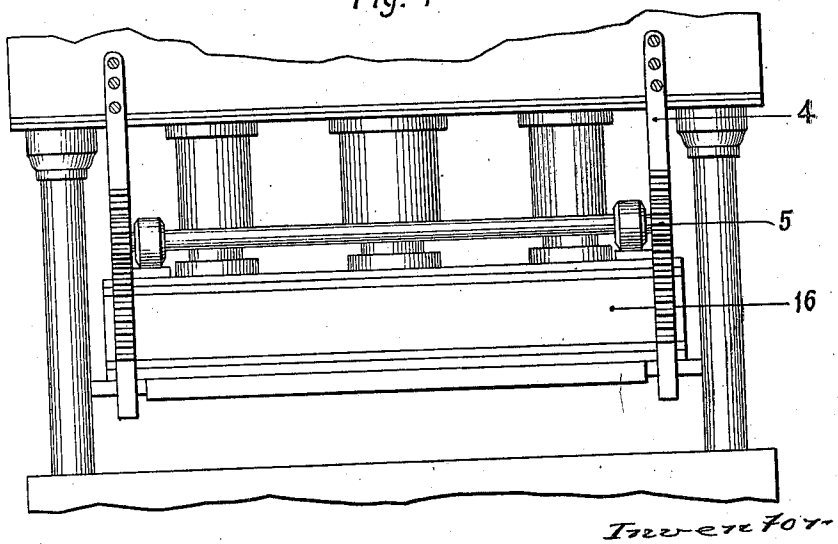


Fig. 4



Inventor
J. S. Prius
By
His Atty

Oct. 2, 1923. 1,469,689

J. S. PRIUS

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Fig. 5

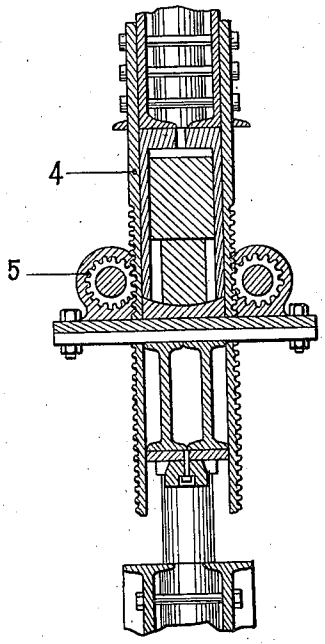
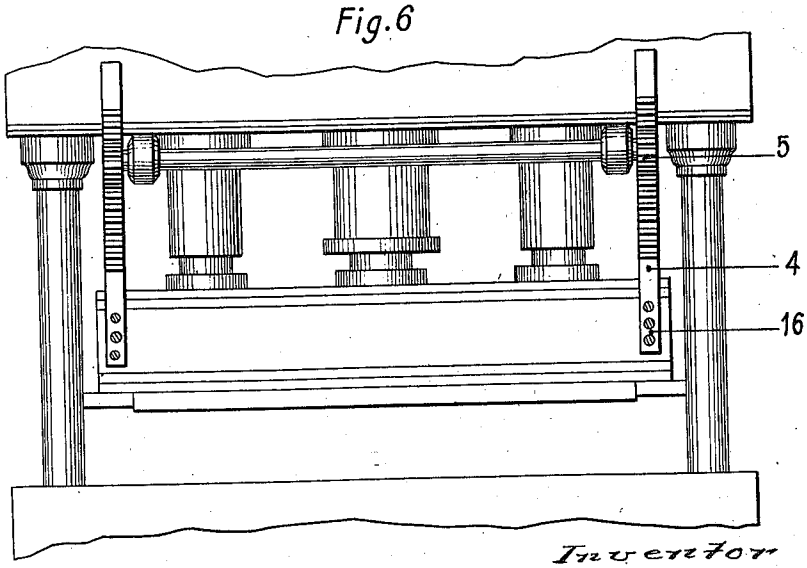


Fig. 6



Inventor
J. S. Prius
by [illegible]
his Atty

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J. S. PRIUS

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Fig. 7.

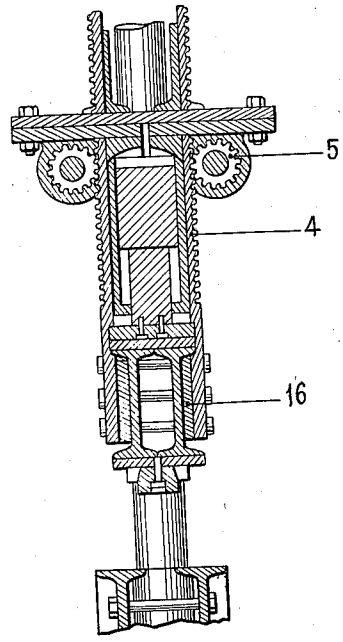
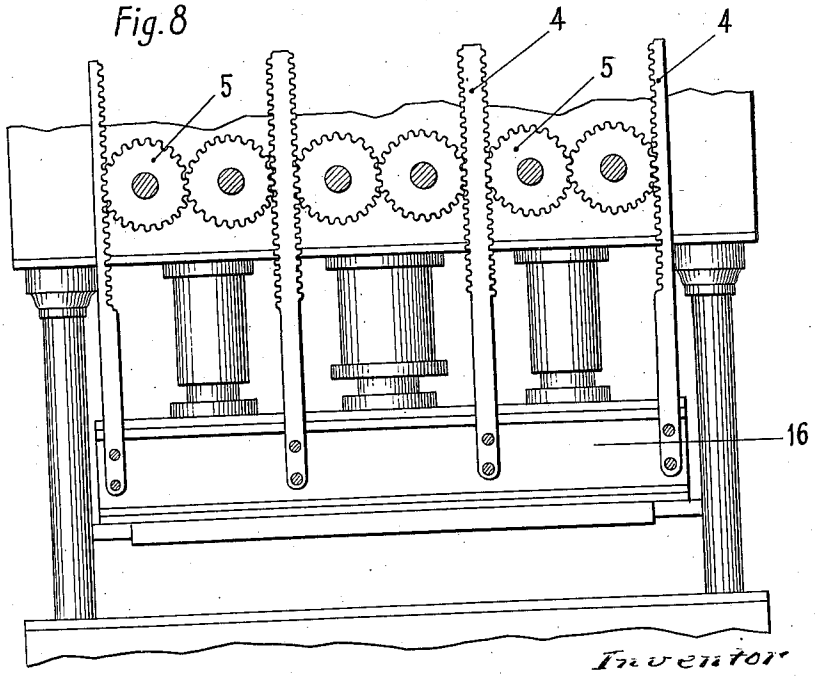


Fig. 8



Inventor
J. S. Prius
By [signature]
His Atty.

Patented Oct. 2, 1923. 1,469,689

UNITED STATES PATENT OFFICE.

JOSEPH SEGIMON PRIUS, OF BARCELONA, SPAIN.

HYDRAULIC PRESS.

Application filed November 14, 1919, Serial No. 338,128. Renewed March 5, 1921. Serial No. 449,768.

To all whom it may concern:

Be it known that I, JOSEPH SEGIMON PRIUS, subject of the King of Spain, residing at Barcelona, in the county of Barcelona and State of Spain, have invented certain new and useful Improvements in Hydraulic Presses; and hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention has for its object to ensure the movements of the ram or movable platen or press head to be always parallel, thus doing away with or reducing the guides and other devices so far employed for the purpose, and which made the construction of large presses to be very expensive.

To this end my invention consists in certain novel features and combination of parts which I will now proceed to briefly describe and particularly point out in the claims.

Fig. 1 is a side elevation of the press.

Fig. 2 is a vertical transverse section thru the central cylinder of the press showing a section of the valve for controlling the cylinders with a plan thereof in relative position above the section.

Fig. 3 is a detail view of one of the valves.

Fig. 4 is a partial side elevation showing a modification of the device, in which the rack bars are shown separated from the supports.

Fig. 5 is a sectional view showing the same arrangement as Fig. 4.

Fig. 6 is a side elevation of the press showing another modification.

Fig. 7 is a transverse sectional view of the modification shown in Fig. 6.

Fig. 8 is a side elevation showing still another modification of the device.

In the figures of the accompanying drawings are shown the toothed racks (4) placed in front of and behind the supporting standards or columns (15). Meshing with the toothed racks are two pinions of the same diameter (5) fastened to the free ends of each of the axles (7) which are mounted along each side of the rammer or movable platen (16). When this platen or press head is caused to move up and down by the cylinders, all the pinions of the axle meshing with the fixed racks are made to turn, and as the rotating motion is imparted from one end to the other, the axle and the movable platen fixed to it, are bound to descend to a level and in a horizontal position, so that their movements are always parallel and the developed pressure is therefore equal at their full length, with the great advantage, that by means of such a device, the need of guiding the pistons or the movable platen or both can be dispensed with altogether in a length sufficient to keep a perfect equilibrium while working; and as a consequence any guides or other like means may be suppressed or reduced to their minimum, the size of the cylinders and their pistons may be just long enough for the stroke, and the structure of the press can be simplified to the utmost, specially in those of large span. Consequently, by the described improvement, besides ensuring constant and perfect parallelism in all the movements of the movable platen, it results that all the presses and mostly those of large width between columns, can be constructed under far more economical conditions than has been heretofore possible.

The rammer or platen (16) is mounted below one, two or more hydraulic cylinders (1′, 2′, 3′) the pistons of which are turned in two sections of different diameters. The diameter of the upper section (2) of larger size, is equal to the bore of the cylinder. The lower section (3) has a smaller diameter and consequently there remains a hollow space between the piston and the wall of the cylinder (1) which is closed by the cylinder head (17) with a suitable packing. This hollow space is full of water supplied from the hydraulic main, by means of a pipe (8) connected directly to the main or through a valve gear, thus giving rise to an upward pressure for the return stroke of the whole system of pistons and rammer or platen, when the upper part of the cylinders remains without pressure and the outlet of water free. The ascending or lifting pressure in the hollow space may be continuous or interrupted, at will, according to requirements. Close to these cylinders there may be others constructed and arranged as usual, provided they answer the purpose of supplying the whole of the power required in the press. In the upper part of the cylinders are fitted the inlet and outlet pipes (9) for the hydraulic supply, the con-

nections with which are made through valve gear (12). The described cylinders may be inversely arranged, i. e., with the pistons above and the chambers below. As it may be seen, through this improvement, the return cylinders which are found in other presses are done away with and advantageously replaced by the hollow spaces of the cylinders that have been just described.

The valves of my invention, shown in longitudinal section and in enlarged scale in Figure 3 of the drawings, are distinguished by their quick working simply through a kind of lever switch. The valve disk (11) opens or closes the hydraulic supply, when it is moved up and down by means of a vertical spindle (19) placed below. Each valve is combined with another, both constituting one pair (20) the arrangement being such that the spindle of one of them is coupled to an end of a two armed lever (21) and the other to the opposite end of same. This lever swings in either direction around an axle in its centre, by means of another lever (10) coupled to said axle. In such a manner, when one of the two spindles is thrust upwards by one of the ends of the lever (21), the other is pulled down by the opposite end of same, thus opening and closing the respective valves of the pair. One of these two valves connects one cylinder or group of them, to the hydraulic main, and the other connects them to the water tank. By swinging the lever (10) in one direction, the hydraulic inlet to the cylinder is opened and the outlet closed, so that the cylinder pistons with the movable platen are caused to descend. By turning the said lever in the opposite direction, the hydraulic main inlet to the cylinders is closed and the outlet for the water opened, so that the cylinder pistons with the movable platen are caused to return upwards through the counter-pressure of the hollow spaces (1) of the cylinders. By placing the lever in the centre, both valves of the pair are closed so that the cylinder pistons remain stationary on account of the outlet of water being closed.

It is obvious that the principle of my invention may be modified in many ways, for instance, the toothed racks, instead of being fitted to the supporting pillars, might be mounted in a vertical position extending downwardly and secured to the top traverse and the axles with their pinions, on the press head or platen, so that by the meshing of the toothed racks with the pinions of the axle, the result would be quite the same (see Figures 4 and 5). Neither would the efficiency of the invention be affected if the toothed racks, instead of being stationary (since they are fitted to rigid parts of the press), and the axles with their pinions movable (on account of their being mounted on movable parts of the press), were both displaced to their opposite positions, the racks then becoming movable with the platen and the axles with their pinions mounted on the stationary portion of the press. This latter case is shown in Figures 6 and 7 of the drawings, where the toothed racks are vertically mounted on the movable platen and the axles with their pinions underneath the cross beam of the frame. In this manner, when the rammer moves up and down, the toothed racks partake of the same motion, and as they engage with the pinions fastened at the ends and along the stationary axles, they are bound to move uniformly and the rammer or movable platen is therefore caused to also move evenly. The same result would be attained if all the axles were omitted and all the toothed racks vertically mounted on the rammer were to be connected with each other, through some intermediate pinions or toothed wheels fitted along the top beam of the frame or any other rigid part of the press, where this purpose could be attained. (See Figure 8 of the drawing).

A three cylinder press is shown in the annexed drawing; the cylinders of both sides forming a group, and that of the centre independently, are connected to the system of valve gear. The pair of valves on the right hand side corresponds to the centre cylinder, and that on the left to the group of cylinders of both sides. Of the three cylinders, the centre one is made with the piston turned in two sections for the lifting or return stroke of the whole piston and movable platen system. End (14) receives the water from the hydraulic main and end (13) is connected to the well or water tank.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be operated, what I claim as new and of my own invention is:

1. In a hydraulic press, the combination of a frame, a plurality of cylinders mounted thereon, pistons movably mounted in the cylinders, a platen slidably mounted in the frame and connected with the pistons, stationary members and connected rotatable members, adapted to engage the stationary members, one set of said members being mounted on the frame and the other set of members on the platen and movable therewith.

2. In a hydraulic press, the combination of a frame, a plurality of cylinders mounted thereon, pistons movably mounted in the cylinders, a platen slidably mounted in the frame and connected with the pistons, toothed bars, and connected rotatable gears adapted to engage the toothed bars, said bars and gears being mounted so that one

is secured to the platen and the other to the frame.

3. In a hydraulic press, the combination of a frame, a plurality of cylinders mounted thereon, pistons movably mounted in the cylinders, a platen mounted on the pistons and slidable in the frame, shafts rotatably mounted on the platen, gears mounted on the shafts adapted to rotate therewith and rack bars mounted on the frame and in toothed engagement with said gears, whereby the gears being mounted to turn with the shafts and engaging the racks, will cause the platen to have an even movement in all points thereof.

In testimony whereof he has signed his name to this specification in the presence of two subscribing witnesses.

JOSEPH SEGIMON PRIUS.

Witnesses:

FERNANDO PERMIO,

DENERI T. DRUEM.