

N. SPERBER.

CRANK PRESS.

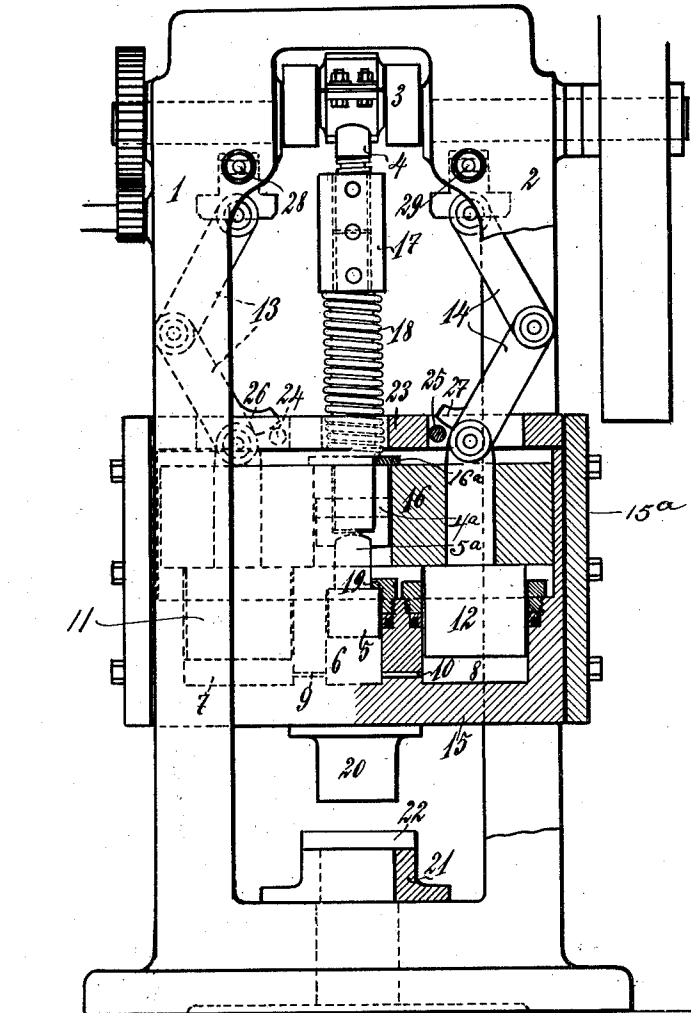
APPLICATION FILED MAR. 28, 1907.

905,601.

Patented Dec. 1, 1908.

4 SHEETS—SHEET 1.

Fig. 1



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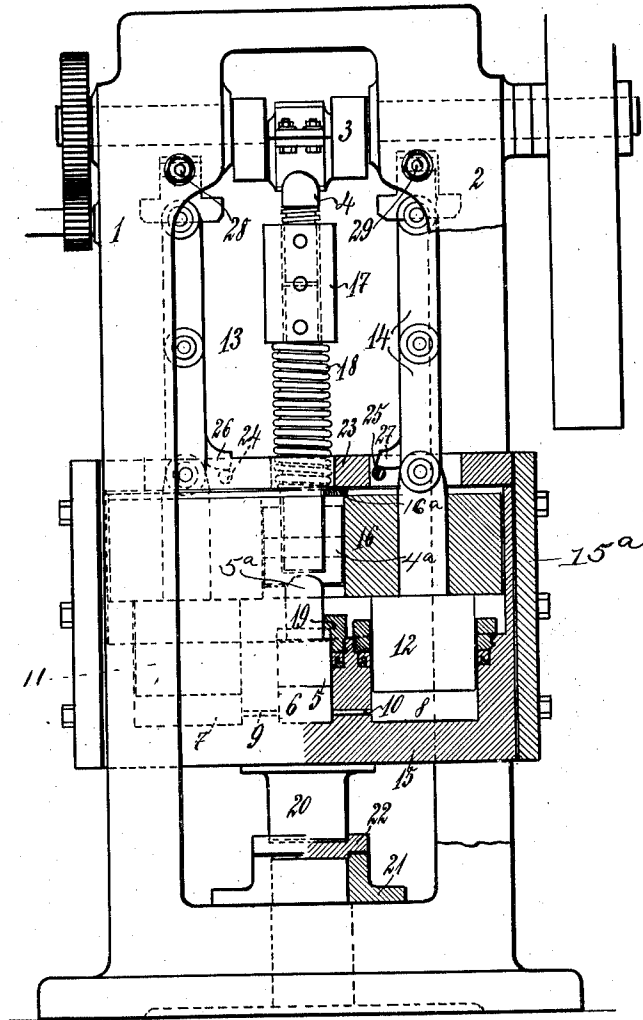
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Fig. 2



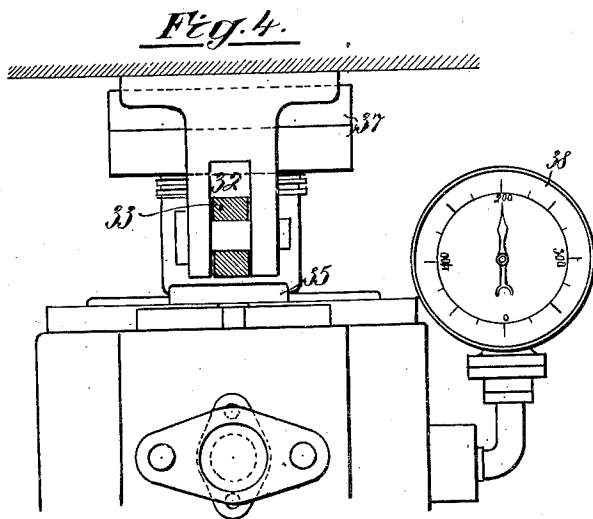
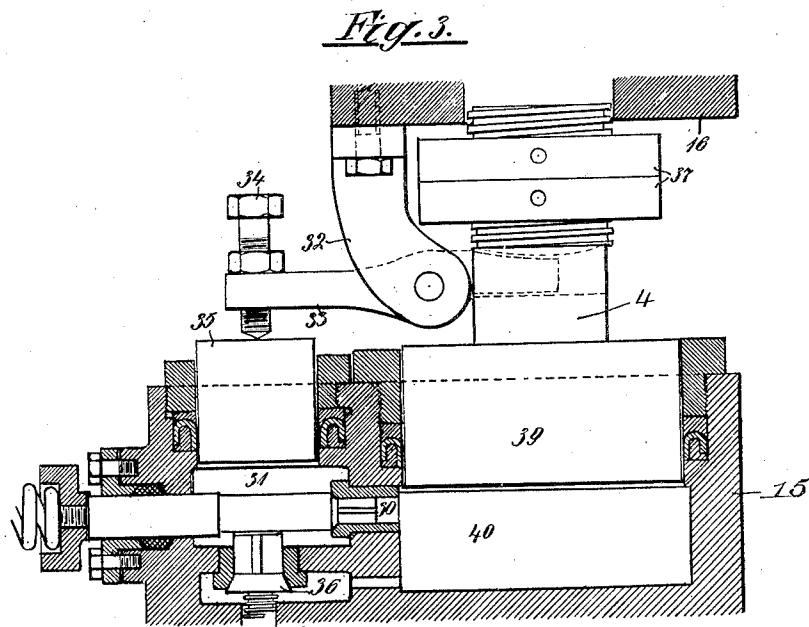
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4 SHEETS—SHEET 3.



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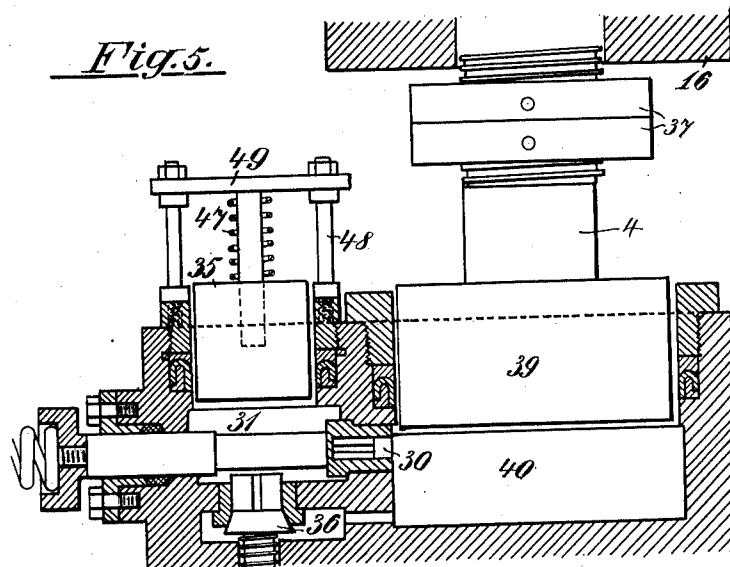
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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CRANK-PRESS.

No. 905,601.

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To all whom it may concern:

Be it known that I, NORBERT SPERBER, a subject of the King of Württemberg, Germany, residing at Paris, France, have invented certain new and useful Improvements in Crank-Presses; and I do 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.

The object of the present invention is a press for cutting, stamping and pressing which is characterized by the feature that an intermediate member is inserted in the direction of the pressure, in the stamping bar, which intermediate member is exchangeable and has a hydraulic action, and is provided with a safety valve; for the purpose of insuring on the one hand that the maximum pressure to be exerted by the press will not be exceeded, and to prevent a breakage of the stamp or of the crank shaft of the press, and further to give a determined maximum pressure to all the material to be stamped or pressed by means of the safety valve, which pressure is indicated by means of a pressure gage. Further to cause the maximum pressure permitted by the safety valve to operate during a certain course of the crank equally upon the work.

For presses of small power, the crank pressure is directly transmitted to the stamp by means of the intermediate member, whereas in heavier constructions the crank pressure is increased to a multiple corresponding to the differential mechanism arranged in the intermediate member and thereby a saving in power is obtained. With presses of ordinary construction the piston rod is rigidly connected with the platen bearing the stamp. In this construction it may happen that for instance in stamping medals or the like the stamp may be adjusted too low, or the workman operating the press may put in the blank to be impressed incorrectly, or put in two at once, or the material may be of different hardness. In all these cases the breaking of the press or the bending of the crank shaft is inevitable. On the other hand, for certain imprints, dies are used which can only support a fraction of the maximum pressure of the press. If one of the above mentioned cases occurs, then the die, which often represents a considerable cost, is inevitably spoiled. All these draw-backs are avoided by the in-

terposition of the exchangeable intermediate member, and moreover, power is economized.

In the accompanying drawing, Figures 1 and 2 illustrate an improved press in front elevation and partial section in two working positions. In each of these the intermediate member embodies differential pistons; Figs. 3 and 4 show the safety valve in section and elevation; and Fig. 5 shows a further modification.

The drive or crank rod 4 is suspended from the crank shaft 3 supported on the two uprights 1, 2, and driven by means of a drive pulley or gearing. To this crank rod 4 is attached by the pin 4^a at its lower end, the piston rod 5^a of the drive piston 5 which reciprocates in the drive cylinder 6. This cylinder is connected with the two pressure cylinders 7, 8, by means of the pipes 9, 10. The pressure pistons 11, 12 working in the two cylinders 7, 8 are suspended by the links 13, 14, which links press against the head of the uprights and support the pressure of the two pressure pistons. A platen 15 is removably mounted for vertical sliding movement between the upright supports 1 and 2, and contains the pressure cylinder, and on it there rests a cross-bar 16 serving to guide the pistons, which cross-bar is yieldingly depressed by means of the spring 18 bearing on the one hand against the adjusting nuts 17, and on the other hand against a loose collar or washer 16^a about the rod 4 above the piston rod 5^a and the cross bar 16, and which always returns the pistons 11 and 12 into their original position, by means of which the pressure water, forced during the pressing into the pressure cylinders 7 and 8, again returns to the cylinder 6, so that it is ready for a fresh pressing. The cylinder 6 is closed by means of a gland 19 which is formed as a stuffing box and serves as a connection for the platen when the piston 5 rises.

The operation of the device is as follows: On the descent of the crank rod and the piston 5, the platen 15 and the cross-bar 16 carried by it, which piece is in turn further pressed by means of the spring 18, are pushed down until the links 13, 14, have entered into their extended positions; at the same moment the stamp 20 is pressed upon the work 22 placed upon the matrix 21, (as shown in Fig. 2), and the pressing begins in such a manner that the piston 5 which has

still to move a considerable distance, forces the pressure water through the channels 9, 10, into the pressure cylinders 7 and 8 and consequently against the lower face of the pistons 11 and 12. The said pistons on their part rest through the now extended elbow levers 13, 14 against the heads of the supports 1, 2, and are thereby fixed, and consequently the platen 15 bearing the stamp is obliged to continue its motion downwards until the maximum pressure fixed by the safety valve has been reached, that is, until the crank has come to its lowermost position and is again commencing to rise. On the rising of the crank rod 4 and piston 5, the pressure water is again drawn out of the cylinders 7 and 8 into the cylinder 6, the piston 5 abutting against the gland 19 and the platen 15 and the cross piece with it are raised by the engagement of the collar 16^a between the upper end of the piston rod 5^a and the lower face of the frame 23. The pins 24, 25, placed in the upper frame 23 of the platen 15 project on rising against the projections 26, 27, of the levers 13, 14, and press them back when they rise further, until the uppermost crank position is attained, whereupon the operation is repeated. The wedges 28, 29, serve for the adjustment for height of the cross piece 16, while the pressure is regulated by means of the nut 17. The platen 15 with its contained cylinder and cooperating pistons constitutes an intermediate member between the power crank rod 4 and the stamp 20, and being held in place in the supports 1 and 2 by means of plates 15^a thereby being made removable and exchangeable for another platen having a system of cylinders of different size, which feature of construction enables the press to be adapted to the different circumstances of use as previously set out. The platen 15 may be removed as follows: The matrix 21 is removed from the base of the press, as is customary in a change of work, and the gland 19 is unscrewed and the end plates 15^a of the platen unbolted and removed, whereupon the pistons 11 and 12 are uncoupled from the links 13 and 14, say, at the lower pivotal joint. The platen is then free to drop, together with the pistons 11 and 12 and the cross-bar 16 until the bar 16 clears the pin 4^a, which is then driven out, releasing the piston 5 so it can drop back into its cylinder 6, the platen can now be slipped endwise from between the uprights 1 and 2 and other members substituted. The same cross-bar 16 can be reinstated with the substitute platen, and the rods of the new pistons 11 and 12 coupled to the links, with the rod of the new piston pinned to the crank rod 4. Thereupon, another matrix 21 corresponding to the new stamp 20 is put in place in the known manner, and the press is again ready for use.

In conjunction with the construction shown in Figs. 1 and 2, may be used the form of safety valve illustrated in connection with Figs. 3 and 4, said safety valve device being on the side opposite the observer in said Figs. 1 and 2, and in operative relation to the cylinder 6. Figs. 3 and 4 show the intermediate member without the differential pistons but with the safety valve and pressure gage in detail. Figs. 3 and 4 show a press in which the crank rods 4 act directly upon the pressure piston 39 which slides in the cylinder 40 whereby the latter is placed directly in the platen 15 supporting the die. To this cylinder 40 is attached the safety valve and pressure gage, wherein in the case of excessive pressure, the pressure water liberated flows through the safety valve 30 in the cylinder 31 and is again forced into the cylinder 40 on the rising of the crank shaft by means of the piston 35. To the bar 16 there is attached the fork 32 in which is located a two-arm lever 33. On the ascent of the platen 15 and piston 39 the lever 33 is turned by means of the piston rod upon its fulcrum, and the end of the lever 33 provided with a set-screw 34 acts upon the piston 35 and thereby presses back the pressure water contained in the cylinder 31 through the valve 36 into the cylinder 40, so that the piston 39 always remains at the predetermined initial pressure. The nuts 37 serve for the adjustment of the pressure piston 39 and for the connection of the platen 15 upwards with the driving parts. To the pressure cylinder 40 is attached a pressure gage 38 which indicates the pressure existing within the cylinder 40, and is consequently that whereby the safety valve 30 is adjusted. In certain cases where during the work circuit of the piston 39, pressure water is forced forward from the cylinder 40 through the valve 30 into the cylinder 31, it is advantageous to effect the pressing back of the pressure water through the valve 36 in the cylinder 40 by means of a spring 47 which latter rests against a cross-piece 49 supported by the pillars 48 as shown in Fig. 5.

Having thus fully described my invention, what I claim is:—

1. In a power press, the combination, with the work holder, the stamp, and the driving member, of power transmission means exchangeably inserted between the driving member and the stamp, said transmission means comprising provision to enable the degree of power applied to be altered as desired.

2. In a power press, the combination, with the work holder, the stamp, and the driving member, of power transmission means exchangeably inserted between the driving member and the stamp comprising a drive piston carried by the driving member, a

drive cylinder to receive the piston, a pressure cylinder communicating with the first cylinder, a pressure piston in the second cylinder, and a connection between the pressure piston and stamp, said transmission means comprising provision to enable the degree of power applied to be altered as desired.

3. In a power press, the combination with the work holder, the stamp, and the driving member, of a platen carrying the stamp, a drive cylinder in said platen, a drive piston carried by the drive member and moving in the cylinder, a plurality of pressure cylinders in the platen communicating with the drive cylinder, pressure pistons in the pressure cylinders, links suspending the pressure pistons from a fixed support and arranged when in a vertical position to act as upper abutments for the said pistons.

4. In a power press, the combination with the work holder, the stamp, and the driving member, of a platen carrying the stamp, a drive cylinder in said platen, a drive piston carried by the drive member and moving in the cylinder, a plurality of pressure cylinders in the platen communicating with the drive cylinder, pressure pistons in the pressure cylinders, links suspending the pressure pistons from a fixed support and arranged when in a vertical position to act as upper abutments for the said pistons, and means controlled by the ascending platen and acting upon the links to swing the same to one side to permit the pressure pistons to rise.

5. In a power press, the combination with the work holder, the stamp, and the driving member, of a platen carrying the stamp, a drive cylinder in said platen, a drive piston

carried by the drive member and moving in the cylinder, a plurality of pressure cylinders in the platen communicating with the drive cylinder, pressure pistons in the pressure cylinders, links suspending the pressure pistons from a fixed support and arranged when in a vertical position to act as upper abutments for the said pistons, and a safety valve arranged as an emergency outlet from the drive cylinders.

6. In a power press, the combination with the work holder, the stamp, and the driving member, of a platen carrying the stamp, a drive cylinder in said platen, a drive piston carried by the drive member and moving in the cylinder, a plurality of pressure cylinders in the platen communicating with the drive cylinder, pressure pistons in the pressure cylinders, links suspending the pressure pistons from a fixed support and arranged when in a vertical position to act as upper abutments for the said pistons, a supplemental reservoir formed as a cylinder, a piston moving therein, a safety valve arranged in an emergency outlet from the drive cylinders to the supplemental reservoir, a return passage from the reservoir to the pressure cylinder, a two-arm lever suitably fulcrumed with one arm in the path of the ascending pressure piston and the other arm bearing upon the reservoir piston whereby the water escaping through the safety valve is again returned to the pressure cylinder.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

NORBERT SPERBER.

Witnesses:

ARTHUR LÉON,
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