

1,407,162.

S. B. MINNICH.
PRESS.
APPLICATION FILED MAY 9, 1919.

Patented Feb. 21, 1922.

4 SHEETS—SHEET 1.

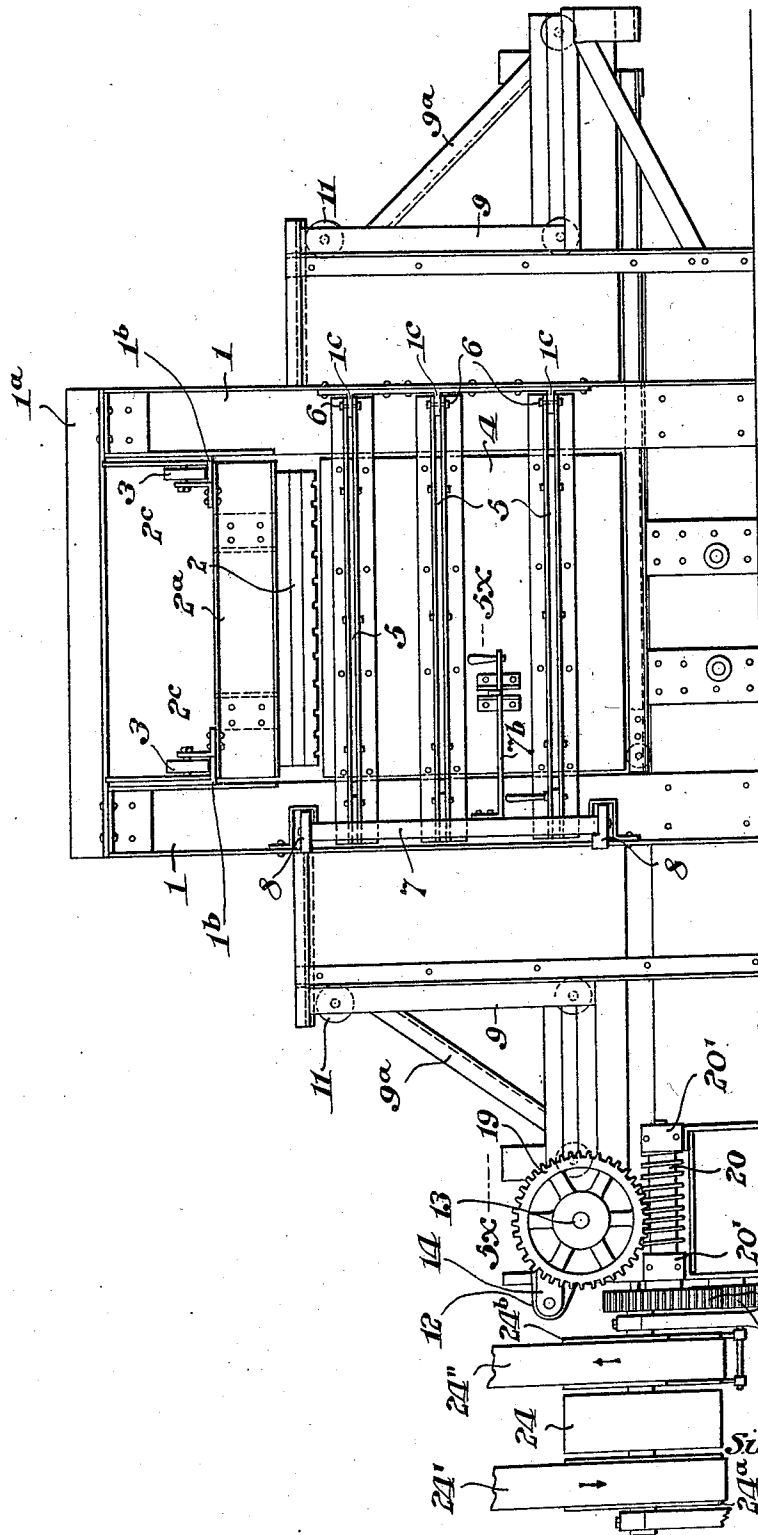


Fig. 1.

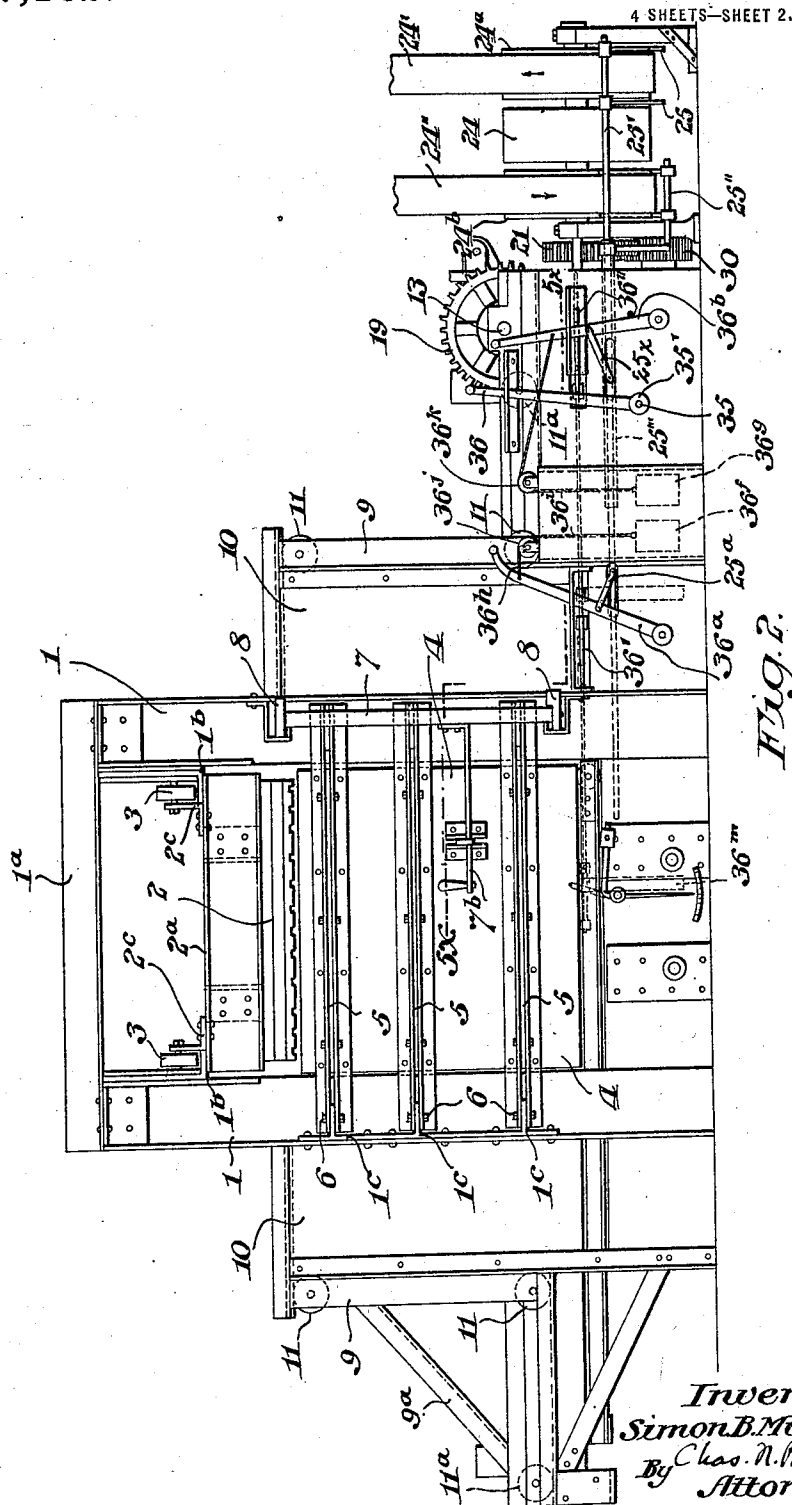
Inventor:
Simon B. Minnich,
Chas. M. Butler
By Attorney.

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4 SHEETS--SHEET 3.

Fig. 3.

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4 SHEETS—SHEET 4.

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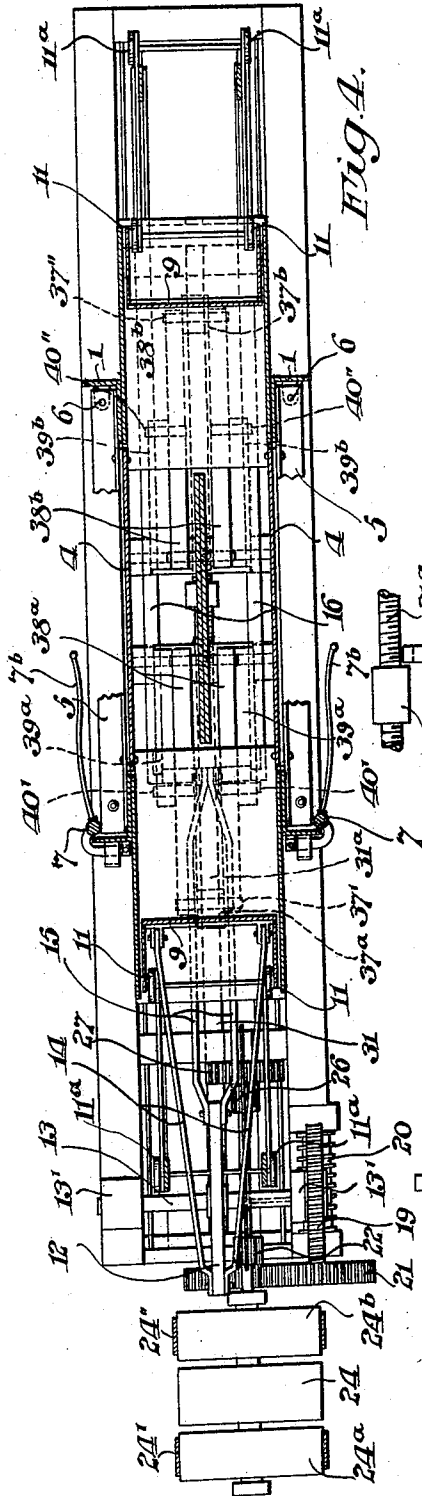


Fig. 4.

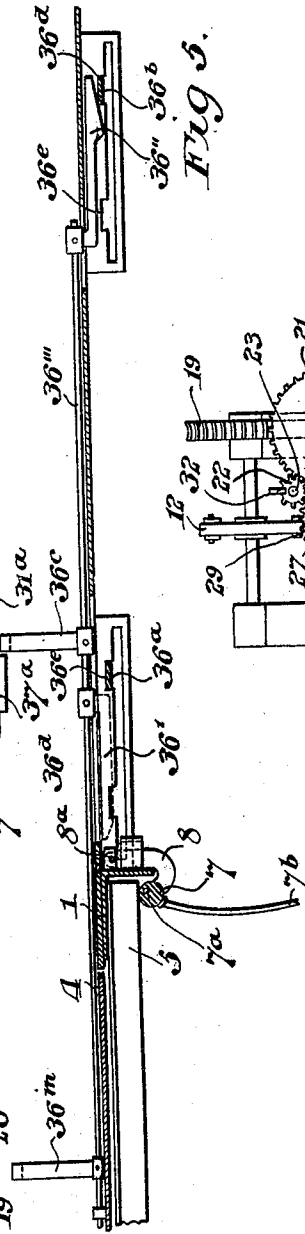


Fig. 5.

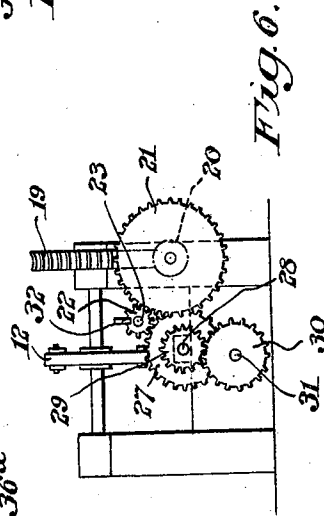


Fig. 6.

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UNITED STATES PATENT OFFICE.

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PRESS.

1,407,162.

Specification of Letters Patent.

Patented Feb. 21, 1922.

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To all whom it may concern:

Be it known that I, SIMON B. MINNICH, a citizen of the United States, residing at Landisville, in the county of Lancaster and State of Pennsylvania, have invented certain Improvements in Presses, of which the following is a specification.

My invention relates more especially to improvements in baling presses, but it is adapted for more general use.

The invention comprises improved means whereby plungers are operated in straight lines to press the materials transversely in succession so that the sides or ends of the bale may be pressed in first, to effect say half the consolidation, and then the bottom is pressed up to complete the consolidation, the operating mechanism being of such character that solid or full faced plungers acting uniformly over the surfaces pressed can be used and such plungers operate without lateral thrust on the frame.

The characteristic features and effects of the improvements are disclosed in the following description and the accompanying drawings in illustration thereof.

In the drawings, Fig. 1 is a side elevation of a press embodying my improvements; Fig. 2 is an elevation of the opposite side thereof; Fig. 3 is a longitudinal vertical sectional view through the same; Fig. 4 is a sectional view taken on the line 4^x—4^x of Fig. 3; Fig. 5 is a sectional view taken on the line 5^x—5^x of Fig. 2, and Fig. 6 is a detached sectional elevation of driving gears used in the construction.

The improved press, in the form thereof illustrated, is provided with a frame comprising the corner posts 1 having their tops connected by the parallel beams 1^a and the transverse parallel beams 1^b, the latter being angular in form to provide bearings for the press head.

The press head 2 is provided with the connected transverse beams 2^a and 2^b, the beams 2^a extending under the bearings 1^a which holds the head against upward movement. Bearings 2^c on the beams 2^a carry the wheels 3 which run on the beams 1^b, the latter providing rails whereby the head can be moved transversely with relation to the frame.

The sides 4 of the press are fixed to the angle bars 5, which are arranged in pairs hinged by the pintles 6 to the bearings 1^c on

posts 1, the angle bars extending across the members 4 so that their free ends may bear against the opposite posts 1, the sides 4 lying between such posts and being fixed in place by the engagement of lock bars 7 with the free ends of the bars 5.

The bars 7 are mounted eccentrically by the bearings 7^a on the arms 8, which have the pivotal bearings 8^a on posts 1 so that such bars can be swung to and fro across the ends of the bars 5, handles 7^b serving to turn the respective bars 7 in contact with the bars 5 to clamp the latter against the posts 1.

The ends of the press comprise the plungers 9 which are movable in the ways or housing 10 of rectangular cross section and fixed between opposite posts 1. The plungers 9 are provided with the rollers 11, which bear against the top and bottom of the respective housings 10, and with the truss members 9^a and 9^b, connected by the cross-braces 9^c, the parts 9^b having on their rear ends the rollers 11^a which run on the tracks 10^a parallel with the bottoms of the housings.

A lever 12, which is fixed on a shaft 13 journaled in the bearings 13¹, has its outer end connected by links 14 with the nearer plunger 9 and its inner end connected by links 15 with the bars 16, the latter being fixed to the other plunger 9 through the parts 9^a, 9^b and 9^c. Rollers 17 on the ends of the bars 16 connected with the links 15 run on the rails 18 as a support for these members.

It will be understood that when the shaft 13 is turned and the lever 12 rocked, the latter acts through the links 14, 15 and 16 to move the plungers 9 simultaneously in opposite directions.

The shaft 13 has fixed thereon a worm wheel 19 which is revolved by its engagement with a worm shaft 20 journaled in the bearings 20¹, the shaft 20 having fixed thereon a driving spur wheel 21. The wheel 21 is adapted to be engaged and driven by a pinion 22 splined on the shaft 23 which is journaled in the bearings 23¹, the shaft being revoluble in opposite directions in any suitable manner as by its provision with the fixed pulley 24 and the idle pulleys 24^a and 24^b adapted for engagement alternately with the respective oppositely running belts 24¹ and 24¹¹.

A belt shifter 25 is provided with a reciprocating rod 25¹ which is connected by a link 25^a with an operating lever 36^a, for shifting the belt 24¹, and a belt shifter 25¹¹ is connected through a hollow rod 25¹¹¹ on the rod 25¹ and a link 25^x, with a lever 36^b, for shifting the belt 24¹¹.

Cams 36¹ and 36¹¹, connected by the rod 36¹¹¹ having an operating arm 36^e thereon, are reciprocated between the respective notches 36^d and 36^e in which the levers 36^a and 36^b are adapted to be engaged, the cams periodically knocking off the levers, which are then operated by the respective weights 36^f and 36^g, connected therewith by the straps 36^h and 36ⁱ passing over the respective pulleys 36^j and 36^k, to shift the belts.

A pinion 26 is splined on the shaft 23 and is adapted for engaging and driving the spur wheel 27 which is fixed on the shaft 28 journaled in the bearings 28¹. A pinion 29, fixed on and driven by the shaft 28, engages and drives the spur wheel 30 which is fixed on and revolves a worm shaft 31 journaled in the fixed bearings 31¹, the shaft having the oppositely turned threads or worms 31^a and 31^b on sections thereof.

A yoke 32 connects the pinions 22 and 26, and contains the slots 32¹ wherethrough pass the bearings 32^a on which it slides. The yoke is reciprocated by an arm 33 connected therewith through a link 34 and fixed to a shaft 35 journaled in a bearing 35¹, the shaft being rocked by an arm or handle 36 fixed thereon.

It will be understood that when the pinion 22 engages the spur wheel 21 to operate the end plungers 9 through the intermediate mechanism described, the pinion 26 is out of engagement with the spur wheel 27 and the shaft 31 is at rest, being disconnected from the driving mechanism. But when the pinion 26 is engaged with the spur wheel 27 to drive the shaft 31, through the intermediate mechanism described, the pinion 22 is disengaged from the spur wheel 21, disengaging the plungers 9 from the power.

A bottom plunger 36^w, movable vertically between the inner ends of the ways 10 and directly beneath the head 2 when in operating position, is reciprocated by the revolution of the shaft 31, which acts through the nuts 37^a and 37^b movable in opposite directions along the shaft by their engagement with the respective oppositely threaded sections 31^a and 31^b thereof, the oppositely inclined struts 38^a and 38^b pivotally connected to the respective nuts by the bearings 37¹ and 37¹¹ and to the plunger by the bearings 36^x and 36^y, and the oppositely inclined struts 39^a and 39^b fulcrumed on the respective stationary bearings 39¹ and 39¹¹ and pivotally connected to the struts 38^a and 38^b by the pins 40¹ and 40¹¹. The several turning points 37¹, 37¹¹, 39¹ and 39¹¹

lie in the same plane and the distances from the respective points of connection 40¹ and 40¹¹ to such turning points are equal.

It will be understood that when the shaft 31 is turned clockwise, viewed from the end to which power is applied, the nuts 37^a and 37^b are drawn toward each other and the struts 38^a and 38^b (acting against the respective struts 39^a and 39^b) are moved from the oppositely inclined position, when the plunger 36^w is withdrawn, to the vertical position when such plunger has reached the limit of its upward stroke. The resultants of the compression in the respective struts is always vertical so that there is no tendency to move plunger laterally and the power transmitted thereto increases as it approaches the position requiring the maximum compression, due to the straightening of the toggles and the lengthening of the power arms of the struts.

In the operation of the filled press (the sides 4 being locked in closed position, the head 2 being positioned over the space between such sides and the plungers 9 and 36^w being retracted) the lever 36^a is operated to throw the slide 32 and engage the pinion 22 with the spur wheel 21 and the shaft 23 is revolved by the belt 24¹¹ running in the direction of the arrow on the pulley 24, the belt 24¹ now being on the idle pulley 24. The wheel 21, revolved thereby, revolves the worm shaft 20, which acts through the parts 19, 13, 12, 14, 15 and 16 on the plungers 9. These plungers are moved toward each other until they reach the inner limits of their housings 10 and thus effect their work in reducing the bulk of the goods, being held in this position by the action of the worm shaft 20 on the wheel 19 when disconnected from the power or prime mover. The plungers 9 having reached the limits of their inward movements, the lever 36^a is shifted in the opposite direction, the pinion 22 is disengaged from the spur wheel 21 and the pinion 26 is engaged with the spur wheel 27. The wheel 27 now acts through the parts 28, 29, and 30 to revolve the shaft 31 clockwise, feeding the nuts 37^a and 37^b toward each other and elevating the plunger 36^w to complete the compression. The reverse movements of the plungers are effected by shifting the belt 24¹ from the pulley 24 to the pulley 24^a and the belt 24¹¹ from the pulley 24^b to the pulley 24.

As the nut 37^a approaches the limit of its movement, along the shaft 31^a in the operation of advancing the plunger 36^w, it strikes the arm 36^m on the rod 36¹¹¹ which is shifted and causes the cam 36¹¹ to knock the lever 36^b out of engagement with its notch 36^d, whereupon this lever is thrown by its weight 36^g and acts through the parts 25¹¹¹ and 25¹¹ to shift the belt from the driving pulley 24 to the idle pulley 24^b. In

the operation of retracting the plunger 36^v, as it reaches the limit of its rearward movement the nut 37^a strikes the arm 36^c, shifts the rod 36¹¹¹ and causes the cam 36ⁱ to knock the lever 36^a out of engagement with its notch 36^a, the weight 36ⁱ then acting through the parts 25^a, 25ⁱ and 25 to throw the belt 24ⁱ from the driving pulley 24 to the idle pulley 24^a.

10 It will be seen that this construction, by which the sides or ends of the bale are first pressed in by solid plungers moving through parallel positions and then the bottom pressed up by a plunger moving through parallel positions, effects not only a more uniform consolidation but avoids the excessive depth or head room required for operating large presses having a single vertically acting plunger.

20 Having described my invention, I claim:

1. A press having plungers movable in straight lines to and from each other constantly in parallel position, a plunger movable transversely to the lines of movement of said plungers first named, means comprising a lever having its opposite ends connected therewith, for moving said plungers first named simultaneously toward each other to effect compression of materials held between them and means comprising pivotally connected struts for thereafter moving said plunger to effect further compression of said materials.

2. A press having plungers movable in straight lines to and from each other constantly in parallel positions, housings in which said plungers are movable, means for moving said plungers simultaneously toward each other to compress materials held between them, a plunger movable transversely to the lines of movements of said plungers to compress said material, and means comprising pivotally connected fulcrumed struts of equal lengths from their pivotal connections to their respective fulcrums whereby said plunger is movable to compress said material subsequently to its compression by said plungers.

3. A press having oppositely acting plungers, means for reciprocating said plungers so as to effect their movements simultaneously in reverse directions, a plunger acting transversely to said plungers, fulcrumed main struts having pivotal connections with said plunger and oppositely inclined in the retracted position thereof, and auxiliary struts having pivotal connections with said main struts and fulcrumed in the plane of the fulcrums thereof, the distances of the pivotal connections to the fulcrums being equal whereby said connections second named are drawn together and communicate thrusts through said struts to said plunger.

4. A press having a plunger, fulcrumed struts having pivotal connections with said

plunger, means connected with said struts for swinging them simultaneously in opposite directions to reciprocate said plunger, and a fulcrumed strut pivotally connected to each of said struts first named, the struts pivotally connected together being oppositely inclined in the retracted position of said plunger, having their fulcrums in a common plane and the same lengths from their respective fulcrums to their pivotal connections together.

5. A press having a plunger, struts having pivotal connections with said plunger, bearings on which said struts are adapted to turn, means for moving said bearings simultaneously in opposite directions, struts having pivotal connections with said struts first named and bearings for said struts second named, said bearings being in the same plane substantially and said struts having a like distance from their connections together to their connections with said bearings.

6. A press having oppositely acting plungers, means comprising a lever having its opposite ends connected therewith for moving said plungers simultaneously in opposite directions, a plunger acting transversely to said plungers, struts connected with said plunger, bearings on which said struts are adapted to turn and by which they are turned relatively to said plunger, struts having turning connections with the respective struts first named, stationary bearings on which said struts second named are adapted to turn, and means comprising a screw for simultaneously moving said bearings first named in opposite directions.

7. A press having a plunger, a journalled shaft having oppositely threaded sections, bearings threaded on the respective sections aforesaid, oscillatory struts having pivotal connections with said plunger and bearings, stationary bearings, and oscillatory struts having pivotal connections with said struts first named and said stationary bearings, the distances from the connections between said struts to their respective bearings aforesaid being equal.

8. A press having oppositely acting reciprocatory plungers, a worm shaft, a lever fixed on said shaft, means connecting oppositely acting arms of said lever with said plungers to effect their reciprocation, a journalled power shaft, and means comprising a worm gear whereby said power shaft is adapted to revolve said worm shaft in opposite directions.

9. A press having oppositely acting plungers, a journalled shaft, a worm wheel fixed on said shaft, a lever fixed on said shaft, means connecting oppositely acting arms of said lever with said plungers to effect their movements simultaneously in opposite directions, a journalled worm shaft engaging said wheel, a driving shaft, means for revolving

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said driving shaft alternately in opposite directions, a gear splined on said driving shaft and a driving gear on said worm shaft adapted to be engaged and disengaged by
5 said shift gear.

10. A press having oppositely acting plungers, a plunger acting transversely to said plungers first named, a journalled worm shaft, a lever on said shaft, means connecting
10 opposite arms of said lever with said plungers first named to move them simultaneously in opposite directions, a second journalled worm shaft, means operated by said

worm shaft last named to reciprocate said plunger, a journalled power shaft, means 15 for revolving said power shaft in opposite directions, gears movable along and revolved by said power shaft, means for simultaneously shifting said gears along said shaft, and gears whereby the respective gears 20 aforesaid are adapted to operate said shafts alternately.

In testimony whereof I have hereunto set my name this 7th day of May, 1919.

SIMON B. MINNICH.