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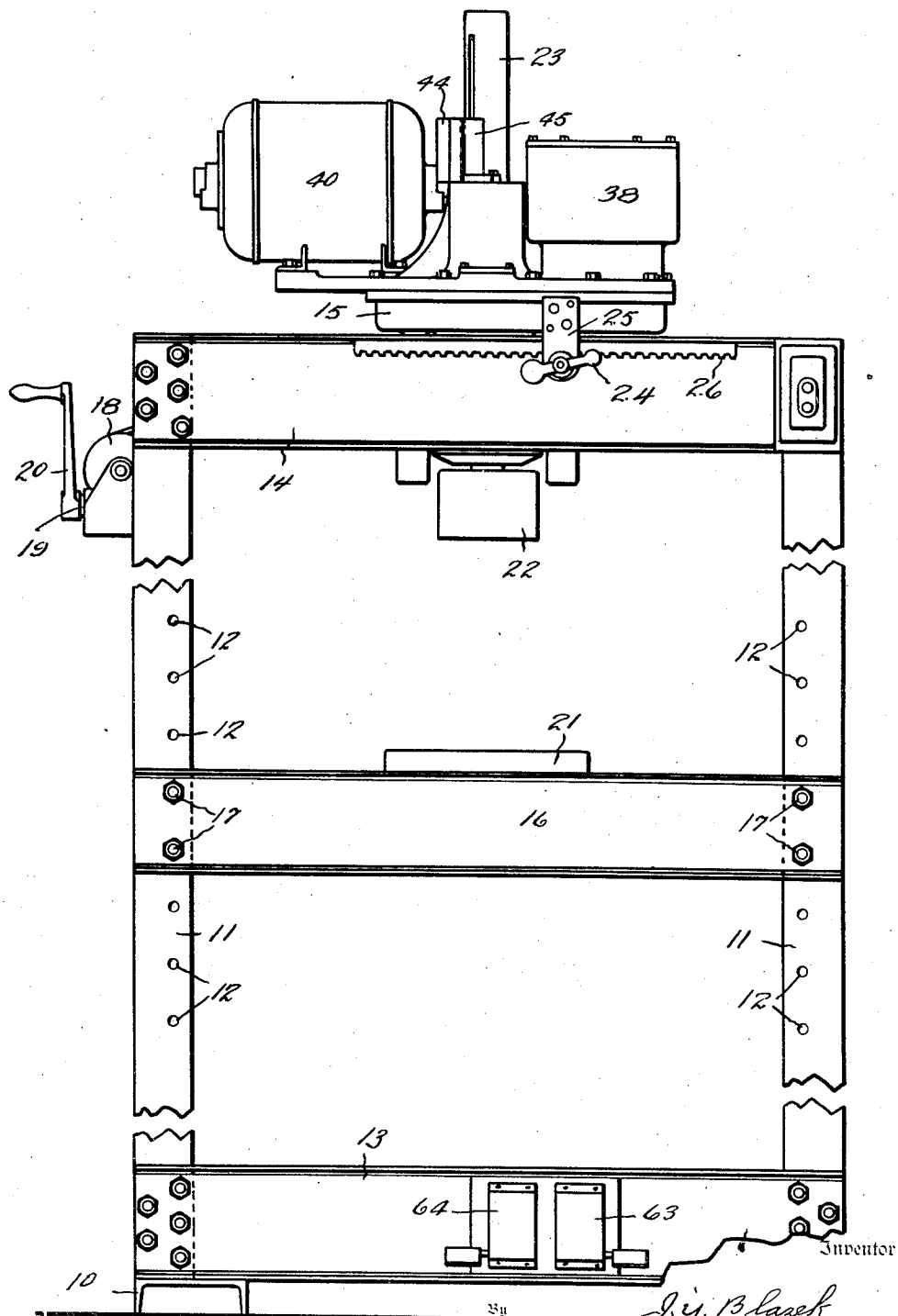
J. Y. BLAZEK ET AL

1,977,423

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Filed Feb. 10, 1933

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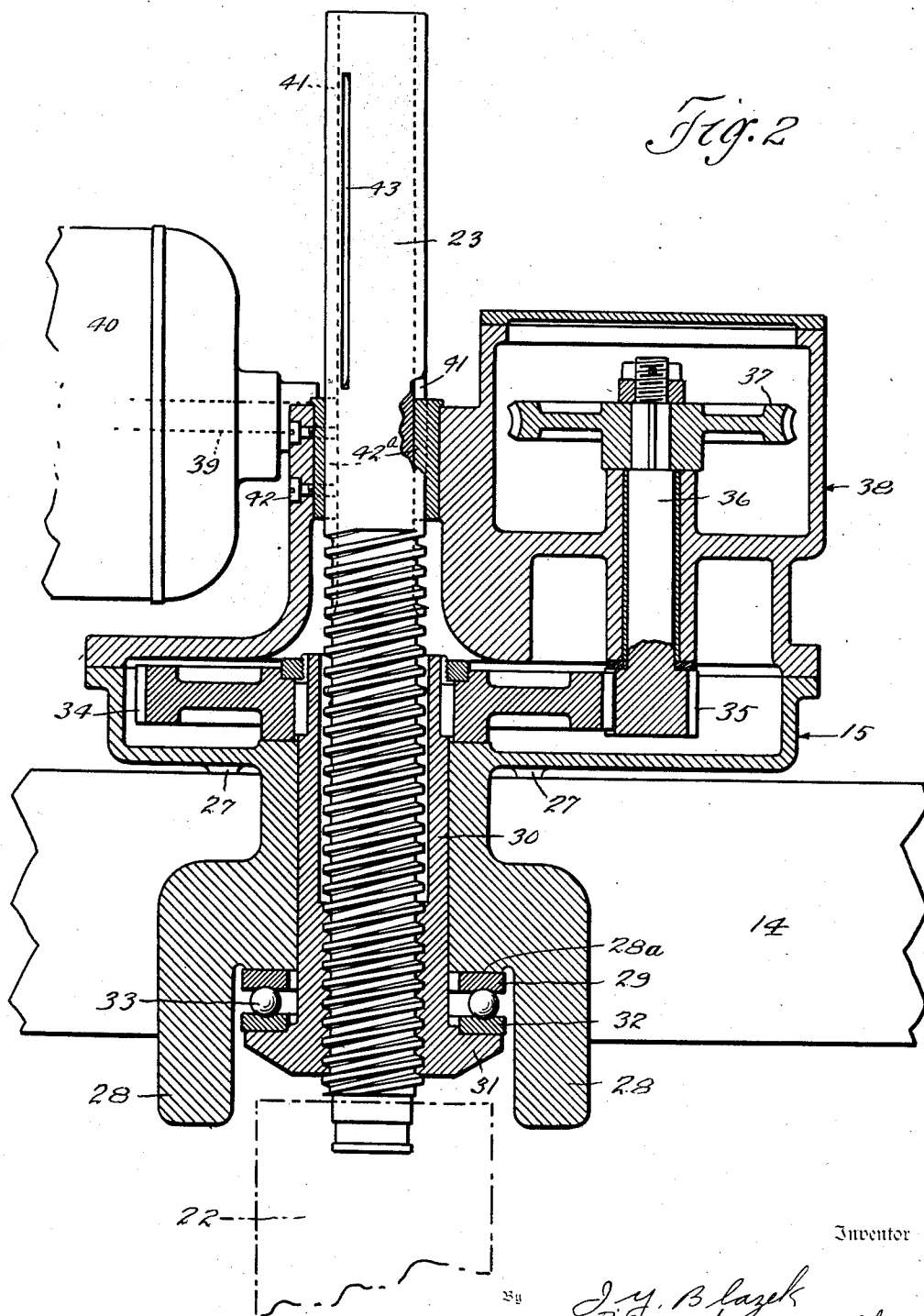
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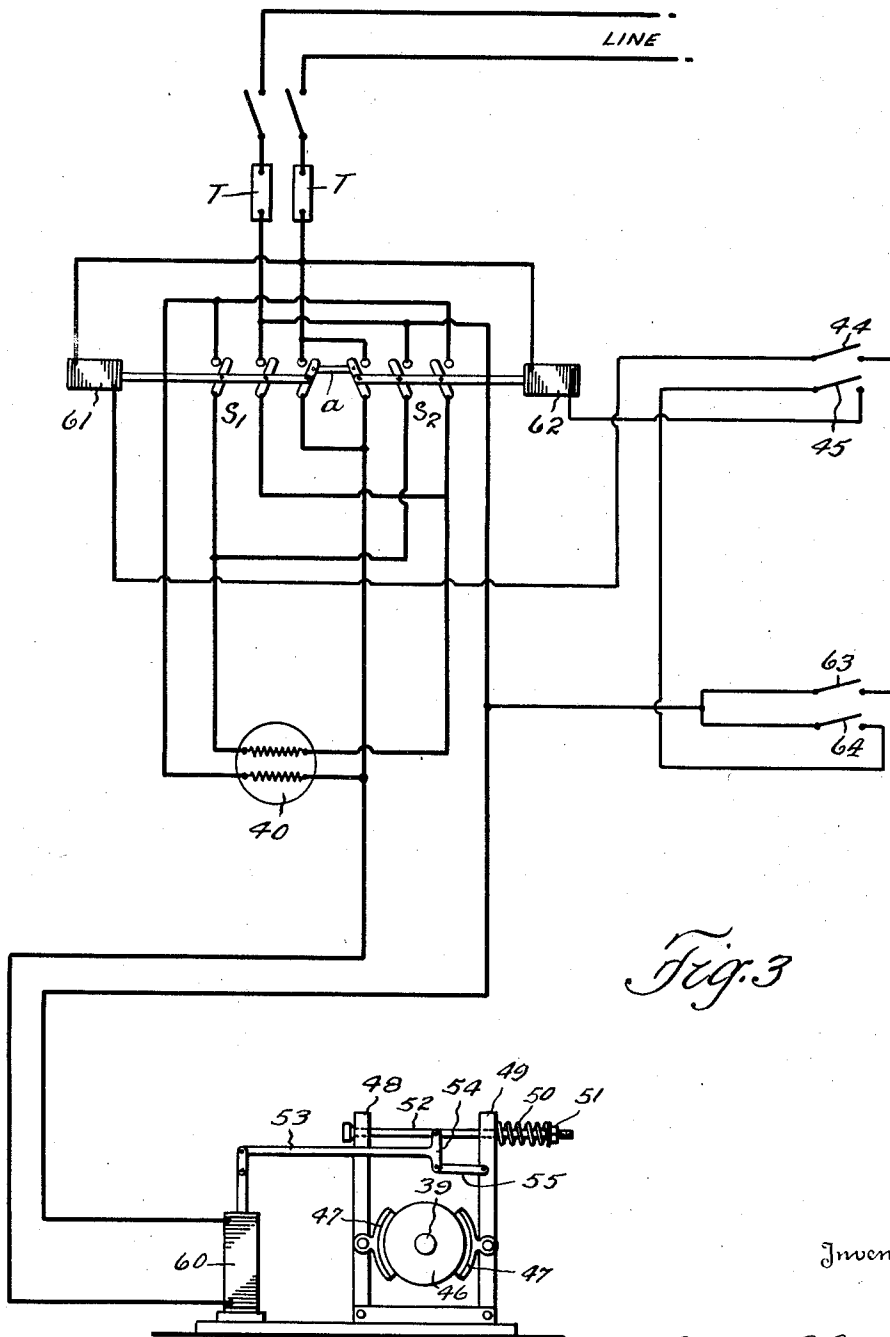


Fig. 3

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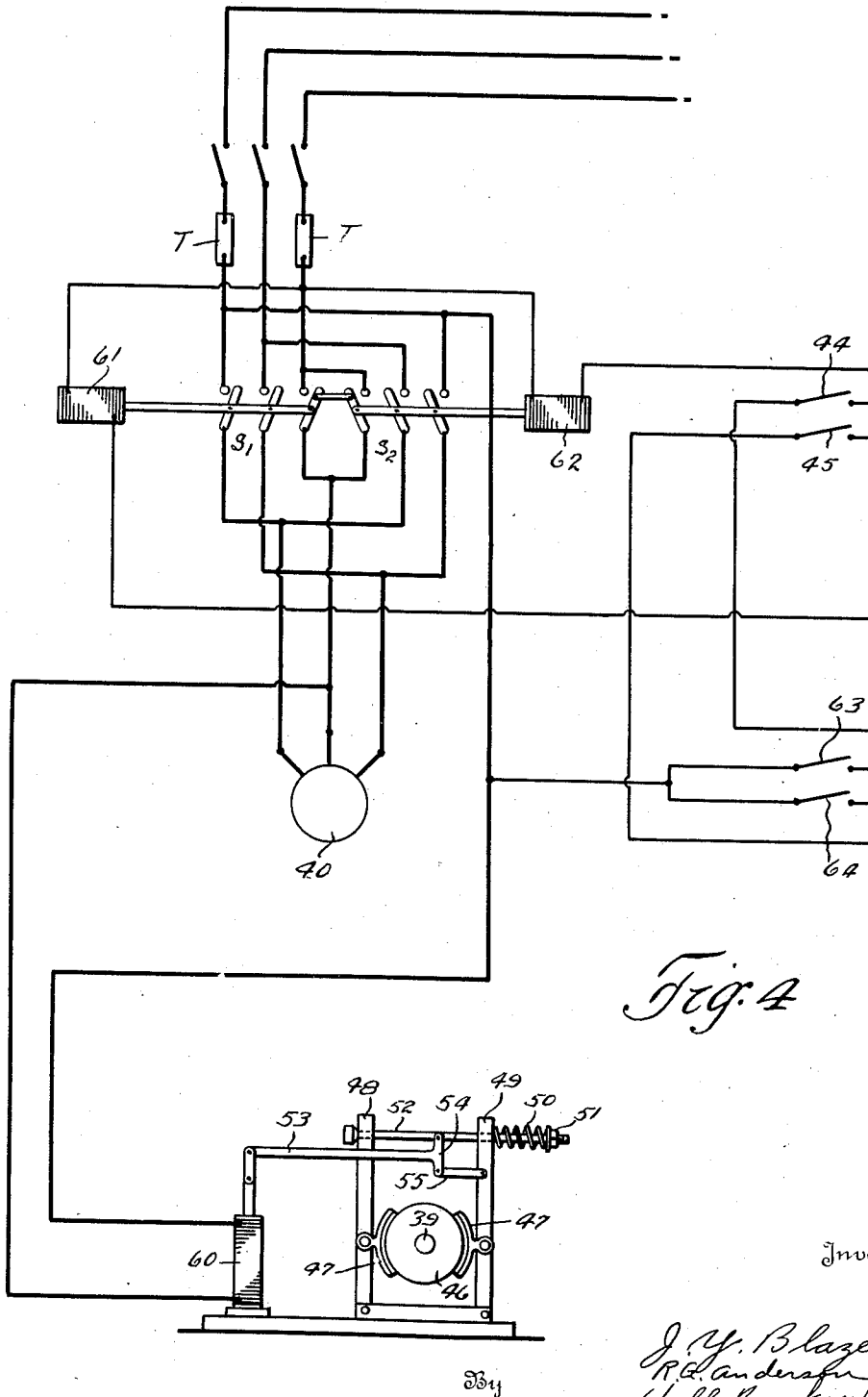


Fig. 4

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UNITED STATES PATENT OFFICE

1,977,423

PRESS

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4 Claims. (Cl. 29—85)

This invention relates to a screw type press and has for its object to provide a particularly sturdy, convenient and high power press of unusually small size, considering its capacity, and to overcome numerous problems encountered in the operation of presses of this type as will be hereinafter more fully pointed out and particularly set forth in the claims.

The embodiment of our invention herein shown and described has been designed especially for use in garages but is well adapted for analogous uses in other shops requiring a press of large capacity which will occupy a relatively small space.

In the drawings, Fig. 1 is a general elevational view showing certain parts broken away to bring the entire device within the compass of the drawings; Fig. 2 is an enlarged fragmentary detail sectional view showing the mounting of the screw threaded plunger and driving means therefor; Fig. 3 is a wiring diagram for direct current or single phase alternating current drive and Fig. 4 is a wiring diagram for a multi-phase alternating current drive.

Referring now to the drawings, the numeral 10 indicates base members extending transversely of the press and affording support to the machine. The members 10 may extend a few feet on each side of the relatively narrow upright portions of the press. Secured to and extending upwardly from the members 10 are uprights 11 of channel cross section and provided with a series of openings 12 through both flanges of the channel. Secured to each side of the members 11 and to the base members 10 are channel members 13. Secured to both sides of the uprights 11 at the upper end thereof are similar channel members 14 which by this arrangement are spaced apart from each other the thickness of the channel members 11 thereby affording a space through which may extend a casting 15. Extending across the uprights and movable up and down with respect thereto is a table 16 composed of a pair of channel members similar to those 13 and 14 spaced apart a distance very slightly greater than the thickness of the channel members 11 and firmly secured together in such spaced relation between said upright channel members. At each end of the table 16 the channel members making up the same are provided with openings adapted to receive pins 17 extending through both such channel members and both flanges of the channel members 11 through the adjacent pairs of openings 12. The table 16 may be elevated and lowered when the pins 17 are removed therefrom by means of cables attached thereto at each end, one passing directly

to a drum 18 and the other passing over a pulley and then to the drum 18. The drum is operated by a worm gear which is in turn rotated by a worm non-rotatably fixed with respect to a shaft 19 operated by a crank 20. A work support 21 may rest upon the table 16 and receive the work to be operated upon by the press. This work support will preferably be slidable with respect to the table 16 whereby it may be aligned with the lower end 22 of the press plunger 23 when the power plant carrying said plunger is moved from side to side.

It will be seen by reference to Fig. 1 that the casting 15 which rests upon the upper surfaces of the members 14 can be moved from side to side therealong by means of a pinion operated by a crank 24, supported by a bracket 25 and meshing with a rack 26 fixed with respect to one of the members 14.

By reference to Fig. 2 it will be seen that the casting 15 has restricted projections 27 on the lower surface thereof for movement back and forth upon the upper surfaces of the members 14 with a limited amount of friction. This casting has a central portion extending downwardly between the channel members 14 and terminating in right angular projections 28 extending underneath the lower surfaces of both the channels 14 and adapted to engage such surfaces and support the compressive force exerted by the plunger 23 thereagainst. These projections or hooks which engage the lower surfaces of the members 14 have their full surfaces adapted for such engagement in contradistinction to the restricted surfaces of the projections 27 which are designed for anti-friction bearing. The central portion of the casting 15 is enlarged at its lower end to afford a surface 28^a against which may engage a ball race 29. Extending through the cylindrical central opening in the casting 15 is a rotatable nut 30 having an outwardly extending flange 31 at its lower end supporting a complementary ball race 32 on its upper surface. Suitable ball or other bearings 33 are engaged between the ball races 29 and 32 and support the compressive forces exerted by the plunger 23. Non-rotatably secured to the upper end of the nut 30 in any suitable manner is a gear 34. Meshing with the gear 34 is a pinion 35 fixed on the same shaft 36 with a worm gear 37, all suitably journaled in a gear reduction box casting indicated generally by the numeral 38. Meshing with the worm gear 37 is a worm fixed to the armature shaft 39 of a driving motor 40.

Threadedly received in the nut 30 is a screw

threaded plunger 23 which has spline grooves 41 milled therein and receiving suitable pins 42 and/or ribs 42a adapted to prevent rotation of the plunger. A shorter groove 43 is milled in the plunger 23 for the purpose of operating limit switches 44 and 45 by engagement with the upper and lower ends thereof respectively.

Secured to the shaft 39 of the motor armature is a brake drum 46 which is adapted to be engaged by brake shoes 47 carried by pivoted uprights 48 and 49 normally spring pressed into braking relation by a spring 50 engaged between the upright 49 and a nut 51 on a connecting bolt 52 and moved to open position by a lever arm 53 having a yoke 54 at one end which is pivoted to the bolt 52 and a link 55 in turn pivoted on the upright 49. It will be seen that when the solenoid 60 is energized the lever 53 is pulled downwardly thereby compressing the spring 50 and releasing the braking pressure. This construction of spring set brake results in an almost instantaneous stopping of the motor when the current is turned off.

The motor 40 having armature and field or rotor and stator windings, depending upon whether direct or alternating current is employed, is controlled by reversing switches S' and S², which are in turn controlled by solenoids or equivalent electromagnetic devices 61 and 62. The solenoids 61 and 62 are controlled by forward and reverse starting switches 63 and 64 which are normally spring pressed to open position and moved to closed position by the operator when it is desired to start the press in forward or reverse direction. It will be noted that the down limit switch 44 and the up limit switch 45 are connected in series with forward starting switch 63 and reverse starting switch 64, respectively, as well as with the solenoids 61 and 62, respectively, and receive their current from the line irrespective of the position of the switches S' and S². It will thus be seen that if the forward starting switch 63 is closed, the down limit switch 44 being above the lower limit and therefore closed, current will flow through the solenoid 61 thereby moving the switch S' to closed position and supplying current to the motor 40 for forward rotation. When the reverse starting switch 64 is closed, the "up" limit switch 45 being closed, the solenoid 62 is energized and current is supplied to the motor 40 through the switch S² for rotation in the reverse direction. It will also be seen that the solenoid 60 controlling the brake is connected in parallel with the motor or one winding thereof whereby when the motor is energized the brake will be inactive and as soon as the motor is de-energized the brake will immediately be effective, requiring no building up of electromagnetic pull as would be the case if an electromagnetically set brake were employed instead of a spring set one.

Inserted in the line ahead of the motor and switches S' and S² are thermal control units T. This may be a single unit but two are preferred and illustrated. These are of standard construction and per se form no part of my invention. These thermal cut-outs are selected of such value as to operate when supplied over a period of time with a current considerably less than may be required to start the motor in reverse. That is, they operate upon a current less than may be momentarily required by the motor in "backing up" from a "stall" or excessive load. Excess current cut-outs are unsuitable in this position for the reason that provision must be made for

excessive current required for starting into reverse in certain circumstances. If, for example, the motor requires 40 amperes to back up from a "stall" it will be desirable to have the thermal cut-out operate on a current of the order of 25 to 30 amperes continued over a substantial period of time as, for example, a quarter or half minute.

In Fig. 4 we have shown a wiring diagram adapted for a three phase current. The connections to brake and the starting and limit switches are identical to the showing of Fig. 3 and need not be further described. The switches S' and S² will be seen to control a multi-phase line instead of a single phase or direct current line. It will also be noted that two of the leads from the switches are reversed below the switches so that the rotating field of the multi-phase motor will cause rotation in the opposite direction depending upon whether S' or S² is closed.

The motors employed are of special design, a large "slip" being provided for the purpose of increasing the running torque. The "slip" and windings of the motor preferably are such that the running torque over the speed ranges employed and with the loads encountered up to the operation of the thermal cut-outs will amount to approximately one-half to three-fourths of the starting torque.

For the purpose of rendering impossible the closing of both switches S' and S² a link α is provided as indicated in Figs. 3 and 4.

Having thus described our invention, what we claim is:

1. In a screw press of the character described, a screw threaded plunger, an electric motor having a large "slip", a driving connection between said motor and said plunger, a brake drum on the armature shaft of said motor, a spring set, magnetically released brake embracing said drum and comprising a pair of pivoted members each pivotally carrying a brake shoe, spring means normally urging said shoes against said drum at opposite sides thereof and a magnetically operated lever for compressing said spring means to release said drum, a source of current, reversing switch means controlling the supply of current to said motor and said brake, magnetic operating means for said reversing switch means, and spring-controlled, normally open switches for controlling the supply of current to said magnetic operating means.

2. In a press of the character described, a plunger, an electric motor, driving connection between said motor and said plunger, reversing switch means controlling the supply of current to said motor and a manually reset thermal cut-out also in said motor circuit, said thermal cut-out being heated, so as to interrupt the circuit, by excessive current flowing over a period of time but not by the temporary overload required to go into reverse after a "stall".

3. In a press of the character described, in combination, a plunger, an electric motor, driving connections between said motor and said plunger, reversing switch means controlling the supply of current to said motor and a manually reset thermal cut-out also in said motor circuit, said thermal cut-out being heated so as to interrupt the circuit by excessive current flowing over a period of time but not by the momentary overload occurring when the motor is reversed, even though the cut-out may have been operated by continued overload due to excessive plunger pressure.

4. In a press of the character described, in combination, a plunger, an electric motor, driving

connections between said motor and said plunger, a magnetic brake connected in parallel with said motor whereby the latter is stopped almost immediately it is de-energized, reversing switch means controlling the current supply to said motor, and thermal cut-out means adapted to open upon continued overload, also controlling the supply of current to said motor, said motor being designed to have materially more than the minimum obtainable "slip" whereby to increase the running torque.	JOHN Y. BLAZEK. RUSSELL G. ANDERSON.	80
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