March 3, 1931. A. W. PHELPS 1,795,141

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Filed Dec. 7, 1928 3 Sheets-Sheet 1

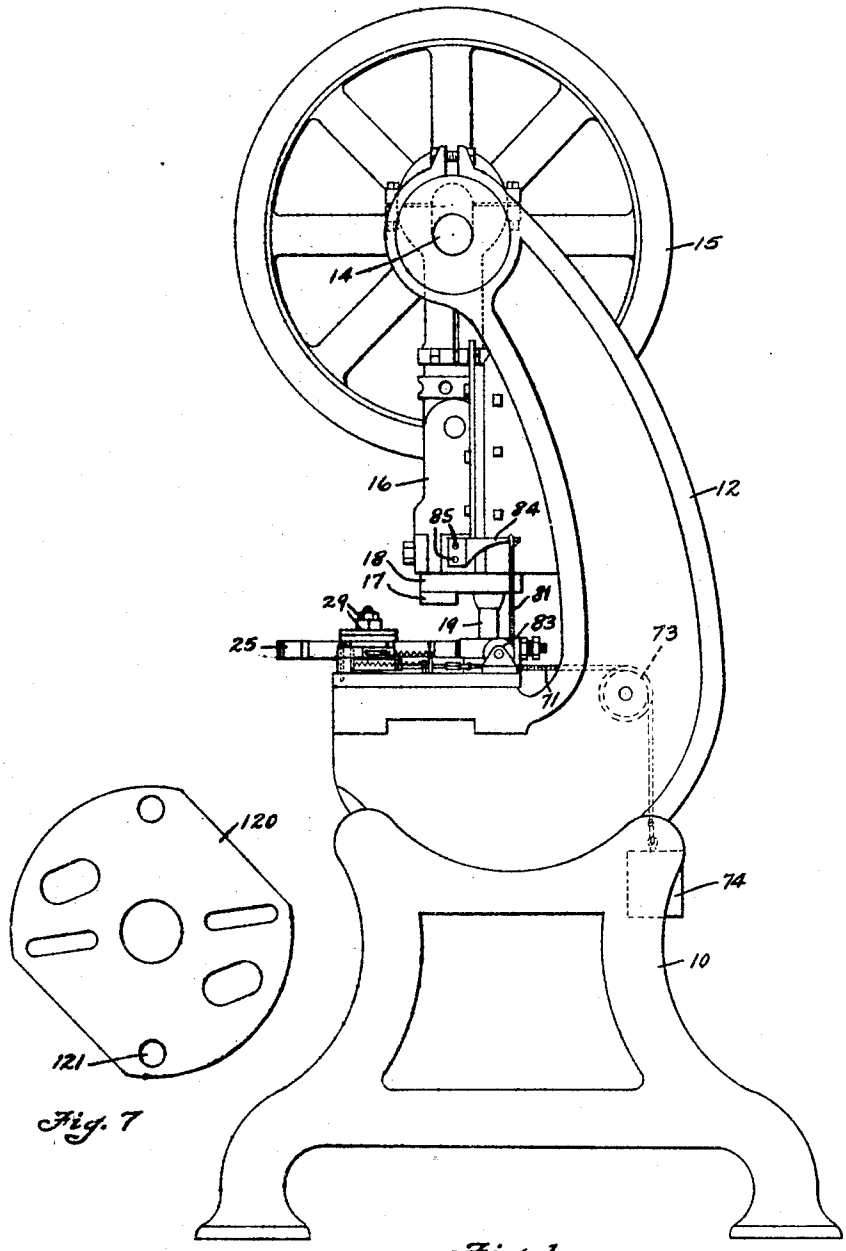


Fig. 7

Fig. 1

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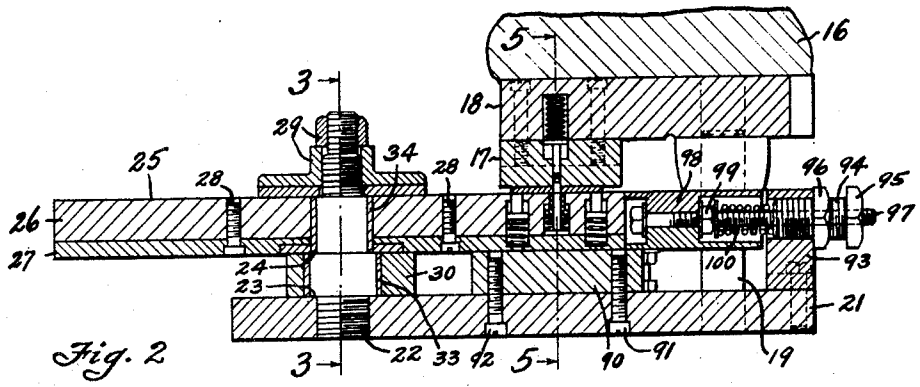


Fig. 2

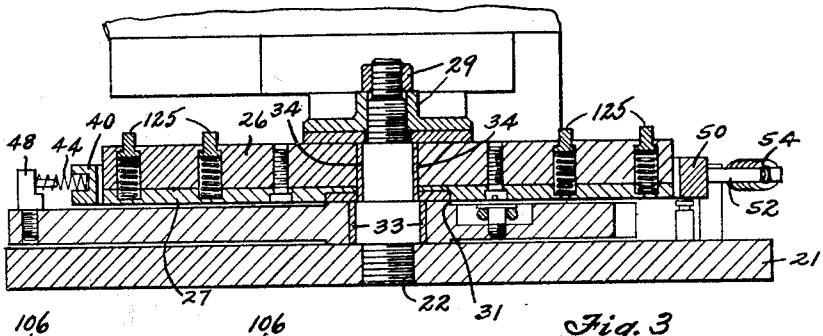
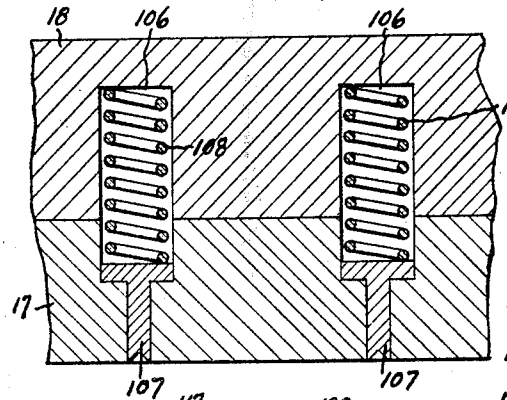


Fig. 3



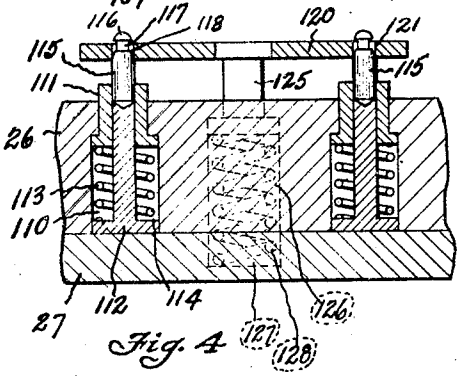


Fig. 4

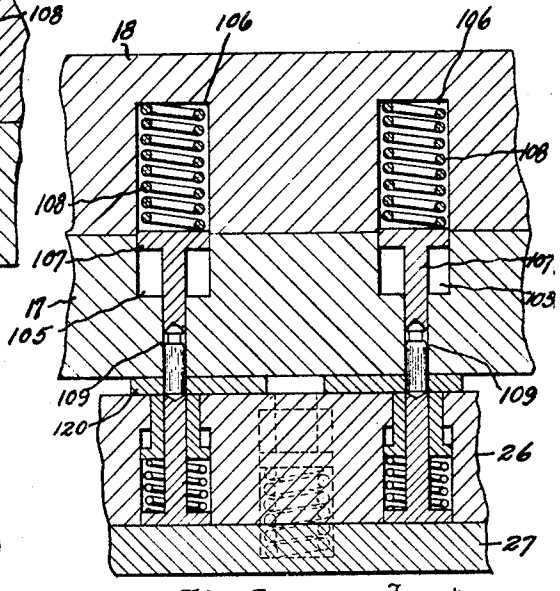


Fig. 5

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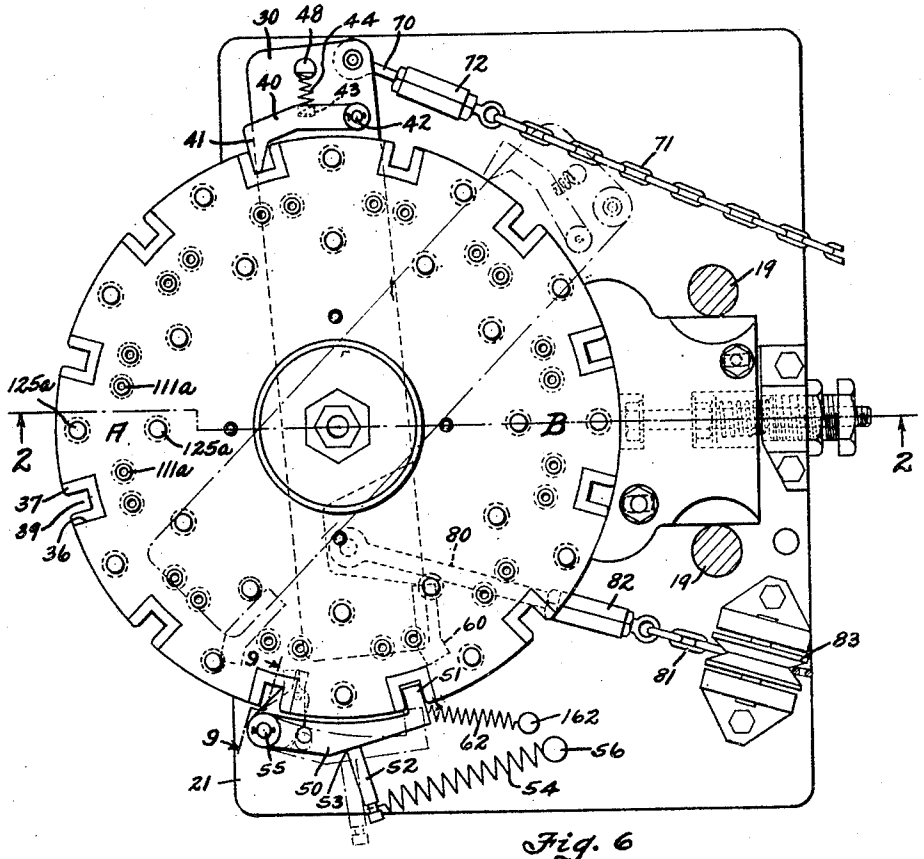


Fig. 6

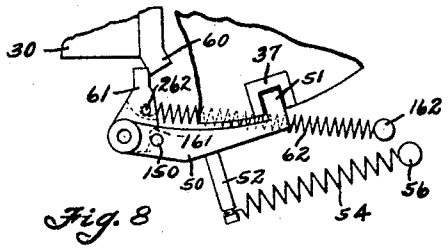


Fig. 8

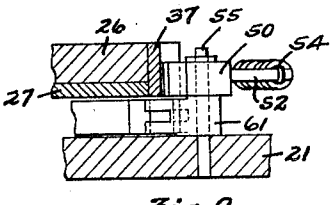


Fig. 9

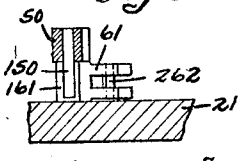


Fig. 11

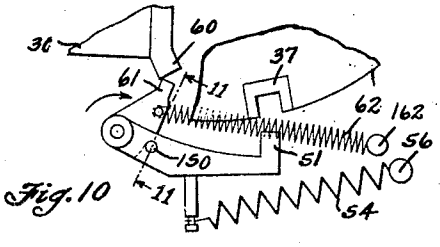


Fig. 10

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Patented Mar. 3, 1931 1,795,141

UNITED STATES PATENT OFFICE

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ASSEMBLING PRESS

Application filed December 7, 1928. Serial No. 324,340.

This invention relates to a machine for and a process of assembling parts of a timer and particularly to a machine for and a process of automatically assembling the governor weight plate and the governor weight plate pins used in automatic ignition timers.

An object of this invention is to press-fit or stake pins into an insulating plate. This is accomplished by inserting a group of pins into pin holders mounted in a rotatable work support which is intermittently driven. A plate with a plurality of apertures is placed over the pins so that the heads of the pins extend through certain of said apertures. The plate is supported in this position on a plurality of resiliently mounted supports mounted in recesses provided therefor in the work support. From this pre-assembled position, the rotatable work support together with the pins and the plate are rotated to a work position where a crosshead forces the plate upon the pins in a direction normal to the plane of rotation of said work support. Mounted in the crosshead are a plurality of ejectors which eject the pins from the crosshead as the crosshead recedes from the work position. As the crosshead lets go of the plate and the pins, they are raised and carried to the side with the rotatable work support. By carrying out the above process, a better assembly is obtained in a shorter length of time with less labor, thereby increasing the life of the assembly and reducing the cost of production.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a side elevation of the assembly.

Fig. 2 is a sectional view of the work table and a portion of the crosshead taken substantially along the line 2—2 of Fig. 6.

Figs. 3 and 5 are sectional views of the work support and the crosshead taken substantially along the lines 3—3 and 5—5 respectively of Fig. 2.

Fig. 4 is a view similar to Fig. 5 showing the plate and the pins in the pre-assembled position.

Fig. 6 is a plan view of the work table.

Fig. 7 is a blank before assembly.

Figs. 8, 9, 10, and 11 are detail views of the releasing mechanism.

In the drawings, reference character 10 indicates a base upon which is mounted the upright member 12 supporting the rotatable work table or support 25 and supporting the driving mechanism. In suitable journals in member 12 is mounted the crank shaft 14 which has attached thereto the flywheel and pulley 15 which may be driven from a belt or any other suitable driving means. On crank shaft 14 there is attached a crosshead 16, the details of this are not explained for the reason that this is all conventional and the invention does not reside in this part of the mechanism. Mounted on the crosshead 16 is a tool carrying member 18 having mounted thereon a reciprocating presser member 17. The crosshead 16 is guided with respect to the work table 25 by a pair of leader pins 19 which are fixedly attached to a base 21. Screw-threaded into base 21 is a stud 22 having a pair of shoulders 23 and 24, the shoulder 23 engaging the base 21. Mounted on the stud 22 is the rotatable work support 25 which consists of a pair of substantially circular plates 26 and 27 secured together by suitable bolts 28, screw-threadedly engaging plate 26. The plates 26 and 27 and the arm 30 are held in position, by lock nuts 29, on the stud 22. Intermediate the work table 25 and the base plate 21 is the oscillating arm 30 having a raised portion 31, the raised portion 31 cooperating with shoulders 23 and 24 in supporting the work table 25. Intermediate arm 30 and the stud 22 is a bronze or brass bushing 33 and intermediate plates 26 and 27 and the stud 22 is a bronze or brass bushing 34. In the periphery of plates 26 and 27 there are a number of U-shaped recesses or notches 36 having mounted therein U-shaped members 37 made of hardened steel and fastened to the plates 26 and 27 by suitable bolts not shown.

The means for intermittently rotating the

rotary work support 25 consists of the arm 30 upon which is pivotally mounted at 42 a pawl 40 having a detent 41. To one side of the pawl 40 is a recess 43 supporting a spring 44 which urges the pawl towards the recess 39 in the U-shaped member 37, the spring being attached to the arm at 48.

Pivotally attached to the arm 30 is a rod 70 which is attached to a chain 71 by means of a turnbuckle assembly 72, the chain passing over a pulley 73 and attached to a weight 74 which urges the arm 30 in a clockwise direction as viewed in Fig. 6. On the other end of arm 30 is pivotally attached a rod 80 connected to a chain 81 by a turnbuckle 82. The chain 81 is passed under a pulley 83 and is attached to an arm 84 which is secured to the reciprocating crosshead 16 by means of a pair of bolts 85 whereby the arm 30 is positively rotated in a counterclockwise direction as viewed in Fig. 6 when the crosshead is being raised.

In Figs. 1 and 6 it may be readily seen that as the cross head moves downwardly and upwardly, arm 30 will rotate in a clockwise direction into the dot-dash position, due to the force exerted by the weight 74 on the chain 71 and in a counter-clockwise direction by the chain 81 into full line position, respectively. It will be seen that as the arm 30 rotates in the counter clockwise direction approximately 15 degrees from the dot-dash position, pawl 40 will engage notch 39 on the side of the work table 25, then rotating the work table through an angle of 30 degrees. Here the work table is locked in position by detent 51 on member 50, which is pivotally mounted on the base 21 at 55, and is biased in a clockwise direction into notch 39 by means of spring 54, having one end attached to the base 21 by pin 56 and the other end engaging a pin 52 attached to the member 50 at 53. In order to permit rotation of the work table 25, a releasing mechanism has been provided which will move member 50 from the full line position disclosed in Fig. 6 to the dot-dash line position. This releasing mechanism comprises a trip member 60 mounted on the arm 30 diametrically opposite pawl 40. As the arm 30 rotates in a clockwise direction, member 60 engages member 61, freely rotating 61 in a counter-clockwise direction, as best seen in Fig. 8. Member 60, however, rotates past the point of engagement of member 61, thereby permitting member 61 to be snapped back in a clockwise direction by a spring 62 secured to the base 21 by a pin 162 and to member 61 by a pin 262. As arm 30 rotates in a counter-clockwise direction, trip 60 engages member 61 moving 61 in a clockwise direction, which causes member 50 to also rotate in the same direction as a shoulder 161 on member 61 engages a pin 150 mounted in member 50. This releasing mechanism is so timed that detent 51 will be completely out of engagement of the notch 36 when the pawl 40 engages another notch 39, thereby permitting the pawl 40 to rotate the table. In Fig. 6 it may be readily seen that trip 60 is moved out of engagement with member 61 long before arm 30 has completed its rotation in a counter-clockwise direction. This permits member 50, by means of the spring 54, to urge detent 51 into another notch 39 as arm 30 approaches its limit of rotation in the counter-clockwise direction.

Intermediate the work table assembly 25 and base plate 21 is an anvil 90 which is directly underneath the member 17. The anvil 90 is bolted to the base plate 21 by bolts 91 and 92 threadedly engaging the anvil 90. Also bolted to the base plate 21 is the upright 93 which has mounted thereon a tubular member 94 provided with a head 95 and locked in position by means of a nut 96, the external threads of the tubular member 94 threadedly engaging the upright 93. Through the tubular member 94 is a freely movable bolt 97 having mounted thereon a retarding member or braking member 98 held in position by means of a nut 99. Member 98 has a concave surface of substantially the same curvature as the cylindrical plates 26 and 27. Mounted intermediate the nut 99 and the tubular member 94 is a compression helical spring 100. By adjusting the sleeve 94, the pressure exerted by member 98 against the rotatable work table 25 may be varied.

In member 17 there are a plurality of aligned apertures 105 which are aligned with recesses 106 in member 18. Before assembling members 17 and 18, the ejectors 107 and the springs 108 are inserted into these apertures, the ejectors 107 being acted upon by the springs 108 to eject the assembly from the crosshead as the crosshead recedes from the operative position. In plate 26 there are a plurality of apertures 110 into which are inserted before assembling plate members 26 and 27, the tubular pin holding members or supports 111. A spring 113, acting against the tubular pin holding member 111 to urge it upwards, rests on a shoulder 114 of the pin supporting member 112. It will be readily seen that as the tubular pin holding member 111 extends beyond the upper surface of the plate 26, pins 115 may be inserted into the tubular member and remain standing there. Each of the pins 115 in the particular work piece disclosed has a head 116, a neck 117 and a shoulder 118. The function of each of these is not described in this application for the reason that this article is shown and claimed in the copending application of Carl H. Kindl, Serial No. 80,714, filed January 12, 1926.

The resilient means for supporting the work plate 120, which is best seen in Fig. 7, consists of a pair of supporting members 125

mounted in an aperture 126 in plate 26 which is urged upwardly by a helical spring 128 which is placed in the aperture 126 and in a recess 127 in plate 27.

Operation

In this disclosure 12 groups of pin holders 111 and 12 groups of plate supporting members 125 have been provided in the work table 25. Only two of these groups have been numbered, the remaining groups being unnumbered for the sake of clearness. Group A, comprising pins 111*a* and supporting members 125*a*, is the group in the work assembling position. When a group is in this position, the operator during a rest period of the work support 25 inserts a pair of pins 115 into the members 111*a*. After inserting the pins 115, he places a plate 120 on the plate supporting members 125 in such a position that the pins 115 are in alignment with the apertures 121 in the plate 120. Each successive group receives a pair of pins 115 and a plate 120 when they reach this position. The pins 115 and the plate 120 are rotated in this pre-assembled position with the work table in a counter-clockwise direction until they arrive at the position B diametrically opposite position A and directly under the crosshead 16 and over the anvil 90. Here the plate 120 is forced or pressed into the home position by the cross head 116, as best seen in Fig. 5.

Since the crosshead receives the pins 115 which have been permitted to extend into the recesses 109, the pins and plate are ejected by members 107 which are acted on by the compression springs 108. The plate and the pins will also be raised from the rotatable work support 25 and by the plate supporting members 125. From this position, the assembled unit is removed from the work table 25 by a suitable blast of air which has not been shown as it is very well known to eject a blank or a piece of work from a press or other machines by means of a blast of air.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A machine for press-fitting pins in a governor weight plate having holes therein for the pins comprising, in combination, a rotary work table, means for supporting the pins on said table, means for supporting the plate above said table, with the apertures in the plate aligned with the pins, reciprocating means having recesses for receiving the pins, said reciprocating means forcing the plate over the pins to press-fit the pins into the plate, and means for ejecting the pins from the crosshead after the pins have been press-fitted.

2. A machine for staking pins in plates, comprising, in combination, a rotary work table, means for intermittently rotating said work table, means for supporting the pins on said table, resilient means for supporting the plate above said table, a reciprocating crosshead with recesses aligned with the pins, said reciprocating crosshead forcing the plate home thereby staking the pins in the plate, driving means for reciprocating the crosshead, and means for ejecting the pins from the recesses in said crosshead after the pins have been staked in the plate.

3. A machine for press-fitting pins in a plate comprising, in combination, a rotary work support, means for intermittently rotating the work support, means for supporting the pins on said support, means for supporting the plate above the work support, said plate having apertures aligned with the pins, reciprocating means for forcing the plate down over the pins thereby press-fitting the pins to the plate, means for driving said reciprocating means, and a brake for said rotary table to prevent excessive movement of the table.

4. A machine according to claim 3 in which the means for supporting the pins on the table, comprises a movable sleeve mounted in a recess in the work table, said movable sleeve having a shoulder cooperating with a shoulder in said recess for limiting the upward movement of said sleeve, resilient means for urging the said sleeve upward and a movably mounted core in the sleeve, the diameter of the core being substantially the diameter of the pin, the core and sleeve cooperating in holding the pin, the core preventing downward movement of the pin.

5. A machine according to claim 3 in which the means for intermittently rotating the work support includes an oscillating member driven in one direction by the driving means for the reciprocating crosshead and a weight to bias the oscillating member in a direction opposite to said one direction.

6. A machine for press-fitting pins in a plate comprising, in combination, a rotary work support, means for intermittently rotating said work support to present the work to the operating position, means for retarding the motion of the work support, means for locking said work support during the rest period, means mounted in said work support for supporting the pins, means for supporting the plate above said work support, and means for forcing the plate over the pins to press-fit the pins in the plate.

7. A machine according to claim 6 in which the rotary work support has a plurality of notches in the periphery, in which the intermittent rotating means cooperates with each notch in succession, and in which the locking means cooperates with another of said notches during the rest period.

8. A machine according to claim 6 in which

the rotary work support has a substantially cylindrical periphery concentric with the axis of rotation, and in which the means for retarding the rotation of the work support includes a spring urged brake with a concave surface cooperating with the cylindrical periphery of the work support.

9. A machine according to claim 6 in which the rotary work support has notches in the periphery, and in which the locking means includes a dog engaging said notches and a member actuated for releasing said dog, said member being actuated by the means intermittently rotating said work support.

10. A machine according to claim 6 in which the rotary work support has notches in its periphery, and in which the locking means includes a dog for engaging one of said notches, resilient means urging said dog into one of said notches, and means for releasing said dog, said last means being actuated by the means intermittently rotating said work support.

11. A press comprising, in combination, a rotary work support having substantially U-shaped notches in the periphery, U-shaped hardened steel members fixedly attached in said U-shaped notches, an oscillating arm, a pawl mounted on said arm so constructed and arranged as to engage said U-shaped members, means for oscillating said arm whereby the pawl rotates the work support intermittently to present work pieces to an operating position, and a reciprocating means cooperating with the work support for carrying out an operation on the work piece.

12. A press for staking pins in a plate, comprising, in combination, a movable work support, means for moving said work support intermittently, means for supporting the pins on said work support, means for supporting a plate to be press-fitted upon said pins, said means supporting the plate so that the heads of said pins extend through apertures in said plate, an anvil supporting the work support in working position, a reciprocating crosshead with recesses aligned with the pins, said crosshead forcing the plate upon the pins so as to press-fit the pins into the plate, and means for ejecting the assembled plate and pins from the crosshead as the crosshead recedes from working position.

13. A machine for press-fitting pins into an insulating plate for use in automatic timers comprising, in combination, a movable work support, means for supporting a plurality of pins arranged in groups on said work support, means for supporting a plurality of plates, each of said plates to be press-fitted upon each group of pins, each plate being supported so that the heads of the pins in one group extend through apertures provided therefor in said plates, a reciprocating crosshead, means for guiding the crosshead so that the pins in one group of pins are received in recesses in the crosshead, the crosshead cooperating with the work support during a rest period of said work support to press-fit the plate upon its group of pins, and means for ejecting the pins and plate from the crosshead as the crosshead recedes from working position, and means for moving the work support so as to position another plate and group of pins in operative position.

14. A machine for press-fitting pins into an insulating plate for use in automatic timers comprising, in combination, work holders, each work holder supporting a plate having a plurality of apertures and supporting a plurality of pins with the heads extending through the apertures in the plate, means for intermittently moving the work holder along a plane into a working position, means for forcing said plate in a direction normal to said plane so as to press-fit the plate upon the pins.

15. The method of press-fitting pins into an insulating plate for use in timers comprising the steps of inserting pins into a work holder, placing a plate on a support so that the heads of the pins extend through apertures in said plate, moving said pins, said plate and said work holder bodily along one plane to a work position, forcing the plate at right angles to said plane whereby the plate is forced upon the pins.

16. The method of press-fitting pins into an insulating plate for use in timers comprising the steps of inserting the pins into work holders, placing a plate on a support so that the heads of said pins extend through apertures in the plate, moving the plate and pins bodily along one plane to a work position, forcing the plate along a normal to said plane whereby the plate is press-fitted upon said pins, moving the plate and pins away from the work position to permit repeating the process upon another work plate and group of pins.

17. The method of press-fitting pins into an insulating plate for use in timers comprising the steps of inserting pins into supports, placing a plate on a support so that the heads of said pins extend through apertures in the plate, and pressing the plate upon the pins whereby the pins are press-fitted into the plate.

18. The method of press-fitting pins into an insulating plate for use in timers comprising the steps of placing pins on supports, placing a plate so that the heads of the pins extend through the apertures in the plate and moving the plate and pins relative to each other in a path along the axes of said pins to press-fit the pins into the plate.

19. In a machine for press-fitting a pin into a support, the combination of a work support with a reciprocating cross head, said

cross head having a recess for receiving the pin, and a pin aligning means mounted in said recess, said pin aligning means being provided with a conical shape recess cooperating with the end of the pin to properly align the pin with said recess.

20. In a machine for press-fitting pins into a support, comprising the combination of a work holder with a reciprocating cross head, said cross head being provided with recesses for receiving the pins, and a spring urged pin aligning and ejecting member mounted in each of said recesses, said member being provided with a conical shaped recess cooperating with the end of a pin to align the pin with the recess in the cross head.

In testimony whereof I hereto affix my signature.

ALVA W. PHELPS.