H. P. MACDONALD.

PATTERN DRAWING APPARATUS.

APPLICATION FILED FEB. 6, 1912.

1,065,541.

Patented June 24, 1913.

2 SHEETS—SHEET 1.

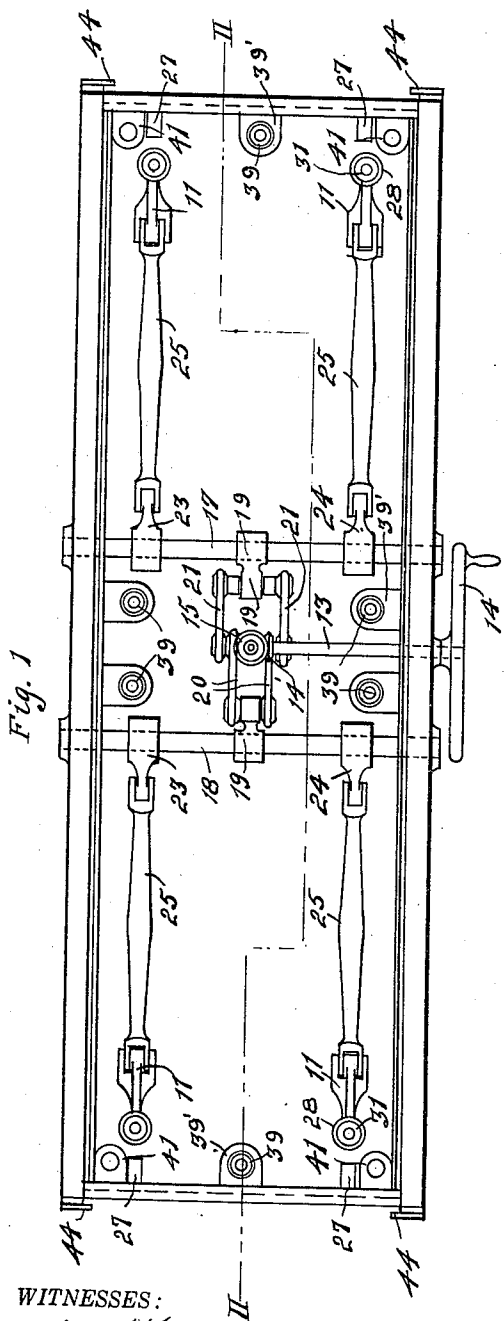

Fig. 1

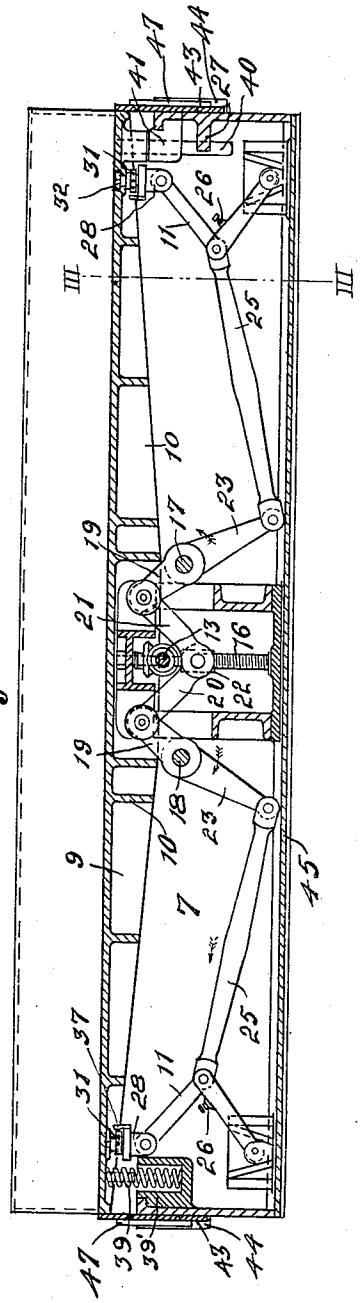

Fig. 2

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2 SHEETS—SHEET 2.

Fig. 3

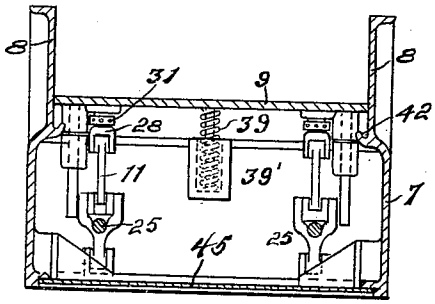


Fig. 6

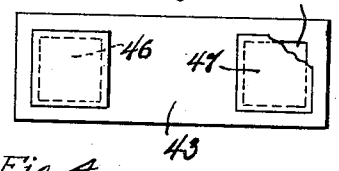
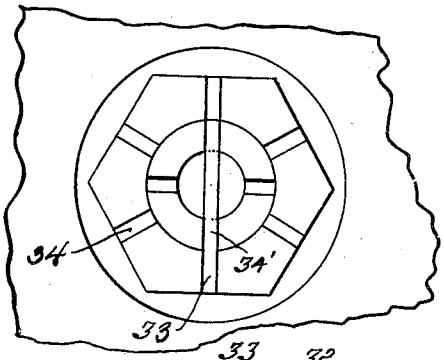


Fig. 4



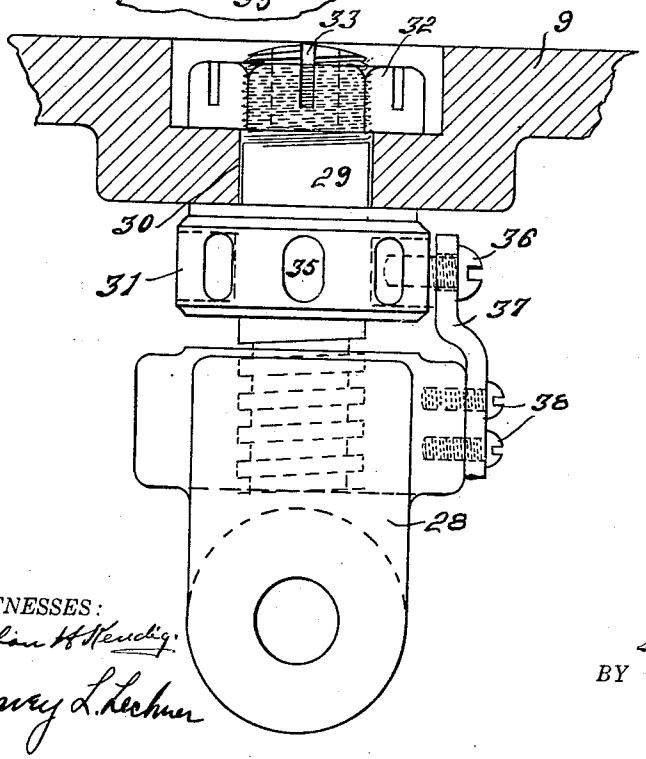


Fig. 5

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PATTERN-DRAWING APPARATUS.

1,065,541. Specification of Letters Patent. Patented June 24, 1913.

Application filed February 6, 1912. Serial No. 675,826.

To all whom it may concern:

Be it known that I, HARRY P. MACDONALD, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Pattern-Drawing Apparatus, of which the following is a specification.

The invention has reference to pattern drawing apparatus particularly of the type wherein the pattern is drawn by lowering the pattern support. It has for its primary objects, the provision in apparatus of the character described of an improved arrangement of operating mechanism for raising and lowering the pattern support; the provision of improved guard devices to prevent sand, grit and dirt from working into the operating mechanism; and the provision in a machine for drawing large patterns of an improved operating mechanism wherein the actuating parts move in unison, preventing tilting of the pattern support and pattern during the drawing operation, thereby reducing to a minimum, liability of injury to the mold. My invention also contemplates the provision of improved guide and counterbalance means. These, together with such other objects as may hereinafter appear, I attain by means of a construction illustrated in preferred form in the accompanying drawings, wherein—

Figure 1 is a plan view of my improved apparatus, parts of the machine being removed to more clearly disclose the operating mechanism; Figure 2 is an irregular, longitudinal section on the line II—II of Figure 1; Fig. 3 is a transverse section on the line III—III of Figure 2, and Figs. 4, 5 and 6 are views of details of my invention.

My invention is designed primarily for use on large molding machines wherein the patterns are of considerable size, designed for example for a large rectangular flat casting.

In carrying out my invention, I provide a main frame 7 which is box-like in shape and is provided with upwardly extending flanges or side rails 8—8 which are adapted to serve as a flask support. Slidably mounted in the frame is a pattern support or table 9 of approximately rectangular shape fitting the frame and provided with a plurality of longitudinal and transverse strengthening ribs 10. The pattern table is raised and lowered by means of toggles 11 which are four in number and are positioned substantially at the corners of the pattern table in the manner indicated in Figure 1. The toggles are operated from a main driving shaft 13 mounted in the frame 7 and operated by means of the hand wheel 14. The shaft is provided with a gear 14′ engaging the bevel gear 15 on the vertical shaft 16 which is likewise mounted in the frame and is screw threaded. Mounted on either side of the shaft 13 are two rock shafts 17 and 18, each of which is provided with an upstanding arm 19 connected to the links 20 and 21 which are rotatably mounted on a block 22 which is mounted on the vertical shaft 16. The rock shafts 17 and 18 are each provided with two arms 23 and 24 which are keyed to prevent relative rotation and are connected to the toggles 11 by means of connecting rods 25. The pattern table is shown in Fig. 2 in its lowest position and in raising it the hand wheel 14 is rotated to turn the vertical shaft 16 in such direction that the block 22 travels downward, which movement causes the links 20 and 21 to rotate the rock shafts 18 and 17 in the direction of the arrows, and moves the connecting rods 25 outward, causing the toggles to straighten out and thus elevate the table. The parts are so arranged that when the toggles 11 are straightened out they travel slightly past the vertical until the abutments 26 strike against the lugs or shoulders 27 of the frame, thus locking the toggles against downward movement until they are released by turning the handle wheel 14 in the opposite direction. It will be noted by this construction that all of the toggles are operated simultaneously by a single actuating mechanism which results in an even and uniform movement of the pattern table and reduces the liability of injury to the molds to a minimum. It will also be noted that the use of toggles to raise and lower the table is particularly advantageous because the initial downward movement of the table when a pattern is being drawn is very slow and gradually increases.

In Fig. 5 I have illustrated an improved arrangement for adjustably supporting the table on the toggles which comprises a clevis 28 rotatably secured to the upper arm of the toggles 11. The clevis is provided

with a screw-threaded member 29 somewhat in the nature of a stud or spindle, which projects through a recess 30 cut into the table 9 and is provided with a collar portion 31 upon which the pattern table rests, the table being clamped in position by means of the nut 32. After the nut 32 has been tightened it is locked against rotation, by means of the small plate or keeper 33 which is inserted into any one of the registering slots 34 and 34′ which are respectively cut into the nut and the spindle. The collar 31 is provided with a plurality of notches 35 which are engaged by the screw 36 carried by the arm 37 which is fastened to the clevis by means of screws 38. It will be noted that by this construction the elevation of the table with respect to the flask plates 8 may be varied to suit different thicknesses of pattern plates and to compensate for any warping or irregularity. The spindle is provided with four slots 34′ and the nut with six slots 34. It will be apparent that this construction will afford a very close adjustment of the nut 32, inasmuch as a set of slots will register at every twelfth of a turn of the nut.

In order to obtain greater ease of operation, the table 9, which is of considerable weight is carried by the counter balance springs 39 which are mounted in the blocks 39′ of the frame 7 and are of a strength not quite sufficient to support the table but which will lighten the load of the table on the operating mechanism. The table is guided in its movement by means of the posts 40 which slide in recesses in the shoulders 41 cast on the frame 7. Such a post is provided at each corner of the table in order to steady the table as it moves.

Referring now to Fig. 3, it will be seen that I have provided the frame 7 with an inwardly projecting lip 42 which extends around the inside of the frame just beneath the pattern table. This lip or plate is bent upwardly so as to form a groove to catch and contain any sand or dirt which may work past the pattern table. The ends of the frame are protected by means of the guard strips or plates 43 which are carried by the table 9 and work in grooves formed by the overlapping plates 44 secured to the ends of the frame, which serve to prevent the entrance of sand or dirt into the frame. The bottom of the frame is closed by the plate 45. This construction practically constitutes the frame and pattern table a closed chamber protecting all the working parts. On reference to Figure 6 which is a side elevation of one of the plates 43, it will be seen that I have provided hand-holes 46 whereby access may be readily had to the interior of the frame to adjust the pattern table support. The handholes are covered by cover plates 47.

A further advantage of the locking arrangement of the toggles is that the load of the pattern support and flask is taken off the operating mechanism during the ramming of the sand.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:

1. A pattern drawing apparatus comprising a flask support, a movable pattern support, a toggle means for raising and lowering the pattern support, and means for actuating the toggle means comprising a threaded shaft, a block having threaded engagement therewith, a rock arm connected to the toggle means, a link between the rock arm and the block, and means for rotating the shaft.

2. A pattern drawing apparatus comprising in combination, a flask support, a movable pattern support, toggles for raising and lowering the pattern support, a drive shaft, rocking arms, driving connections between the shaft and rocking arms, and connections between the said arms and the toggles.

3. A pattern drawing apparatus comprising in combination, a flask support, a movable pattern support, toggles for raising and lowering the pattern support, a threaded shaft, a movable block having threaded engagement with said shaft, rock arms connected at one end to the toggles, links connected to the rock arms and the block, and means for rotating the shaft.

4. A pattern drawing apparatus comprising in combination a main frame provided with a flask support, a pattern support movably mounted in the main frame, mechanism for raising and lowering the pattern support, and a counterbalance spring independent of the operating mechanism for supporting the pattern support in the main frame.

5. A pattern drawing apparatus comprising in combination, a main frame, a movable pattern support mounted therein, toggle members for raising and lowering the pattern support adapted to abut the frame and lock when in raised position, and means for actuating the toggle members.

6. A pattern drawing apparatus comprising in combination, a main frame, a movable pattern support mounted therein, toggle members for raising and lowering the pattern support, abutments adapted to engage and lock the toggle members when in raised position, and means for actuating the toggle members.

7. A pattern drawing apparatus comprising in combination, a movable pattern support, a toggle member for raising and lowering the pattern support, means for actuating the toggle member, and an adjustable connection between the toggle member and the pattern support comprising a member adjustably mounted on the toggle member for substantially vertical movement with

respect thereto, and means for clamping the pattern support in position on the said member releasably.

8. A pattern drawing apparatus comprising in combination, a movable pattern support, actuating means for raising and lowering the pattern support, a main frame inclosing the actuating mechanism in which the pattern support is movably mounted, and a guard plate on the inner surface of the frame located beneath the pattern support for catching sand and dirt.

9. A pattern drawing apparatus comprising in combination, a movable pattern frame, a pair of toggle members at each end of the frame adapted to form a four-point support and a common operating means for actuating the toggle members in unison comprising a threaded drive shaft, a rock shaft disposed on each side of the drive shaft, a pair of links mounted on the threaded drive shaft, connections between the links and rock shafts, a pair of arms mounted on each rock shaft, and connections between said arms and the toggle members.

10. A pattern drawing apparatus comprising in combination, a movable pattern support, a toggle member for raising and lowering the pattern support, means for actuating the toggle member, and a connection between the toggle member and pattern support comprising a screw stud mounted in the toggle member, and means for clamping the pattern support in position on the screw stud.

11. A pattern drawing apparatus comprising in combination, a movable pattern support, a toggle member for raising and lowering the pattern support, means for actuating the toggle member, and a connection between the toggle member and pattern support comprising a screw stud mounted in the toggle member projecting through the pattern support and provided with an abutment, and a nut on the stud engaging the pattern support adapted to clamp the support against the abutment.

12. A pattern drawing apparatus comprising in combination, a movable pattern support, a toggle member for raising and lowering the pattern support, means for actuating the toggle member, and a connection between the toggle member and pattern support comprising a screw stud mounted in the toggle member projecting through the pattern support and provided with an abutment, a nut on the stud engaging the pattern support and adapted to clamp the support against the abutment, and means for locking the nut.

13. A pattern drawing apparatus comprising in combination, a movable pattern support, a toggle member for raising and lowering the pattern support, means for actuating the toggle member, and a connection between the toggle member and pattern support comprising a screw stud mounted in the toggle member projecting through the pattern support and provided with an abutment, a nut on the stud engaging the pattern support and adapted to clamp the support against the abutment, and means for locking the screw stud.

14. A pattern drawing apparatus comprising in combination, a movable pattern support, a toggle member for raising and lowering the pattern support, means for actuating the toggle member, and a connection between the toggle member and pattern support comprising a screw stud mounted in the toggle member projecting through the pattern support and provided with an abutment, a nut on the stud engaging the pattern support and adapted to clamp the support against the abutment, means for locking the nut and means for locking the stud.

15. A pattern drawing apparatus comprising in combination, a movable pattern support, actuating mechanism for raising and lowering the pattern support, and an adjustable support for supporting the pattern support on the actuating mechanism comprising a screw stud provided with an abutment, a nut on the stud engaging the pattern support and adapted to clamp the pattern support against the abutment, a plurality of slots in the stud, a plurality of slots in the nut, and a keeper adapted to fit into the slots and lock the nut.

16. A pattern drawing apparatus comprising in combination, a movable pattern support, actuating mechanism for raising and lowering the pattern support, and an adjustable support for supporting the pattern support on the actuating mechanism comprising a screw stud provided with an abutment, a nut on the stud engaging the pattern support and adapted to clamp the pattern support against the abutment, a plurality of slots in the stud, a greater number of slots in the nut and a keeper adapted to fit the slots and lock the nut.

17. A pattern drawing apparatus comprising in combination, a movable pattern support, actuating mechanism for raising and lowering the pattern support, and an adjustable support for supporting the pattern support on the actuating mechanism comprising a screw stud provided with an abutment, a nut on the stud engaging the pattern support and adapted to clamp the pattern support against the abutment, a plurality of slots in the stud, a greater number of slots in the nut, and a member for locking the stud.

18. A pattern drawing apparatus comprising in combination, a movable pattern support, actuating mechanism for raising and lowering the pattern support, and an

adjustable support for supporting the pattern support on the actuating mechanism comprising a screw stud rotatably mounted on the actuating mechanism and adapted to project through the pattern support, a collar on the stud, a nut on the stud engaging the pattern support and adapted to clamp the support against the collar, an arm mounted on the actuating mechanism, a plurality of recesses in the collar, and an abutment on the arm adapted to engage one of the recesses on the collar and lock the stud against rotation.

19. A pattern drawing apparatus comprising in combination, a movable pattern support, actuating mechanism for raising and lowering the pattern support, and an adjustable support for supporting the pattern support on the actuating mechanism comprising a screw stud rotatably mounted on the actuating mechanism and adapted to project through the pattern support, a collar on the stud, a nut on the stud engaging the pattern support and adapted to clamp the support against the collar, an arm mounted on the actuating mechanism, a plurality of recesses in the collar, a movable abutment on the arm adapted to engage one of the recesses on the collar and lock the stud against rotation, and means for locking the nut.

20. A pattern drawing apparatus comprising in combination a frame, a pattern supporting table mounted for movement therein, operating means for raising and lowering the pattern table, the said table being carried on said operating means, and counterbalance means supporting the table so that at no time is the entire weight of the table supported directly on the operating means.

21. A pattern drawing apparatus comprising in combination, a movable pattern support, mechanism for raising and lowering said pattern support, and an adjustable connection between the operating mechanism and the support comprising a member carried by the former and provided with a pair of abutments engaging the support on opposite sides, one of said abutments being movable.

22. A pattern drawing apparatus comprising in combination, a movable pattern support, mechanism for raising and lowering said pattern support, and an adjustable connection between the operating mechanism and the support comprising a member carried by the former and provided with a pair of abutments engaging the support on opposite sides, said abutments being movably carried on said member.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

H. P. MACDONALD.

Witnesses:
C. C. GREENLEE,
J. A. ARNOLD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."