

No. 665,163.

Patented Jan. 1, 1901.

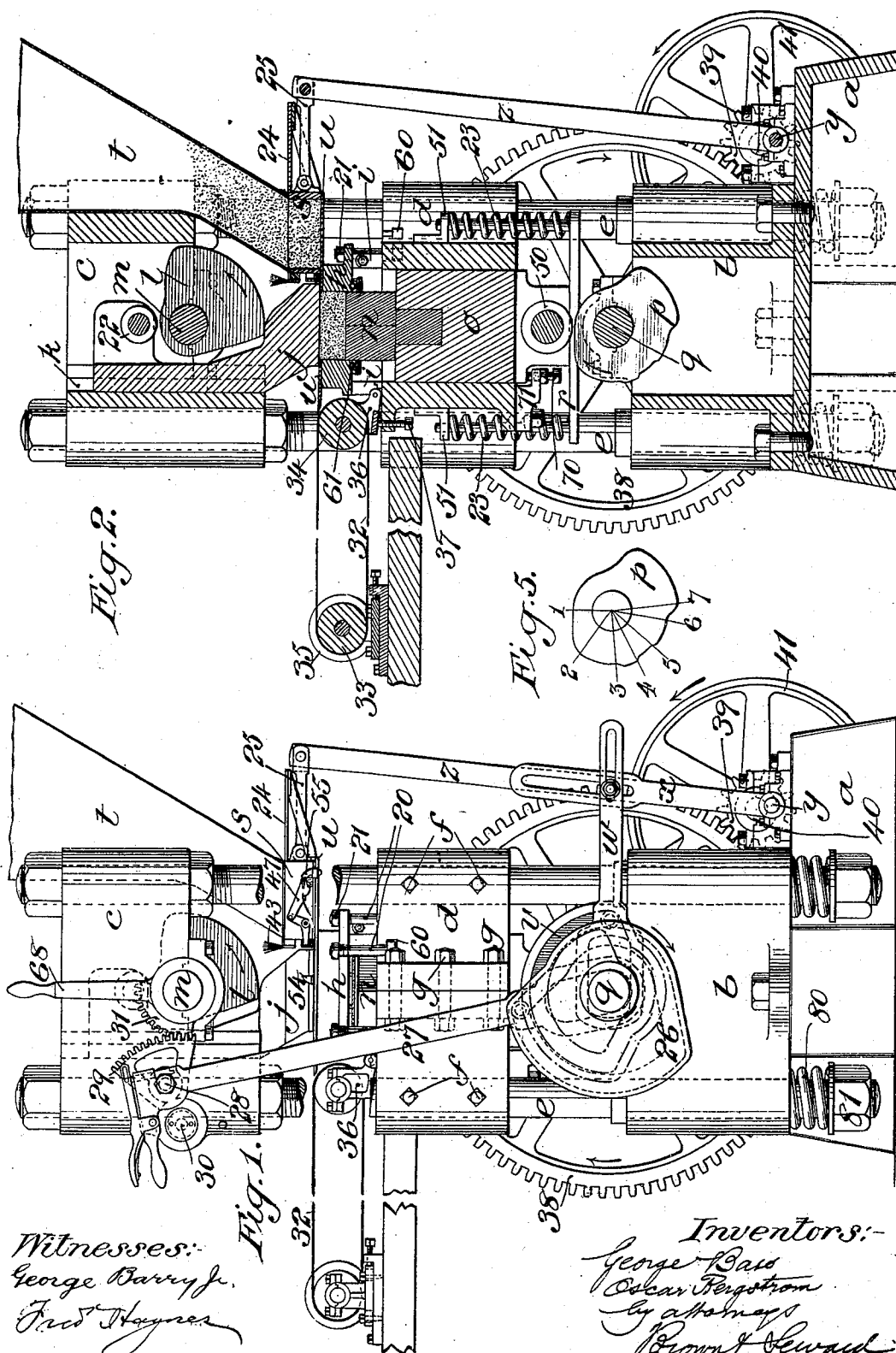
G. BASS & O. BERGSTROM.

PRESS FOR MOLDING AND COMPRESSING VARIOUS ARTICLES.

(Application filed Aug. 10, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
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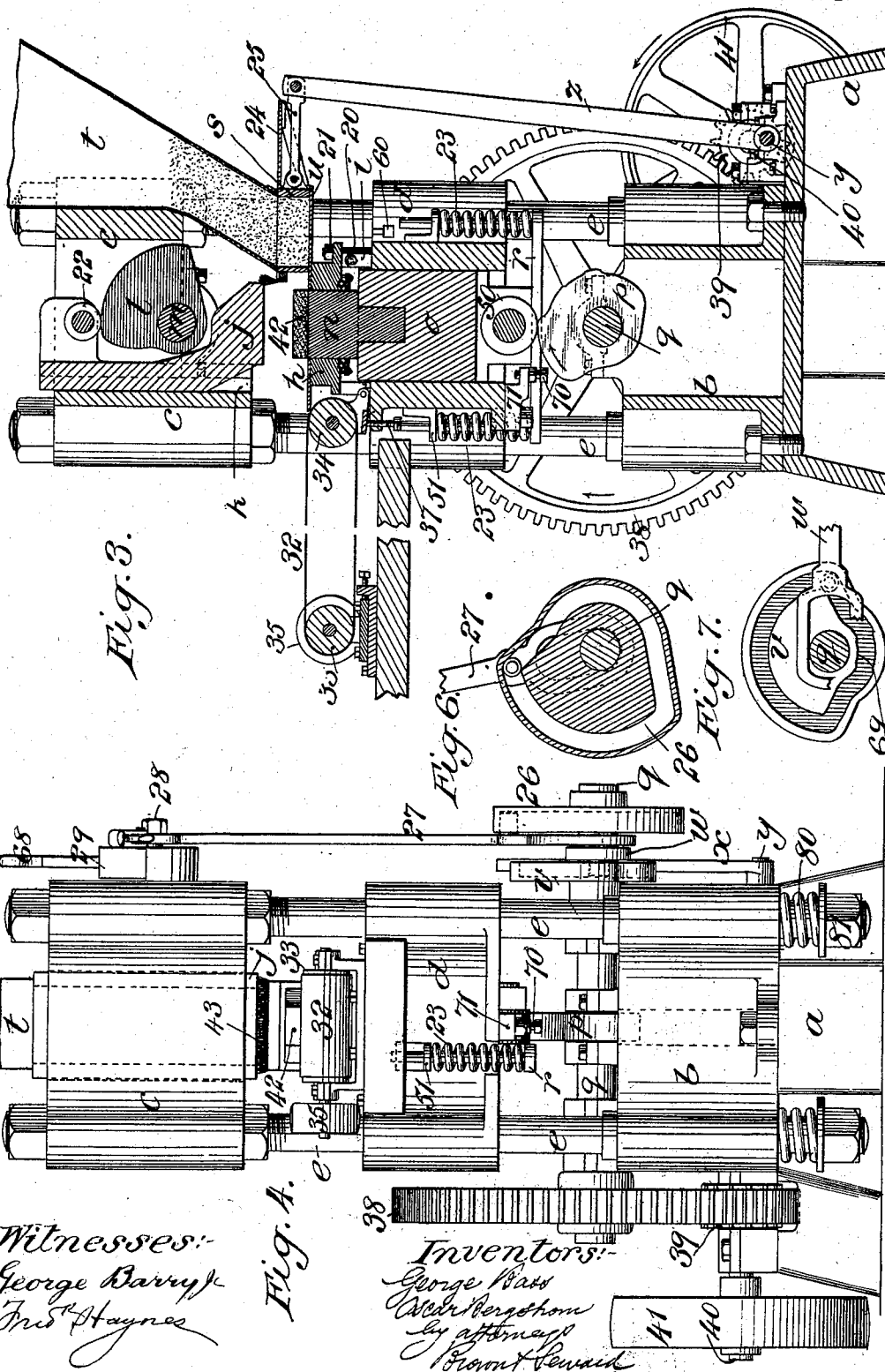
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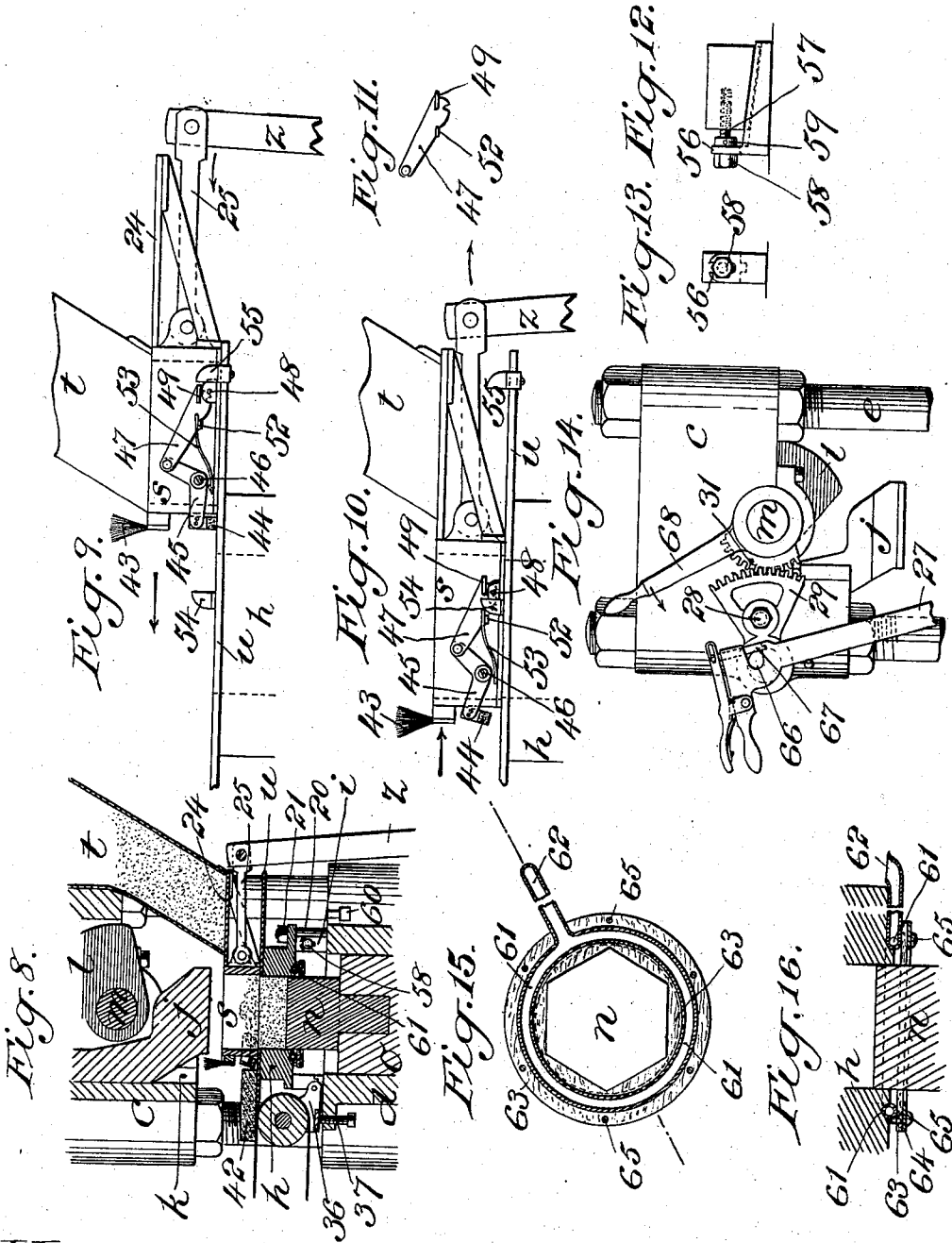
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UNITED STATES PATENT OFFICE.

GEORGE BASS AND OSCAR BERGSTROM, OF NEW YORK, N. Y.

PRESS FOR MOLDING AND COMPRESSING VARIOUS ARTICLES.

SPECIFICATION forming part of Letters Patent No. 665,163, dated January 1, 1901.

Application filed August 10, 1900. Serial No. 26,454. (No model.)

To all whom it may concern:

Be it known that we, GEORGE BASS, a citizen of the United States, and OSCAR BERGSTROM, a subject of the King of Sweden and Norway, (but having made the oath required by law declaring my intention of becoming a citizen of the United States,) both residents of the borough of Brooklyn, in the city and State of New York, have invented a new and useful Improvement in Presses for Molding and Compressing Various Articles, of which the following is a specification.

The object of this invention is especially the molding and compressing of such articles—tiles, for example—as are produced from material in the condition of powder.

A press embodying our invention comprises a mold or die of a form corresponding with the perimetrical outline of the article to be produced for the reception of the material of which such article is to be composed, a platen adapted to said mold or die and against which the said material is compressed within said mold or die, and a plunger fitted to said mold or die for the compression of said material therein.

Our improvement consists in certain combinations in which such mold, platen, and plunger constitute elements and in certain devices employed in connection with said mold, platen, and plunger, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of such a press with portions of the framing broken away to show the working parts. Figs. 2 and 3 are central vertical sectional views taken in planes parallel with Fig. 1, showing the parts in two different positions; Fig. 4, a front elevation of the same. Figs. 5, 6, and 7 represent cams by which parts of the machine are actuated. Figs. 8, 9, 10, 11, 12, 13, 14, 15, and 16 are detail views which will be hereinafter explained.

a b c d e designate the framing of the machine, consisting of a bed-plate *a* and a base *b*, bolted thereto, a head *c*, connected with said bed-plate by uprights *e*, and a box *d*, constituting a fixed die-base, and a plunger-guide fixedly but adjustably secured on said uprights between the base *b* and head *c* by means of binding-screws *f f*. The box *d* is repre-

sented (see Fig. 1) as made in two parts bolted together by screw-bolts *g*. Above the said box *d* is the open die *h*, represented as supported upon said box, but adjustable thereon relatively to the platen by compound wedges *i*, upon which the said die is held down by screw-bolts 20 and nuts 21, as will be hereinafter fully explained. The upright sides of the interior of this die correspond in their longitudinal profile with the form of the outline of the sides of the tile or other article to be produced.

j is the platen, arranged above the die and having its face large enough to completely cover and close the mouth of said die. This platen has an upright stem which works in a vertical slideway *k* in the press-head *c* and is operated by a cam *l* on a horizontal rock-shaft *m*, which works in fixed bearings in or on the head *c*, the said cam acting on the back of the platen, as shown in Figs. 1 and 2, to hold it down on the upper face of the die *h* and acting on an antifriction-roller 22, pivoted to the stem of the platen, as shown in Fig. 3, for raising the platen.

n is the plunger, secured in any suitable manner to the block *o*, which slides vertically within the die-supporting and plunger-guiding box *d* and which is furnished with an antifriction-roller 50, through which it is acted upon, for the purpose of raising the plunger, and thereby producing the pressure of the material within the die by a cam *p* on a rotary shaft *q*, working in bearings on the base *b*. The downward movement of the plunger-block *o* and the plunger *n* is produced by means of compression-springs 23, the upper ends of which abut against lugs 51, attached to the box *d*, and the lower ends of which press against a bar *r*, secured to the bottom of the plunger-block *o*.

s is a feed-box which receives the material to be compressed, generally in a state of powder, from a hopper or reservoir *t* and carries it to a position over the die. This feed-box, open at top and bottom, is wide enough in all directions to surround the opening of the die, and it has attached to and projecting backward from its rear edge a plate 24, forming a cut-off to the hopper. This feed-box slides upon a thin steel plate *u*, which is fast on the top of the die and which consequently forms

a portion of the depth of the latter, the said plate projecting backward far enough under the hopper to form a bottom to the feed-box, as shown in Figs. 2 and 3, when the said box is under the hopper. The feed-box is moved back and forth between the hopper and the die *h* by means of a grooved cam *v* on the rotary shaft *q*, the said cam transmitting motion through its yoke-rod *w* to the arm *x* of a rock-shaft *y*, which works in fixed bearings on the bed-plate *a* and which has another arm *z* connected by a link 25 with the feed-box.

The rock-shaft *m*, for operating the platen, derives its motion from a grooved cam 26 on the shaft *q*, the said cam transmitting motion to said rock-shaft through a yoke-rod 27, which connects with a wrist-pin 28 (see Fig. 1) in a short toothed sector-lever 29, which works on a fixed pivot 30 on the head *c* and which gears with a toothed sector 31 on the rock-shaft.

In front of the die *h* is an endless apron 32 for carrying and delivering the tiles or articles which have been produced in the die, the said apron running on two rollers 33 34, of which 33 is the driver receiving motion through a pulley 35 from any suitably-driven belt. (Not shown). The roller 34, which is arranged as close as practicable to the die, is made adjustable vertically to bring the top of the apron to a level with the tops of dies of different depth or thickness, is journaled in a carrier 36, which is pivoted to the top of the plunger guide-box and adjustable vertically by means of a screw 37, upon which it rests, the said screw screwing through a tapped hole in a lug provided on the box *d*. The top plate *u* of the die, before described, is extended forward to partly overlap the roller 34 to form a practically continuous path for the tiles or other articles from the die to the apron.

The shaft *q*, from which the plunger, the feed-box, and the platen all derive motion, may be driven in any suitable manner. It is represented as geared for that purpose by gears 38 39 with a driving-shaft 40, furnished with a driving-pulley 41.

The description which is to follow of certain adjuncts of the press not yet herein mentioned, may be rendered more easy and better understood by first describing, as we will now proceed to do, the operation of the principal parts, the construction and organization of which have been above fully described.

We will first suppose the plunger, the platen, and the feed-box to be in the relative positions shown in Fig. 8, which represents a section corresponding with Figs. 2 and 3 of those parts. The platen is raised, the plunger is drawn down, and the bottomless feed-box is over the die, wherein it has just deposited a charge of material sufficient for the tile or other article, which will be hereinafter mentioned as the "tile," the hopper being closed by the cut-off 24, attached to the feed-

box. The feed-box is then drawn back from the die to the hopper or reservoir *t*, whence it takes a new charge, the platen is brought down solidly on the die, forming a head there- to, as shown in Fig. 2, and the plunger begins to ascend to compress the material within the die against the platen *j*. When the compression produced by this ascent is sufficient, the platen is lifted from the die, the ascent of the plunger continuing till its face is flush with the upper face of the die, as shown in Fig. 3, and the formed and compressed tile (indicated by 42 in said figure and in Fig. 4) is thus expelled from the die. The feed-box next moves forward over the die with a fresh charge of material, and so doing pushes the tile 42 from the die to the delivery-apron 32, as shown in Fig. 8. The plunger then descends the proper distance, according to the depth to which the die is to be filled, which is regulated by an adjustable stop consisting of a screw 70, which screws through a fixed lug 71 on the bottom of the box *d*, and the fresh charge of material drops from the feed-box into the die, the parts now being all again in the positions shown in Fig. 8, ready to repeat the several operations described.

In the above-described operations the ascent of the plunger produced by the cam *p* is not regular and continuous, but is first nearly sufficient to produce complete compression and is then temporarily arrested to permit the escape before final compression of some of the air that may have been retained in the interstices of the pulverulent or granular material of which the tile is to be made, which escape may take place downward between the plunger and the die, as these are not fitted perfectly air-tight. After a short rest for this escape the plunger makes a further slight ascent to complete the compression, the platen being still held down on the die, and after that it makes a short descent, which leaves a space between the plunger and the tile for the further escape of air. This descent is followed by a further ascent to produce the final compression. The platen then rises, and the continued upward movement of the plunger forces out the tile from the die. To explain how these movements are produced, we have given in Fig. 5 a diagrammatic view of the cam *p*, of which the parts from 1 to 2 produce the first compression, the parts from 2 to 3 retain this compression and permit the escape of air, the part between 3 and 4 produces the further compression, the part between 4 and 5 producing the retraction of the plunger for further escape of air, the part between 5 and 6 produces the final compression, and the part from 6 to 7 produces the expulsion of the tile from the mold.

For the purpose of cleaning the face of the platen there is attached to the feed-box a brush 43, which as the feed-box moves back and forth under the raised platen brushes

from its face any matter that may have adhered to it after the compression of the tile. For the purpose of wiping the face *u* of the mold in advance of the forwardly-moving feed-box there is placed in front of the said box and attached thereto a wiper 44, made of or faced with felt; but as this wiper requires to be raised out of contact from the charged mold as the feed-box retires it is carried by the front end of elbow-levers 45, fulcrumed at 46 to the sides of the box. One of these levers and the mechanism operating in connection with it for raising and depressing the wiper is shown imperfectly in Fig. 1, but better in Figs. 9 and 10, which are side views, on a larger scale, of the feed-box, the upper part of the die, and the wiper mechanism. To the rear end of this lever 45 is pivoted a gab-hook 47, of which a detached view is given in Fig. 11, for the purpose of engaging with a pin 48, affixed to the side of the feed-box. This hook is furnished on one side with two projections 49 52, upon the latter of which is exerted constantly the downward pressure of a spring 53, which is attached to the feed-box, while the said projection 49 moves back and forth with the feed-box between two stationary upward projections 54 55 on the top of the face-plate *u* of the die. To explain the wiping operation, we will first suppose the feed-box to have started on its forward movement, as shown in Fig. 9. The spring 53 then pressing on the projection 52 of the gab-hook, while the rounded nose of the said hook is against the front of the pin, depresses the forward part of said hook and so pushes forward the upper arm of the lever 45 and presses down the wiper on the plate *u*. As the feed-box is just about to complete its forward movement the projection 49 of the hook strikes the projection 54 and causes the holding back of the said hook in such manner that the completion of said movement produces a pull of the hook on the lever, which raises the wiper, while the pin 48, moving with the feed-box, slips under and beyond the rounded nose of the hook until it reaches the gab of the latter, when the hook is depressed by the spring 53 and caused to engage with the pin and lock the wiper in its raised position clear of the plate *u*, in which condition it remains, as shown in Fig. 10, during the backward movement of the feed-box until the latter movement is just about to be completed, when the projection 49 of the hook strikes the fixed projection 55, and the continued movement of the feed-box while the hook is arrested by the projection 55 causes the lifting of the gab of the hook from the pin 48, and the completion of said movement carries the pin beyond the nose of the hook, when the spring 53 presses down the hook in front of the pin 48, and so causes the wiper to be locked down again in the operative position shown in Fig. 9.

The means for adjustably supporting the

die *h* on the box *d*, hereinbefore mentioned, consisting of the compound wedges *i*, which are only imperfectly represented in the views of the machine, are fully represented in Figs. 12 and 13, which are respectively a side and an end view of one of said wedges. The lower wedge member, which rests upon the box *d*, has provided on its butt or outer end an up-turned lug 56, through an upright slot in which there passes and turns freely a screw 57, which screws into the upper member, the said screw having upon it outside of the lug 56 a head 58, adapted to receive a wrench, and having fast upon it inside of said lug a collar 59. The die rests upon the upper wedge members and is adjusted vertically to the proper height relatively to the platen by turning the screws 57 to move the upper wedge members upon the lower ones. The holding-down bolts 20, hereinbefore mentioned, of the die are shown as having their heads received in T-shaped grooves 60 in the top of the box *d*, the said grooves being open outward to the sides of said box. The said bolts pass through open slots in the flange which surrounds the lower part of the die and above which the holding-down nuts 21 are applied to said bolts. The bolts thus applied are easily removable laterally or horizontally from the box *d* and the die *h* and as easily replaceable to permit the removal and replacement or changing of the dies, which can be inserted or taken away in a lateral direction. This provision for insertion, removal, and replacement of the dies, together with their vertical adjustment by the compound wedges, affords facility for the use in the same press of interchangeable dies of different depth or thickness and form.

To provide for the lubrication of the plunger, and through it of the die, an annular oil-tube 61 is inserted into a recess provided for it in the bottom of the die, where it surrounds the plunger. This tube is shown imperfectly in Figs. 2, 3, and 8, but better on a larger scale in Figs. 12 and 16, of which Fig. 15 represents in vertical section portions of the die and plunger, together with said oil-tube and its appurtenances. The said tube is provided with an open-mouthed laterally-projecting spout 62, through which it is supplied with lubricating-oil, and the inner circumference of its ring is perforated for the issue of the oil around the plunger. To slowly and properly regulate the delivery of oil to the plunger, a ring 63 of fibrous or absorbent material, as felt, is secured to the bottom of the die by a metal ring 64, which is screwed to the die by screws 65 and holds not only the felt but the annular tube itself in place. The oil is distributed from the perforations of the tube to the felt and by it to the plunger, which in its turn gives it to the die. The screws may be adjusted to more or less compress the felt, and so give a more or less restricted supply to the plunger.

To provide for the disconnection of the platen *j* from its operating-rod 27 and the raising of it high enough to get easy access to the die or to the feed-box, the connection between the said rod 27 and the wrist 28 of the sector-lever 29 is made by a gab-hook 66, which is closed by a spring-actuated sliding bolt 67, by the withdrawal of which from the gab the rod 27 is allowed to fall back out of engagement with the wrist, as shown in Fig. 14, which is a side view of the upper parts of the press. When the rod is thus disengaged, the platen can be raised by the operation of its cam *l* by a hand-lever 68 (shown in Fig. 14) on its shaft *m*.

With regard to the to-and-fro movement of the feed-box provision is made for the shaking of said box over the die between the termination of its forward movement and the commencement of its backward movement by a recess 69 (see Fig. 7) in its operating-cam *v*, which causes first a slight rapid backward movement and afterward a slight rapid forward movement of the box before it is taken back to the hopper.

To give a yielding character to the pressure produced by the cam *p* on the plunger, the uprights *e* are made capable of a limited vertical movement in the sockets provided for them in the base *b*, and strong spiral springs 80 are placed upon the said uprights at the bottoms of said sockets between the base *b* and the nuts 81, which are applied to screw-threads on the said uprights to secure them in place.

What we claim as our invention is—

1. In a press for molding and compressing, the combination of an open die and a support therefor, a movable platen overlying said die for covering and closing the mouth thereof, a plunger entering said die through its bottom, means for operating said platen, and means for operating said plunger whereby without withdrawing it from the die it is caused first to receive an upward movement therein for producing partial compression of material in said die, afterward to be retracted therein to permit the escape of air from said material and finally to receive a further upward movement for completing the compression, substantially as herein described.

2. In a press for molding and compressing, the combination of an open die and a support therefor, a movable platen overlying said die for covering and closing the mouth thereof, a plunger entering said die through its bottom, means for operating said platen, and means for operating said plunger whereby while in the die it is caused first to receive an upward movement to produce a first compression of the material therein, next to remain for a time stationary for permitting the escape of air from said material, next to receive a further upward movement for further compressing the material, next to receive a downward movement for further escape of air, and

finally to receive a further upward movement greater than the first-named upward movement for completing the compression, substantially as herein described.

3. In a press for molding and compressing, the combination of an open die, a fixed base for said die, a platen movable toward and from said die, means for operating said platen, wedges on said base for adjusting said die relatively to the platen, and screw-bolts for holding down the die upon its adjusting-wedges, substantially as herein described.

4. In a press for molding and compressing, the combination of a die open at top and bottom, a support for said die, a platen above said die movable toward and from it, a plunger operating through the bottom of said die, a feed-box movable across said die between it and said platen, a brush carried by said feed-box for wiping the face of the platen and means for operating said platen, plunger and feed-box, substantially as herein described.

5. In a press for molding and compressing, the combination of a die open at top and bottom, a support for said die, a platen above said die movable toward and from it, a plunger operating through the bottom of said die, a feed-box movable across said die between it and said platen, a wiper attached to said box for wiping the face of the die and means for operating said platen, plunger and feed-box, substantially as herein described.

6. In a press for molding and compressing, the combination of a die open at top and bottom, a support for said die, a platen above said die movable toward and from it, a plunger operating through the bottom of said die, a feed-box movable across said die between it and said platen, a wiper attached to said box for wiping the face of the die, mechanism between the feed-box and the die for depressing said wiper to the die during the movement of said box in one direction and for raising said wiper during its movement in the other direction, and means for operating said platen, plunger and feed-box, substantially as herein described.

7. In a press for molding and compressing, the combination with a die and a plunger working therein, of a lubricating device consisting of an annular perforated oil-tube surrounding the plunger, a metal ring also surrounding the die for confining said tube to the die, a ring of absorbent material between said metal ring and oil-tube, and screws for securing the said tube and rings to the die and for more or less compressing said absorbent ring, substantially as herein described.

8. In a press for molding and compressing, the combination of a die and a support therefor, a movable platen above said die for closing the mouth thereof, a rock-shaft and a cam thereon for operating said platen, a toothed sector and a hand-lever on said rock-shaft, a toothed sector-lever having a fixed fulcrum and engaging with the first-men-

tioned sector, a rotary shaft and a cam thereon,
and a detachable connection between the last-
mentioned cam and said sector-lever, all sub-
stantially as and for the purpose herein de-
scribed.

5

In testimony that we claim the foregoing as
our invention we have signed our names, in

presence of two witnesses, this 11th day of
June, 1900.

GEORGE BASS.
OSCAR BERGSTROM.

Witnesses:

FREDK. HAYNES,
L. M. EGBERT.