F. S. HARTWELL & L. C. SEARS.

MACHINE FOR FORMING CEMENT TILES.

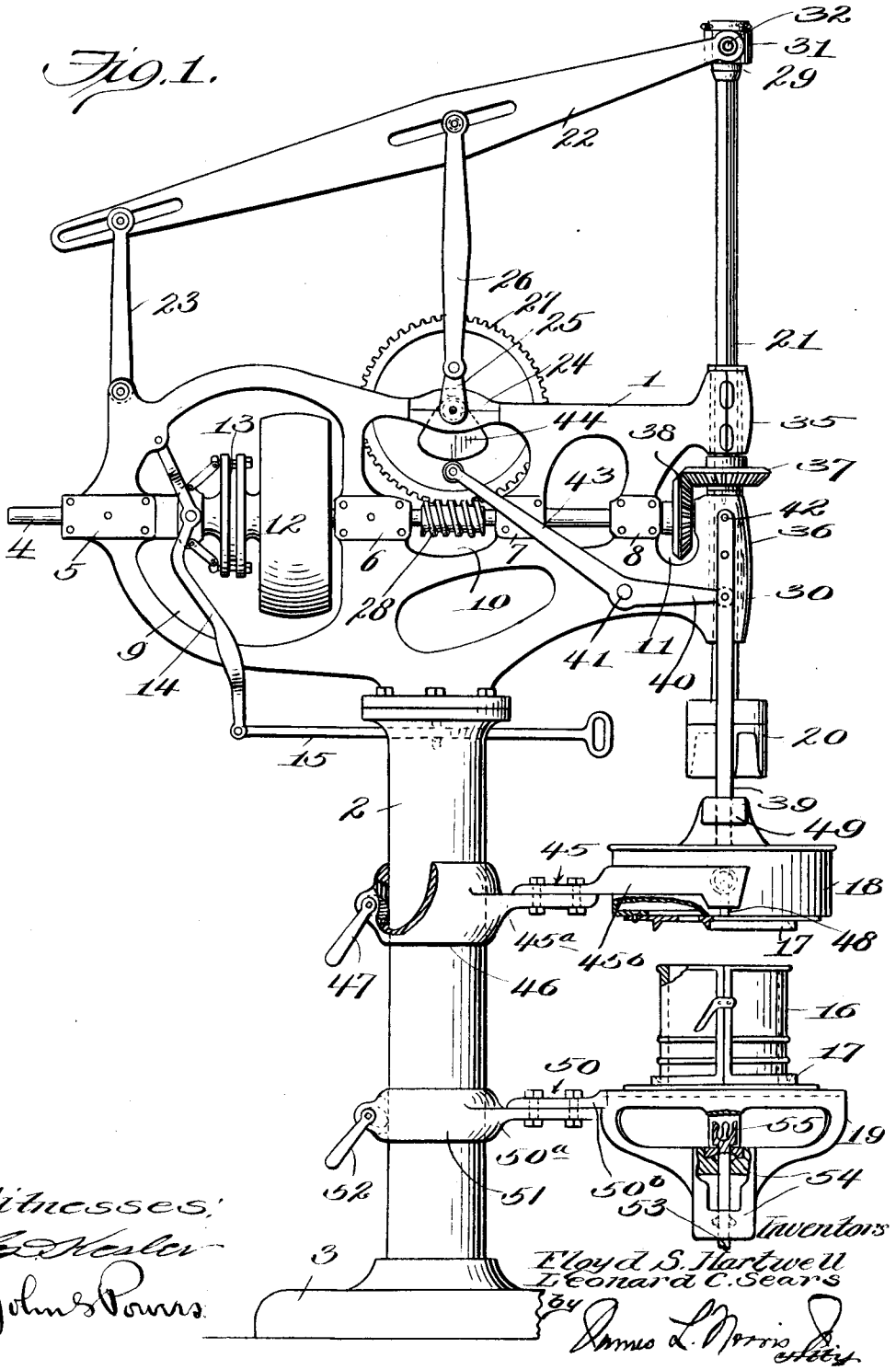
APPLICATION FILED SEPT. 22, 1911.

1,036,618.

Patented Aug. 27, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



F. S. HARTWELL & L. C. SEARS.
MACHINE FOR FORMING CEMENT TILES.
APPLICATION FILED SEPT. 22, 1911.

1,036,618. Patented Aug. 27, 1912.

4 SHEETS—SHEET 2.

Fig. 3.

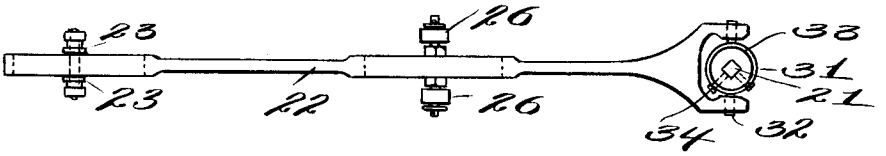


Fig. 4.

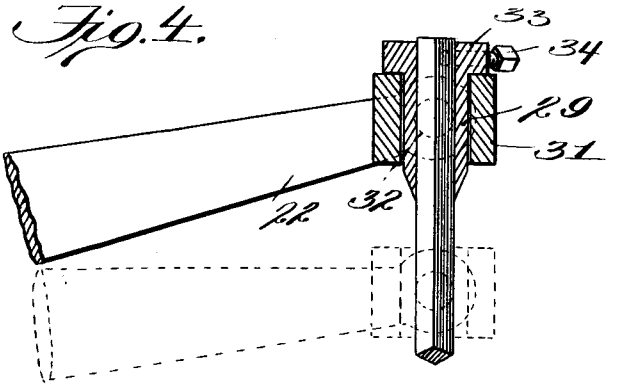


Fig. 2.

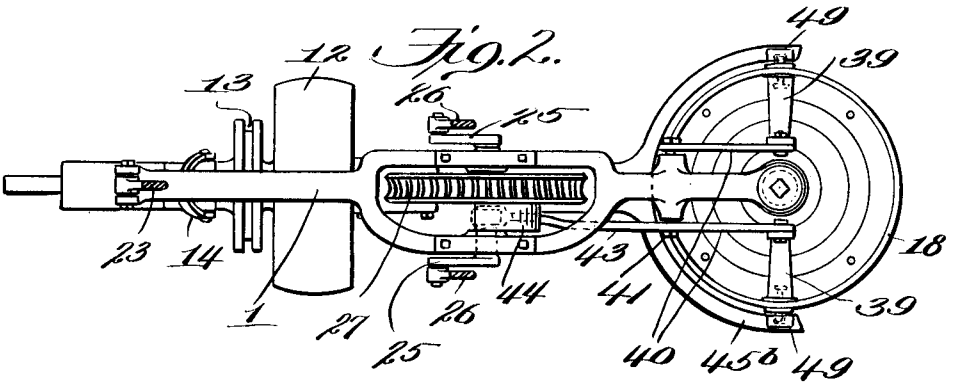
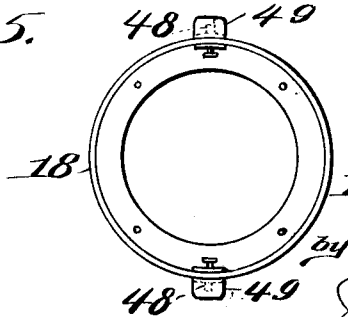


Fig. 5.



Witnesses:
C. E. Keeler
John S. Sowers.

Inventors
Floyd S. Hartwell
Leonard C. Sears
by
James L. Norris
Atty.

F. S. HARTWELL & L. C. SEARS.

MACHINE FOR FORMING CEMENT TILES.

APPLICATION FILED SEPT. 22, 1911.

1,036,618.

Patented Aug. 27, 1912.

4 SHEETS—SHEET 3.

Fig. 6.

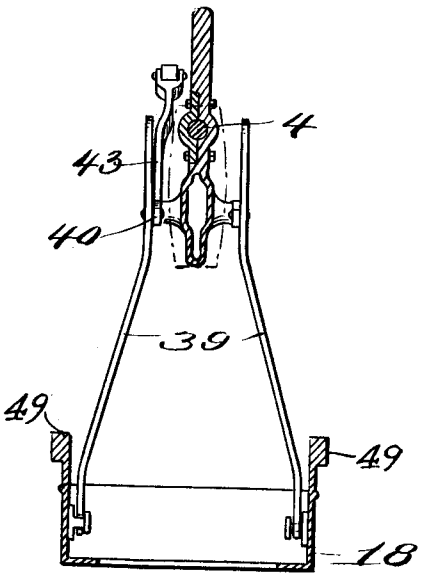


Fig. 7.

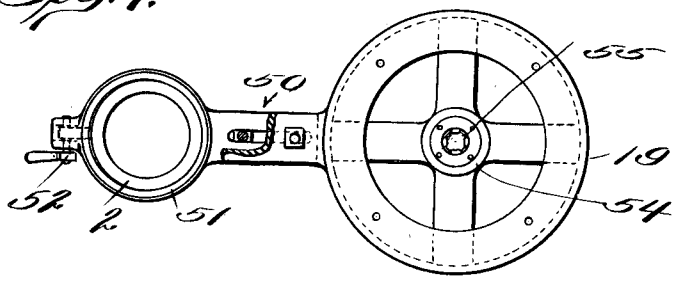
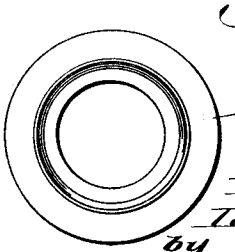


Fig. 8.



Witnesses:

John S. Sowers.

Inventors

Floyd S. Hartwell

Leonard C. Sears

by

James L. Morris, Jr.

Atty.

F. S. HARTWELL & L. C. SEARS.

MACHINE FOR FORMING CEMENT TILES.

APPLICATION FILED SEPT. 22, 1911.

1,036,618.

Patented Aug. 27, 1912.

4 SHEETS—SHEET 4.

Fig. 9.

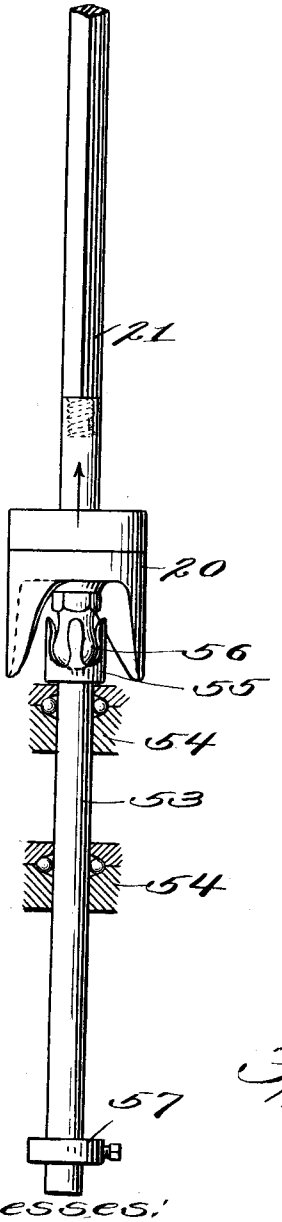


Fig. 10.

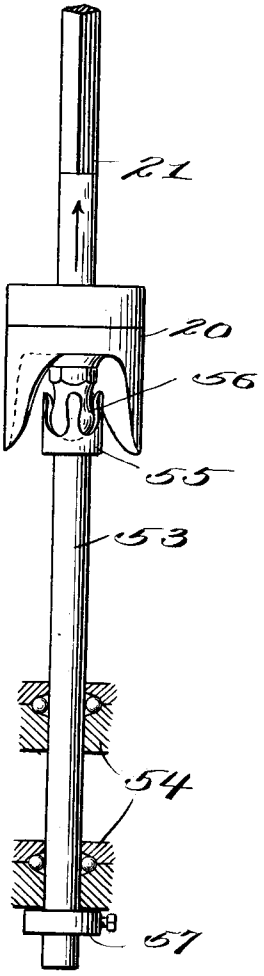


Fig. 11.

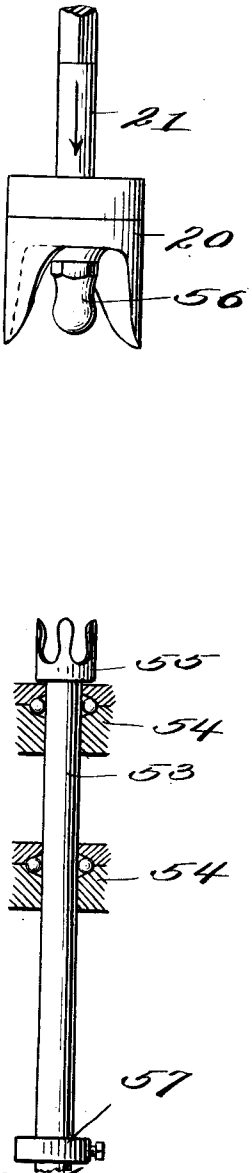
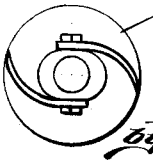


Fig. 12.



Witnesses:
E. E. Hafer
John S. Powers.

Inventors
Floyd S. Hartwell
Leonard C. Sears
by
James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

FLOYD S. HARTWELL AND LEONARD C. SEARS, OF ONAWA, IOWA.

MACHINE FOR FORMING CEMENT TILES.

1,036,618. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed September 22, 1911. Serial No. 650,703.

To all whom it may concern:

Be it known that we, FLOYD S. HARTWELL and LEONARD C. SEARS, citizens of the United States, residing at Onawa, in the county of Monona and State of Iowa, have invented new and useful Improvements in Machines for Forming Cement Tiles, of which the following is a specification.

This invention relates to improvements in machines for forming tiles from cementitious material and the construction proposed is of that type wherein the cement is introduced into a removably supported jacket and is therein formed as a tile by the action of a reciprocatory forming head.

The principal objection to machines of the type referred to is the loss which arises from the wabbling or irregular movement of the forming head as it passes axially through the body of cement confined in the jacket. This loss is very considerable, since the wabbling of the forming heads, which are quite heavy and revolve very rapidly, is transmitted as a series of strong and rapidly succeeding blows to different parts of the cementitious body and thereby results, in many cases, in the destruction or serious injury of the tile in course of formation.

The principal object of the present invention is to eliminate or reduce, as far as possible, loss from the cause referred to and with this object in view the invention proposes a means for positively holding the forming head against wabbling or play, as it moves axially through the body of cement.

The invention also involves certain novel combinations and arrangements of operating parts, to be hereinafter pointed out, and by virtue of which a machine of simple, compact, and readily accessible nature, and which accomplishes its work with speed and facility, is produced.

A machine embodying the features of the present invention is illustrated by way of example in the accompanying drawings, wherein:—

Figure 1 is a side elevation with parts shown in section; Fig. 2 is a top plan view, with the operating beam omitted; Fig. 3 is a detail plan view showing the operating beam; Fig. 4 is a detail sectional view showing the connection between the operating beam and the shaft which carries the forming head; Fig. 5 is a detail plan view of the cement hopper through which the material of which the tile is to be formed is introduced into the mold or jacket; Fig. 6 is a detail sectional view showing the manner of hanging the cement hopper; Fig. 7 is a detail plan view of the supporting platform for the mold or jacket; Fig. 8 is a detail plan view of a pallet for the mold or jacket; Fig. 9 is a diagrammatic elevation showing the relation between the forming head and its guiding and steadying means at the inception of the operative stroke of said head; Fig. 10 is a similar view showing the relation between the forming head and its guiding and steadying means at the moment of completion of the operation of forming a tile; Fig. 11 is a similar view showing the relation between the forming head and its guiding and steadying means subsequent to the formation of a tile; and Fig. 12 is a detail view showing a known construction of forming head in connection with which the features of the present invention may be practised.

Similar characters of reference designate corresponding parts throughout the several views.

The operating parts are carried by a frame 1 which is of integral construction and which is bolted or otherwise secured to an upright pedestal 2, in turn resting upon a base 3. The operation of the machine is produced by a shaft 4, disposed longitudinally of the frame and supported in bearings 5, 6, 7, and 8. These bearings are suitably spaced and have removable cap pieces which are all located on the same side of the frame to provide for the ready removal of the shaft 4 and the parts carried thereby, when the occasion arises. The bearings referred to are located at the ends of openings of suitable outline, which are formed in the frame and which serve the purposes, both of lightening the construction and of enabling a compact and advantageous assemblage of the operating parts. These openings, in so far as they are concerned with the organization of the machine, are indicated by the characters 9, 10, and 11, the bearings 5 and 6 being at the ends of the openings 9; the bearings 6 and 7 being at the ends of the opening 10; and the bearing 8 being at one end of the opening 11.

The shaft 4 carries within the opening 9 a loose pulley 12, which is driven from any suitable motor and a clutch 13 by means

of which the pulley 12 may be operatively connected with said shaft to drive the latter. It will be apparent that the arrangement of the pulley 12 and clutch 13 in the opening 9 is advantageous not only by reason of compactness, but by reason of the security and strength of support which these elements have from the bearings 5 and 6. The clutch 13 is operated to engage or disengage the pulley 12 by a lever 14, which is pivotally hung from the frame and which may be actuated by a conveniently located slidable rod 15.

The tile is formed in a suitably constructed jacket 16 which is held between pallets 17 associated with a cement hopper 18 and a supporting platform 19, respectively. The formation of the tile is produced by a revoluble forming head 20 which is removably secured to the lower end of a shaft 21 and rotates and reciprocates with the latter. The cement hopper 18 is also reciprocatory and its upward movement is timed to occur upon the completion of the formation of the tile by the head 20; and in the interval during which the cement hopper is moving upwardly and downwardly, the attendant removes the jacket 16 with the completed tile therein from the platform 19 and substitutes an empty jacket in which the next tile is to be formed.

Reciprocatory movement is imparted to the shaft 21 by an oscillatory beam 22 arranged above the frame and which at its rear end is adjustably connected, for example by the well known slot and pin device, to radius links 23, the latter being pivoted to the frame 1. The connections for oscillating the beam 22 comprise a transverse shaft 24 which is journaled in a bearing associated with the frame and is arranged above the shaft 4; crank arms 25 formed on the shaft 24; and pitmen 26 connecting the crank arms and the beam 22, the pitmen being adjustably connected to the beam by a pin and slot device or some other suitable connection. The shaft 24 carries a worm wheel 27 which gears with and is driven by a worm 28 fixed on the shaft 4 and located in the opening 10 of the frame.

The shaft 21 is slidable through guide sleeves 29 and 30, said shaft having a square cross section to which the openings of the sleeves conform in order that the shaft and the sleeves may turn together. The sleeve 29 is rotatable in a bearing collar 31 which is pivoted as at 32 in a fork at the forward end of the beam 22; and said sleeve is also formed at its upper end with a flange 33 which rests upon the collar 31, thereby supporting the sleeve and through which passes a screw 34 to connect the sleeve 29 and the shaft 21. The sleeve 30 is journaled in upper and lower bearings 35 and 36 at the forward end of the frame and in the space between said bearings carries a bevel gear 37 which is in mesh with and is driven by a bevel gear 38 fixed upon the forward end of the shaft 4 and arranged in the opening 11.

The cement hopper 18 is carried by hangers 39 which depend from the ends of arms 40, these being fixed at opposite sides of the frame upon a rock shaft 41. The hangers 39 are pivotally connected to the arms 40 and the connecting pivot pins may be passed through any one of the openings 42 in said hangers whereby the position of the hopper 18 with relation to the platform 19 may be varied in accordance with the height of the jacket to be employed. One of the arms 40 is provided with a lever extension 43 which projects angularly and rearwardly and carries at its rear end a friction roller to engage the peripheral surface of a cam 44 fixed upon the shaft 24. The cam and the lever extension 43, in connection with the arms 40, constitute a means for reciprocating the hopper 18.

The hopper 18 is supported by and slidable with relation to a bracket 45 which includes adjustably connected parts 45^a and 45^b. The part 45^a is formed with a collar 46 which slidably surrounds the pedestal 2 and which may be fixed at any desired point on said pedestal by a cam lock 47. The part 45^b is formed as a fork, the arms of which are vertically recessed at their ends to accommodate guide ribs 48 formed at opposite sides of the hopper 18. Said hopper is also provided above the guide ribs with lugs 49 which engage and rest upon the arms of the part 45^b when the hopper is in its lowermost position.

The platform 19 is supported by a bracket 50 which includes adjustably connected parts 50^a and 50^b. The part 50^a is formed with a collar 51 which slidably surrounds the pedestal 2 and which may be fixed at any desired point on said pedestal by a cam lock 52. The platform may be secured to or it may be integral with the part 50^b.

As previously stated the invention includes a means for guiding and steadying the forming head 20 during its axial movement through the body of cement in the jacket 16 and this means preferably includes a rod 53 which is slidable and rotatable in bearings 54 formed as a part of the platform 19. The rod 53 carries at its upper end an enlarged socket 55 having spring gripping fingers and which coöperates with a knob 56 arranged co-axially with the shaft 21 and under the head 20. The rod 53 carries at its lower end an adjustable collar 57, the office of which is to engage the lower bearing 54 and thereby limit the upward movement of said rod and cause the disengagement of the socket 55 and the knob 56.

Referring to Fig. 1 it will be observed

that the head 20 and the hopper 18 are at the limit of their upward movement and are ready to commence their downward stroke. The jacket 16 shown is assumed to have just been placed in position. The hopper remains in its uppermost position during the first portion of the downward movement of the head 20 and until said head has started to pass through the upper pallet 17, at which time the hopper moves downwardly with the head. When the head 20 reaches its lowermost position its knob 56 engages with the socket 55. At such time cement is quickly poured into the jacket through the hopper and thereafter the head commences its upward movement (Fig. 9). As the forming head moves upwardly through the jacket it is held against wabbling and vibration by the rod 53 which is efficiently steadied in the guides 54. It will of course be obvious that the engagement of the knob 56 in the socket 55 causes the rod 53 to be lifted by the head 20 and said rod thus acts to steady the head continuously with the movement of the latter through the jacket. As the head 20 passes from the jacket the collar 57 engages the lower bearing 54 and is thereby effective to limit the upward movement of the rod 53 and to cause the disengagement of the knob 56 and the socket 55. The rod 53 thereupon drops by gravity to its original position (Fig. 11) in which it remains until the knob 56 again engages the socket 55 in the manner above explained. It will be understood that when the head 20 passes from the jacket it has completed the operation of forming a tile in said jacket and at such time the upward movement of the hopper 18 takes place. As said hopper moves upwardly the pallet 17 carried thereby obviously releases the jacket which, together with the tile contained therein, is then removed by the attendant and an empty jacket substituted. The operation then proceeds in the manner detailed.

The machine is adapted to form tiles or similar articles of varying sizes, governed of course by the dimensions of the jacket and of the forming head. In changing from jackets of one size to jackets of another the proper adjustment of the shaft 21 is made by manipulation of the connections of the beam 22 with the radius links 23 or with the pitmen 26 or with both; the position of the hopper 18 with reference to the platform 19 is regulated by placing the pins which connect the hangers 39 and the arms 40 in the desired openings 42, (it being understood that as many of these openings may be provided as is necessary or desirable); and the position of the brackets 45 and 50 is changed as required by loosening the cam locks 47 so as to enable the brackets to be moved to the desired point on the pedestal 2 and then by tightening said locks. It will be apparent that said brackets may not only be adjusted vertically with relation to the pedestal but they may also be adjusted pivotally so as to secure an accurate centering of the hopper and of the platform with relation to the forming head.

The mechanism described for effecting the operative movements of the shaft 21 and of the hopper is of extremely simple, compact, and efficient character. It will be observed that the reciprocatory movement of each of these elements is effected by mechanism which is directly driven by the shaft 24 and that such mechanism is devoid of springs, for producing return movements of the parts. In the case of the shaft 21 the operating mechanism is arranged at the upper side of the shaft 24 and in the case of the hopper 18 the operating mechanism is arranged at the lower side of the shaft 24. This arrangement contributes to the uniform balancing and compactness of the machine and provides for the location of the beam 22 above instead of below its operating shaft. Said beam being thus located may, as shown be of integral character throughout its extent instead of consisting of jointed parts as in many existing types. The location of the beam above the frame is furthermore of advantage in that it enables the shaft 21 to be made of considerably less length than the forming head shafts in many of the existing types. The manner of mounting the beam 22 is of distinct advantage since the forward end of the beam has a perpendicular instead of a curved thrust, thus enabling the use of a connection between said beam and the shaft 21 which is not susceptible to relatively great wear and which is not detrimentally affected by such wear as takes place. Ordinarily in machines of this type the operating beam is pivoted on a fixed instead of a yielding axis and the connection between the beam and the forming head shaft (at which point the greatest wear occurs) is in the nature of a pin and slot device. Such a device is highly unsatisfactory at this particular location since it is inherently weak (relatively speaking) and since the pin is being constantly worn and sheared to such an extent as requires frequent renewal or repair of the connection, thereby directly and indirectly being a source of trouble, delay, and expense.

It is to be understood that no specific description herein contained is intended to put any limitation upon the scope of the appended claims which does not inhere in the language thereof.

Having fully described our invention we claim:

1. In a machine of the type set forth, the combination with a jacket and operative in its movement to form a tile, a forming head

movable through the jacket, and an element by which the forming head is carried, of a means structurally independent of the element for positively guiding and steadying the forming head in its operative movement through the jacket.

2. In a machine of the type set forth, the combination with a jacket and operative in its movement to form a tile, a forming head movable through the jacket, and an element by which the forming head is carried, of a movable positively guided member constructed for association with the forming head during the operative movement of the latter through the jacket to guide and steady said head in its operative movement and means for causing the dissociation of the forming head and the member at the completion of the operative movement of the former.

3. In a machine of the type set forth, the combination with a jacket, a reciprocating shaft, and a forming head carried at the lower end of the shaft of a platform upon which the jacket is supported and which is formed with axially located bearings, a rod slidable through the bearings and positively guided by the latter, a knob arranged under the head, a spring socket carried by the rod for engagement by the knob and a collar arranged at the lower end of the rod to limit the upward movement thereof and to cause the disengagement of the socket and the knob at the moment the forming head passes upwardly from the jacket.

4. In a machine of the type set forth, in combination, an oscillatory operating beam, a radius link pivotally connected therewith as a support, a forming head, a shaft carrying the forming head and having a square cross section, a collar mounted for rocking movement at the forward end of the beam, and a sleeve journaled in the collar and connected to the shaft for rotation therewith.

5. In a machine of the type set forth, in combination, a jacket, a forming head which has reciprocatory movement through the jacket and is operative on its upward stroke to form a tile, a positively guided element by which the forming head is carried, a second positively guided element automatically engageable with the forming head when the latter comes into its lowermost position and movable with the forming head as the latter passes upwardly through the jacket, and means for causing the dissociation of the forming head and said second element as the forming head passes from the jacket.

6. In a machine of the type set forth, in combination, an oscillatory beam, a shaft arranged below the beam having a crank arm, a pitman connection between the crank arm and the beam at an intermediate point of the latter, a radius link supporting the beam at its rear end, a forming head, a vertically reciprocatory shaft carrying the forming head, and a bearing for the upper end of said vertically reciprocatory shaft, said bearing being pivotally connected for rocking movement to said beam at the forward end of the latter.

7. In a machine of the type set forth, in combination, a stationarily supported jacket, a hopper movable toward and away from the upper end of the jacket, a forming head movable through the hopper and through the jacket, a bracket having a forked end associated with the hopper to positively guide the latter in its movements with relation to the jacket, and means for reciprocating the forming head and the hopper.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

FLOYD S. HARTWELL.
LEONARD C. SEARS.

Witnesses:
C. W. BISBEE,
C. C. HONEYMAN.