4 Sheets--Sheet 1.

T. COOK.

Press for Forming Concrete Paving and Building Blocks.

No. 161,867. Patented April 13, 1875.

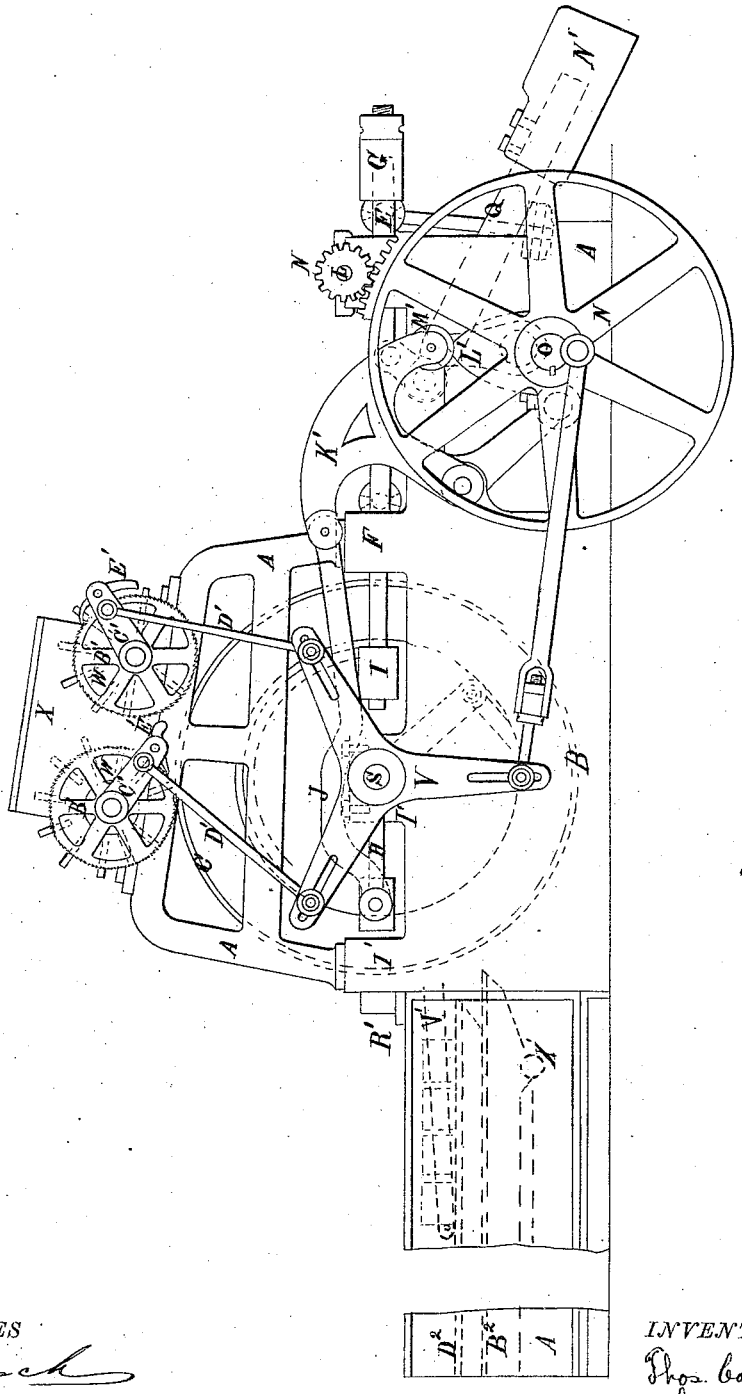

Fig. 1.

WITNESSES

E. S. Harmer.

INVENTOR

Thos. Cook

By Hill & Ellsworth

His Attorneys

4 Sheets--Sheet 2.

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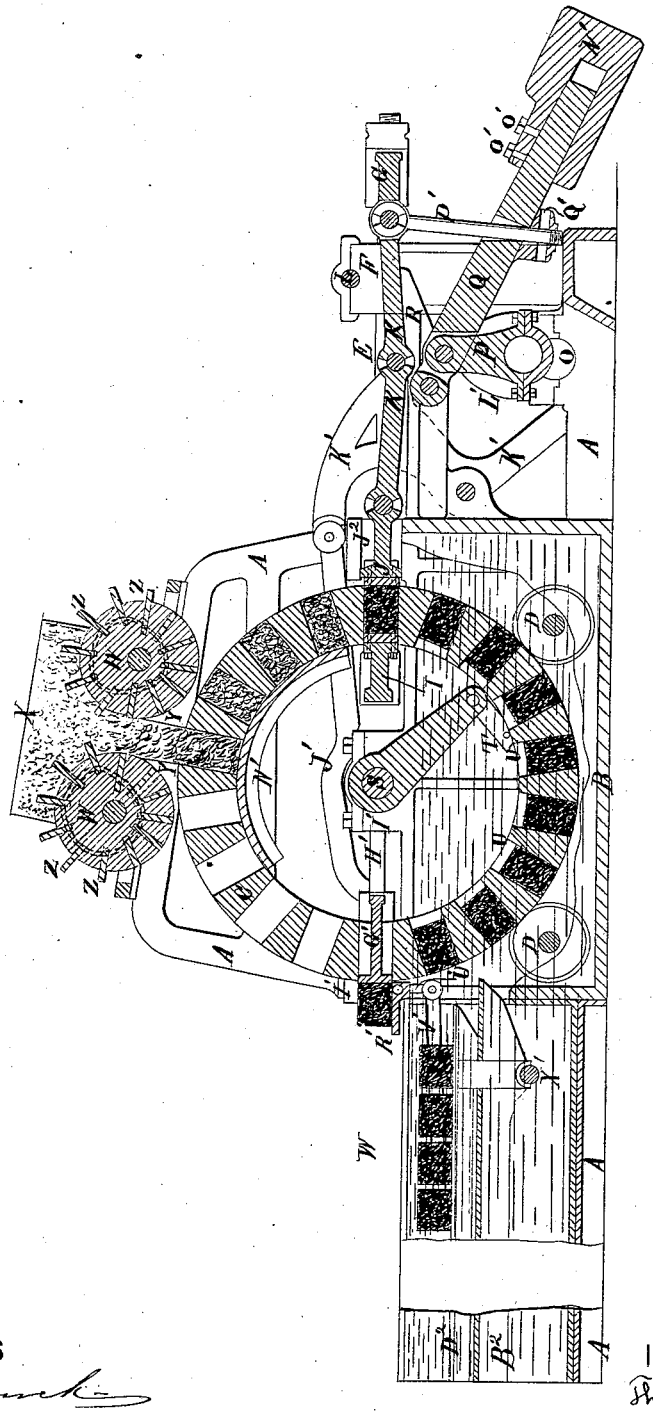

Fig. 2.

WITNESSES

M. C. Church
E. S. Harner.

INVENTOR

Thos. Cook
By Hill Kellogg & Co.
His Attorneys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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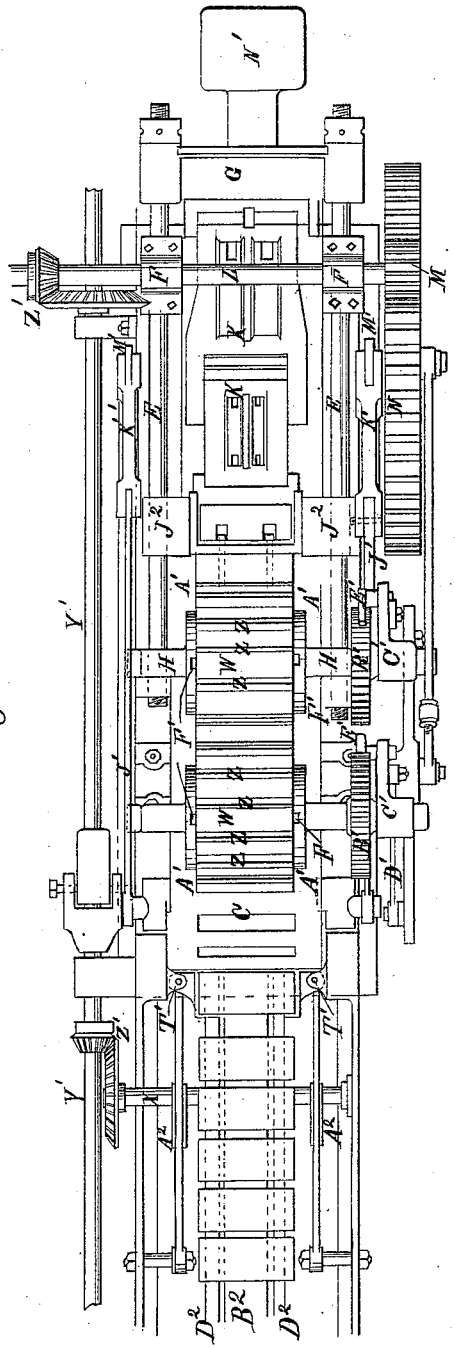

Fig. 3.

WITNESSES

C. Edmunds

E. S. Harner.

INVENTOR

Thos. Cook

By Hill & Ellsworth

His Attorneys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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Fig. 5.

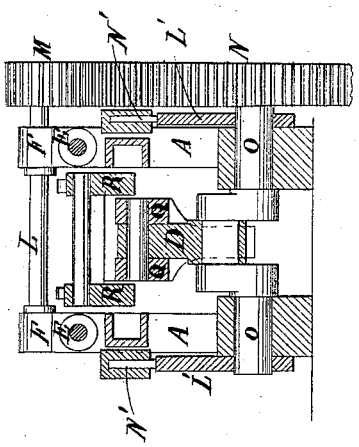


Fig. 6

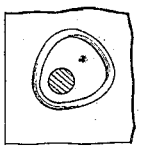
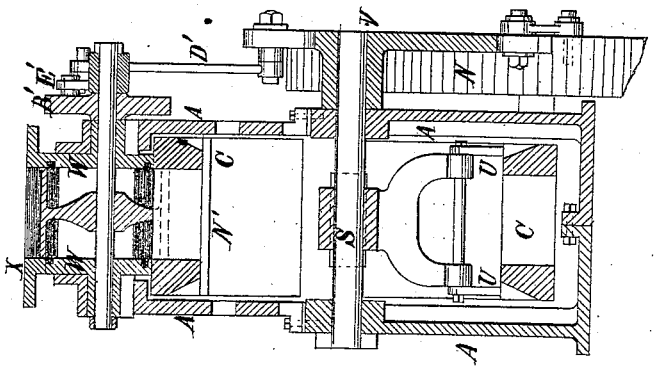


Fig. 4.



WITNESSES

M. C. Church

C. S. Kanner.

INVENTOR

Thos. Cook

By Wm. Ellsworth

His Attorney.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

THOMAS COOK, OF SING SING, NEW YORK, ASSIGNOR TO J. R. DOS PASSOS AND ZACHARIAH E. SIMMONS, OF NEW YORK CITY.

IMPROVEMENT IN PRESSES FOR FORMING CONCRETE PAVING AND BUILDING BLOCKS.

Specification forming part of Letters Patent No. **161,867**, dated April 13, 1875; application filed February 24, 1875.

To all whom it may concern:

Be it known that I, THOMAS COOK, of Sing Sing, in the county of Westchester and State of New York, have invented a certain new and Improved Press for forming Concrete and other Paving and Building Blocks; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings forming part of this specification, in which—

Figure 1, Sheet 1, is a side elevation of the press. Fig. 2, Sheet 2, is a longitudinal section of the same. Fig. 3, Sheet 3, is a top-plan view. Fig. 4, Sheet 4, is a transverse vertical section, taken in the plane of the line *x x*, Figs. 1 and 2. Fig. 5, Sheet 4, is a similar section, taken in the plane of the line *y y*, Fig. 2; and Fig. 6, Sheet 4, is a detached view of one of the cam-plates.

Similar letters of reference in the accompanying drawings denote the same parts.

My invention relates to that class of presses for the formation of paving and other blocks in which a plunger and platen are mounted upon two parallel rods or bars, and operated by a toggle-joint to press the material between them within an intermittingly-rotating mold wheel or rim. It has for its object to improve the operation and efficiency of such presses, and to that end consists, first, in the method of operating the toggle-joint from the counter-shaft of the press, to move the platen and plunger within the mold-wheel. It also consists in the means employed for imparting an intermitting rotation to the mold-wheel, so as to successively present the molds for the action of the feeding devices, the plunger, and the discharger, the wheel remaining at rest during the feeding, pressing, and discharging operations. It also consists in the mode of operating the discharger or follower from the counter-shaft, to discharge the pressed blocks outward from the wheel upon the side opposite the pressing mechanism. It also consists in withdrawing the discharger from the molds by the positive action of a cam and bell-crank lever, to prevent the follower from adhering to the faces of the molds. It also consists in a release motion to relieve the pressure of the plunger and platen, and prevent the press from breaking or becoming strained when the movements of the plunger and platen are varied by a difference in the size of the blocks or the presence of any unyielding substance therein. It also consists in producing the release motion by a weighted lever connecting the toggle-joint with a link upon the counter-shaft. It also consists in adapting the weight for adjustment to regulate the pressure of the plunger and platen. It also consists in suspending the weighted lever from the toggle-joint by means of a rod, in such a manner as to permit the lever to rise and fall freely when the press is operated. It also consists in an elastic cushion applied to the lower end of the suspending-rod, for the purpose of absorbing the shock of the lever in falling. It also consists in the employment of two rollers provided with radially-reciprocating blades, for feeding the material into the mold-wheel. It also consists in adjusting the point of projection and retraction of the feeding-blades with respect to the space between the feed-rollers, for the purpose of regulating the force of the feed into the mold-wheel. It also consists in the construction of the feed-hopper. It also consists in imparting an intermitting rotary motion to the feed-rollers, for the purpose of feeding the material when the molds are open to the hopper, and to prevent the material from being pressed down when the wheel is in motion. It also consists in a rising and falling plate arranged to receive the pressed blocks from the molds and carry them down to the cooling-tank and block-carriers, for the purpose of protecting the edges and corners of the blocks from injury. It also consists in a carrier having an intermitting reciprocating movement, to receive and carry off the pressed blocks from the rising and falling plate, and at the same time expose them to a cooling and drying medium. Lastly, my invention consists in running the mold-wheel within a reservoir of cold water, for the purpose of cooling the molds, as well as the pressed blocks contained therein, so that the latter may be discharged without adhering to the molds.

In the accompanying drawings, A is the cast-iron frame-work of the press, formed with a tank or reservoir, B, and C is the mold rim

or wheel placed within the reservoir, so as to rest in an upright position upon the flanged rollers D D, arranged therein. The rollers are spread apart sufficiently upon their shafts to receive the mold-wheel between the flanges and prevent it from lateral displacement. This method of supporting the mold-wheel adapts it for easy removal from and application to the frame, as circumstances require. E E are the parallel tension rods or bars, arranged in a horizontal position upon each side of the machine, so as to slide freely through the front uprights F F of the frame. Their outer ends are connected by a cross-head, G, and their inner ends by a cross-head, H, which extends through the mold-wheel and is provided with a central plunger, I, to enter the molds from the inner side. J is the pressing-platen, arranged to slide in guides J^2 of the frame, outside of the mold-wheel, and connected to the outer cross-head G by the toggle-joint K, which is arranged to incline downward between the bars. L is the main driving-shaft, having its bearings in the front upright F of the frame, and geared by the pinion M and wheel N to a steel counter-shaft, O, having its bearings in the frame beneath the toggle-joint. The counter-shaft is formed with a central crank, which is connected to the toggle by a link, P, and an inclined weighted lever, Q, in the following manner: The upper end of the weighted lever extends beneath the toggle, and is pivoted between two wings, R, formed upon the front arm thereof, as shown in Fig. 2. The lower end of the link embraces the crank of the counter-shaft, and its upper end is pivoted within a recess formed in the inclined lever. The pivot of the link is vertically in line with the joint of the toggle, while the pivot of the lever is in rear of or out of line with such joint, as clearly shown in Fig. 2. When the machine is in operation the throw of the crank-shaft reciprocates the link vertically to alternately straighten and depress the toggle-joint to move the pressing-plunger. The weighted lever and link, together with their connections, form the releasing mechanism previously referred to, and whose operation I will presently describe. S is a cross rock-shaft, extending through the center of the mold-wheel, and having its bearings in the frame of the press. It is provided with a fixed central arm, the ends of which carry the notched moving dogs or pawls T T. These dogs occupy an inclined position, and their notched points engage with shoulders U U, formed along the edges of the mold-wheel, to rotate the latter intermittingly when the rock-shaft is operated. This is effected by connecting the lower arm of a three-armed spider, V, on the rock-shaft with the gear-wheel N on the counter-shaft by means of a suitable rod, as shown in Fig. 1. W W are the feed rollers or wheels, arranged a short distance apart above the mold-wheel, and having their bearings in the frame or hopper X. The space between the rollers, together with the inner parallel sides Y of the hopper, form a throat for the passage of the material from the hopper to the molds of the mold-wheel. Z Z represent a series of radial blades, let into the feed-rollers parallel to each other, and provided with trunnions upon their ends, which enter cam-grooves formed in the proximate faces of plates A^1 A^1. These plates are cast with suitable hubs, which enter the sides of the hopper or frame to form journal-boxes for the roller-shafts. When the wheels are rotated the cam-grooves and trunnions project the feed-blades to feed down the material into the mold-wheel, and retract them to clear the edges of the hopper-sides Y.

B^1 B^1 are ratchet-wheels, keyed to the roller-shafts outside the hopper; and C^1 C^1 are pawl-arms, mounted loosely upon the same shafts outside the ratchet-wheels, and connected by rods D^1 with the upper arms of the spider V. E′ are weighted pawls, pivoted to the outer ends of the pawl-arms, so as to engage with the ratchet-wheels, and move them intermittingly when the rock-shaft is operated. The cam-plates are formed with radial grooves F′ at suitable points, to permit the application and removal of the feed-blades; and they are also made adjustable in their bearings, to regulate or change the points at which the blades shall be projected and withdrawn.

The paving-blocks contain a large percentage of asphalt, which must be worked in a heated state; but in this condition it is exceedingly tough and sticky, and is liable to choke the hopper and stop the feed of the material. The feed-blades prevent this by forcing the material down through the hopper into the molds, and are themselves cleaned of the gummy substance by being withdrawn into the rollers. The faces of the rollers and ends of the blades are cleaned by the upper edges of the hopper-sides Y, which are sharpened for this purpose. Thus the material is properly fed, and the feeding mechanism cleaned automatically. The feed is varied in proportion to the richness of the material by adjusting the cam-groove plates, as above described.

G′ is the discharger or follower, arranged transversely through the mold-wheel, upon that side of the rock-shaft opposite the plunger, so as to slide freely upon two parallel guide-rods, H′, secured to the uprights I′ I′ of the frame. J^1 J^1 are two parallel rods, connecting the follower-head outside the guide-rods with double bell-crank levers K′ K′, pivoted to the press-frame near the counter-shaft. These bell-crank levers are thrown up, to move the follower through the mold-wheel in discharging a pressed block, by means of cams L′ L′, mounted upon the counter-shaft, as shown in Fig. 1. One of the double bell-crank levers is provided with an additional arm, as shown in Fig. 2, extending down to or below the axis of the counter-shaft, to receive the action of one of the cams L′ and draw back the follower. Friction-rollers M′ M′ are pivoted to the bell-crank levers, to reduce the friction of the cams.

By employing the double bell-crank levers and cams, the discharger is operated positively in both directions, and all danger of accident from irregular or uncertain movements of the parts prevented.

The operation of the machine thus far described is as follows: Power being applied to the driving-shaft, the material to be pressed into blocks is fed into the molds, as hereinbefore described, so as to rest upon the shield N′, which is arranged within the upper part of the mold-wheel, to prevent the material from falling through into the interior. As the counter-shaft revolves, the gear-wheel N and its connecting devices operate the rock-shaft, and cause the pawls T T to rotate the mold-wheel the distance of one mold. This carries the filled mold in line with the pressing-plunger, when the rock-shaft oscillates in the opposite direction and the mold-wheel ceases to move. The crank of the counter-shaft then throws up the link P, which straightens the toggle-joint and moves the plunger horizontally into the filled mold. This movement also holds the platen in position at the face of the wheel, to receive the pressure of the plunger against the block. The block therefore sustains all the horizontal pressure of the plunger and platen, and relieves the mold-wheel of diametrical strain.

As the power of the toggle-joint is exerted outward against the cross-heads secured to the parallel bars, the tensile strength of the latter sustains the entire force of the pressure upon the blocks.

The tension-rods are made large and strong enough to resist the force of the lever, and, as the latter possesses great power, any medium interposed between the plunger and platen is subjected to enormous pressure.

When the counter-shaft is further rotated, the link P pulls down the toggle-lever with a positive action, and retracts the plunger from the mold, so that the mold-wheel may be again rotated the requisite distance by the moving pawls to present the succeeding filled mold to the action of the plunger.

If the block undergoing pressure is larger than the usual or predetermined size, or contains a hard unyielding substance, the movements of the plunger and toggle-joint will be stopped before reaching the limit of their throw, leaving the toggle bent down, and thereby shortening the distance between such joint and the crank-shaft. This would result in breaking the press but for the release motion before named, which operates to throw up the weighted lever and relieve the strain upon the toggle and link.

N′ is a weight, adapted for adjustment upon the lever Q by means of the set-crews O′, for the purpose of regulating the pressure of the plunger and platen—or, in other words, to determine the amount of pressure exerted by the plunger and platen before being released by the lifting of the lever. P′ is a rod, pivoted to the outer joint of the toggle, and extending down through the weighted lever, beneath which it is provided with an india-rubber or other elastic cushion, Q′, which takes up the shock of the lever in falling, and prevents it from jarring or breaking the machine.

When, in the operation of the machine, the plunger moves into the mold-wheel, the cams on the counter-shaft throw forward the bell-crank levers K′ and connecting-rods J′, to move the discharger into the mold opposite the plunger and discharge its contents outward through the wheel. As the plunger is withdrawn from the mold, the discharger is retracted by the action of one of the cams L′ upon the extended arm of one of the bell-crank levers, as hereinbefore described.

Instead of employing one of the cams L′ for this purpose, an additional cam on the counter-shaft may be used, if desired.

The several operations of filling the molds, compressing the blocks, and discharging them from the molds, are performed simultaneously, the mold-wheel being turned by the moving pawls to present the molds first to the feeding devices, next to the pressing-plunger, and, lastly, to the action of the discharger.

The compressed blocks discharged from the mold-wheel pass out upon a carrying-plate, R′, mounted upon vertical guide-rods T′, in rear of the mold-wheel, and pivoted by short links U′ to the inner ends of parallel arms V′. The outer ends of these arms are pivoted to the frame of the press, or to projections therefrom, and their centers carry friction-rollers W′. X′ is a cross-shaft, having its bearings in the frame of the press beneath the arms V′, and receiving its motion from the main driving-shaft of the machine through the medium of the shafting Y′ and beveled gearing Z′, as shown clearly in Fig. 3. The carrying-plate is raised on the guide-rods T′ to a level with the bottom of the mold from which a pressed block is to be discharged by means of cams A^2 on the cross-shaft, which, when the shaft revolves, come in contact with the friction-rollers W′, and so lift the carrying-plate. The gravity of the latter, together with the weight of the pressed block, causes the connecting-arms to lower the plate as the cross-shaft continues to revolve, and deposit the block upon a horizontal carrier, B^2, arranged upon a central crank of the cross-shaft, and a corresponding crank on a second cross-shaft, C^2, also mounted in the frame. Reversed cranks are also formed in the two cross-shafts upon each side the central cranks, which are connected with horizontal carriers D^2 D^2, as shown in Fig. 3. The rotation of the cross-shafts raises and lowers the several carriers, causing them to reciprocate in line with the mold-wheel, while the position of the cranks causes the central carrier B^2 to raise while the outer carriers D^2 D^2 are both falling, and vice versa. By this means the pressed blocks are moved along intermittingly so that they may be exposed to a cooling or drying medium for a considerable time before being removed from the carriers. The gradual lowering of the pressed blocks

from the mold-wheel to the carrier prevents them from becoming broken or misshapen, which would be the case if they were allowed to drop suddenly before being cooled or hardened. The carrier as well the mold-wheel moves in reservoirs of cold water, for the purpose of cooling the blocks and molds. A stream of water is also allowed to flow into the body of the plunger and platen, which are made hollow for the purpose, so that their faces may be kept cool, and therefore prevented from adhering to the face of the blocks subjected to their action. The molds may also be cooled by streams of water, if preferred.

I claim as my invention—

1. The weighted lever and link, combined with the crank-shaft and toggle-joint, to operate the platen and plunger upon the parallel tension-rods E E, substantially as described, for the purpose specified.

2. The moving pawls upon the rock-shaft S, adapted to move the mold-wheel intermittingly by means of an oscillating spider, V, operated from the main driving-shaft of the press, substantially as described.

3. The discharger or follower operated from the counter-shaft through the medium of connecting-arms J′, double bell-crank levers K′, and cams L′, substantially as described.

4. The discharger or follower adapted to be withdrawn from the molds with a positive action by means of a cam on the counter-shaft, combined with an arm on one of the bell-crank levers, substantially as described.

5. The release-lever Q, to relieve the pressure of the plunger and platen, and prevent the press from breaking when the movements of the plunger and platen are varied by a difference in the size of the blocks or the presence of any unyielding substance therein, substantially as described.

6. The release motion produced by the weighted lever and connecting-link, pivoted to each other, and connected to the toggle-joint and counter-shaft, substantially as described.

7. The weight upon the lifting-lever adapted for adjustment to regulate the pressure of the plunger and platen, substantially as described.

8. The weighted lever, suspended from the toggle-joint by means of the rod P′, substantially as described.

9. The elastic cushion, in combination with the suspending-rod and releasing-lever, substantially as described, for the purpose specified.

10. The two feed rollers or wheels, provided with radially-reciprocating blades for feeding the material into the mold-wheel, substantially as described.

11. The feed-blades, having their points of projection and retraction adjustable with respect to the space between the feed-rollers, for the purpose of regulating the force of the feed into the molds, substantially as described.

12. The arrangement of the grooved cams for separately retracting the feed-blades completely within the feed-rollers, substantially as described, for the purpose specified.

13. The open-ended feed-hopper X, constructed with two parallel faces, Y Y, having sharpened upper edges extending up between the two feed-rollers, substantially as described, for the purposes specified.

14. The feed-rollers, having an intermittent rotation toward each other, substantially as described, for the purpose specified.

15. The combination of the grooved cam-plates with the feed-rollers and reciprocating blades, substantially as described, for the purpose specified.

16. The grooved cam-plates, provided with radial slots for the application and removal of the feed-blades, substantially as described.

17. The spider V upon the rock-shaft, combined with the counter-shaft and ratchet-wheels of the feed-rollers, by the means substantially as described, for the purposes specified.

18. The carrying-plate R′, adapted to receive the pressed blocks from the mold-wheel, and deposit them upon a reciprocating carrier in rear of the mold-wheel, substantially as described.

19. The feed-plate R′, operated by the pivoted connecting-arms V′ and the cams A^2 from the cross-shaft X′, substantially as described.

20. The carrying-plate R′, guided in its vertical movements by the upright rods T′, substantially as described.

21. The carrier, composed of three reciprocating parts, B^2 D^2 D^2, operating as described, to feed the pressed blocks intermittingly, substantially as described.

22. The combination, with the mold-wheel, of the feeding rollers and blades, the plunger and platen, the discharger, the dropping-plate, and the carrier, substantially as described, for the purposes specified.

23. The mold wheel and carrier adapted to rotate within reservoirs of water, substantially as described, for the purposes specified.

24. The pressing plunger and platen, adapted to receive a stream of water within them, to prevent their pressing-face from becoming heated, substantially as described.

THOS. COOK.

Witnesses:
WM. H. MINNIX,
M. CHURCH.