

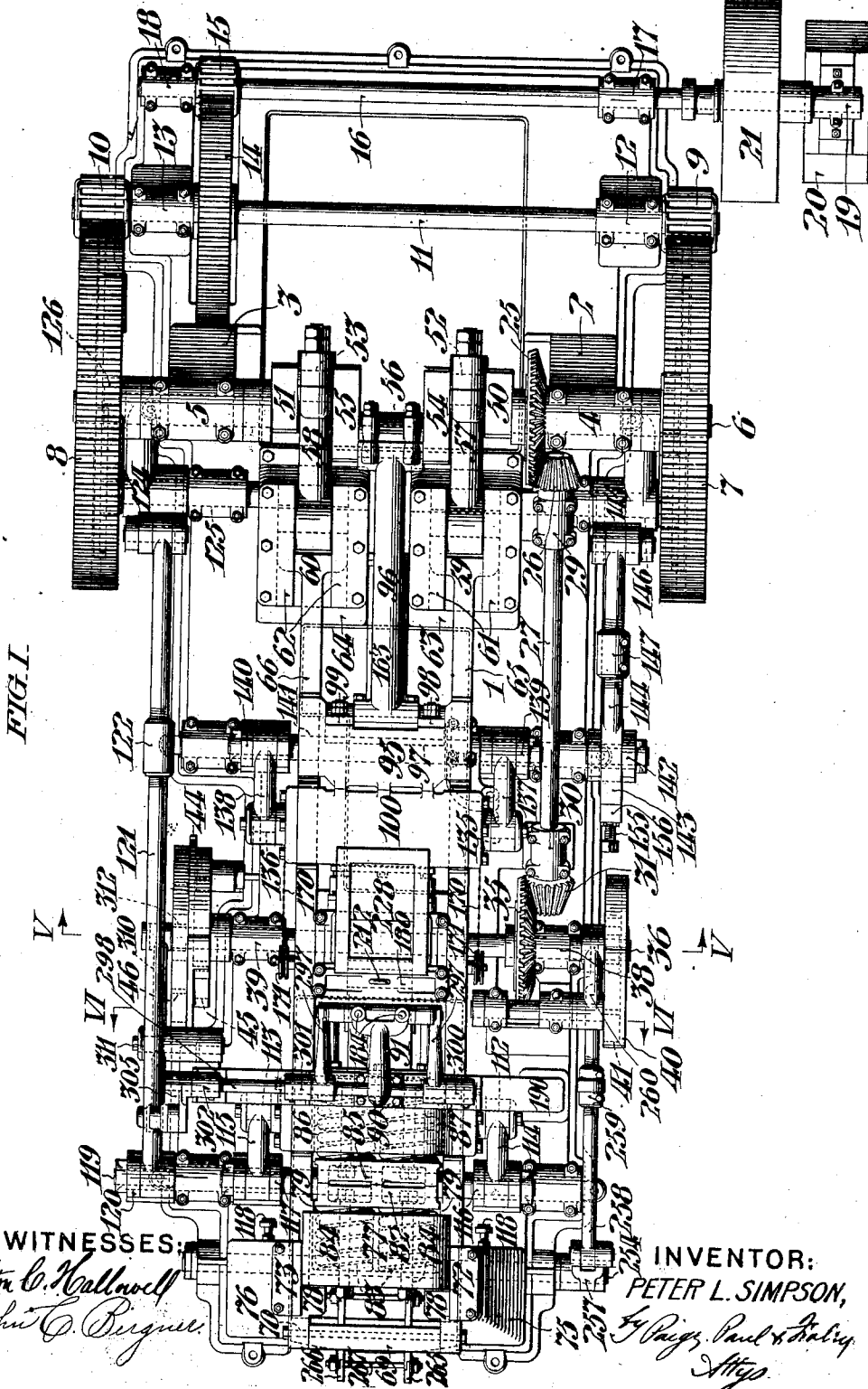
No. 826,751.

PATENTED JULY 24, 1906.

P. L. SIMPSON.  
BLOCK PRESS.

APPLICATION FILED NOV. 22, 1904.

7 SHEETS—SHEET 1.



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7 SHEETS—SHEET 2.

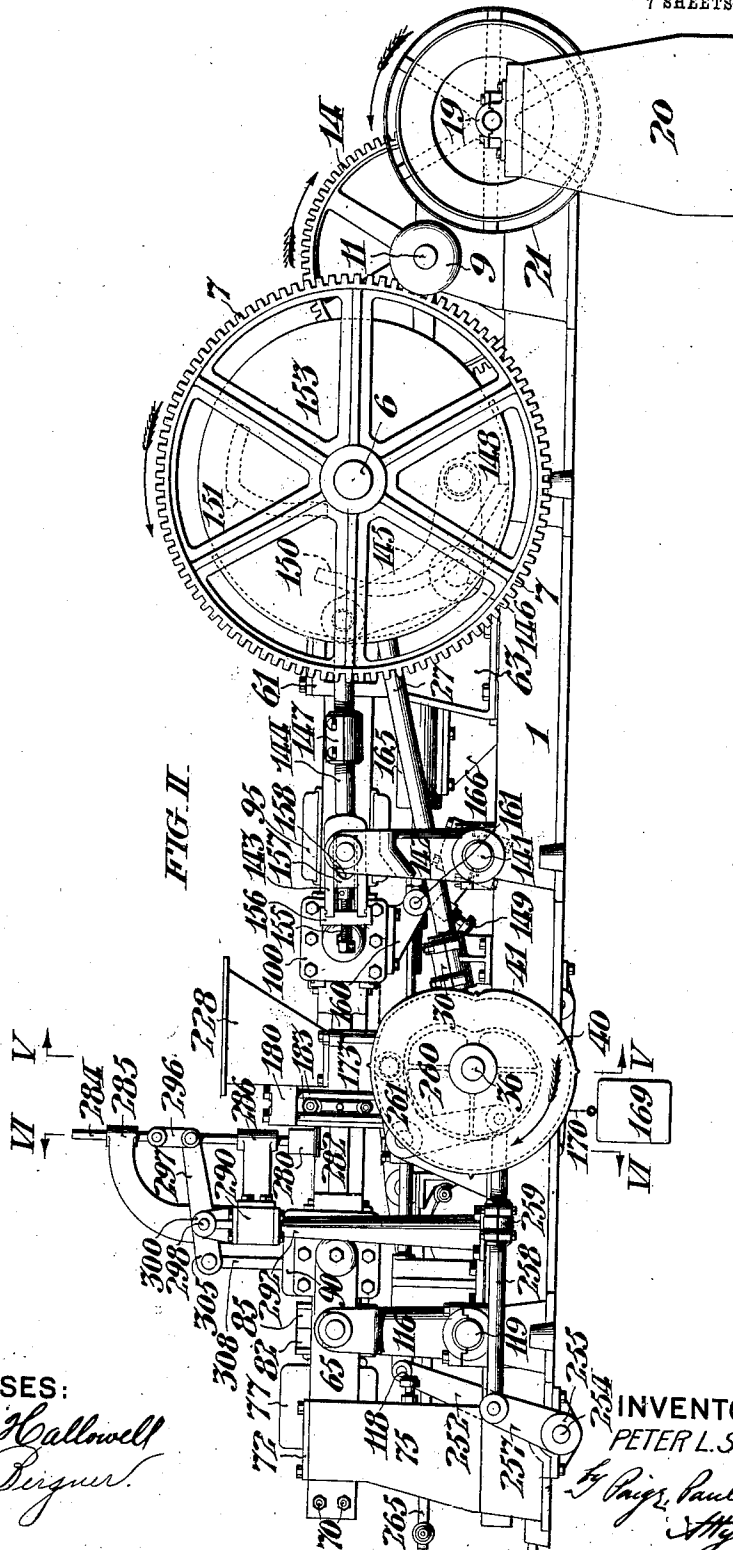


FIG. II.

WITNESSES:

*Clifton C. Halliwell*  
*John C. Berger*

INVENTOR:

PETER L. SIMPSON,

*By Rags, Paul & Haley*  
*Attys.*



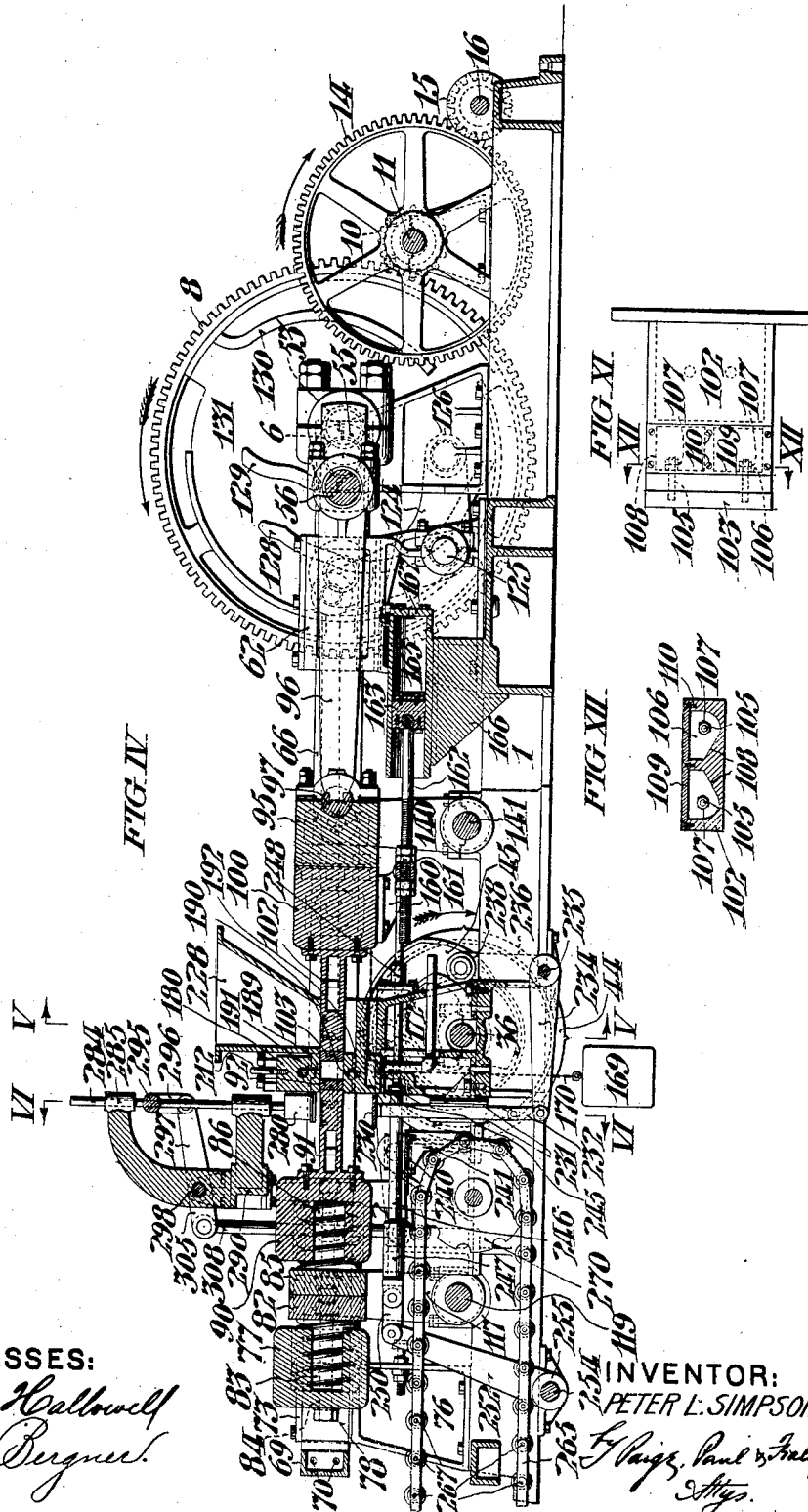
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7 SHEETS—SHEET 5.

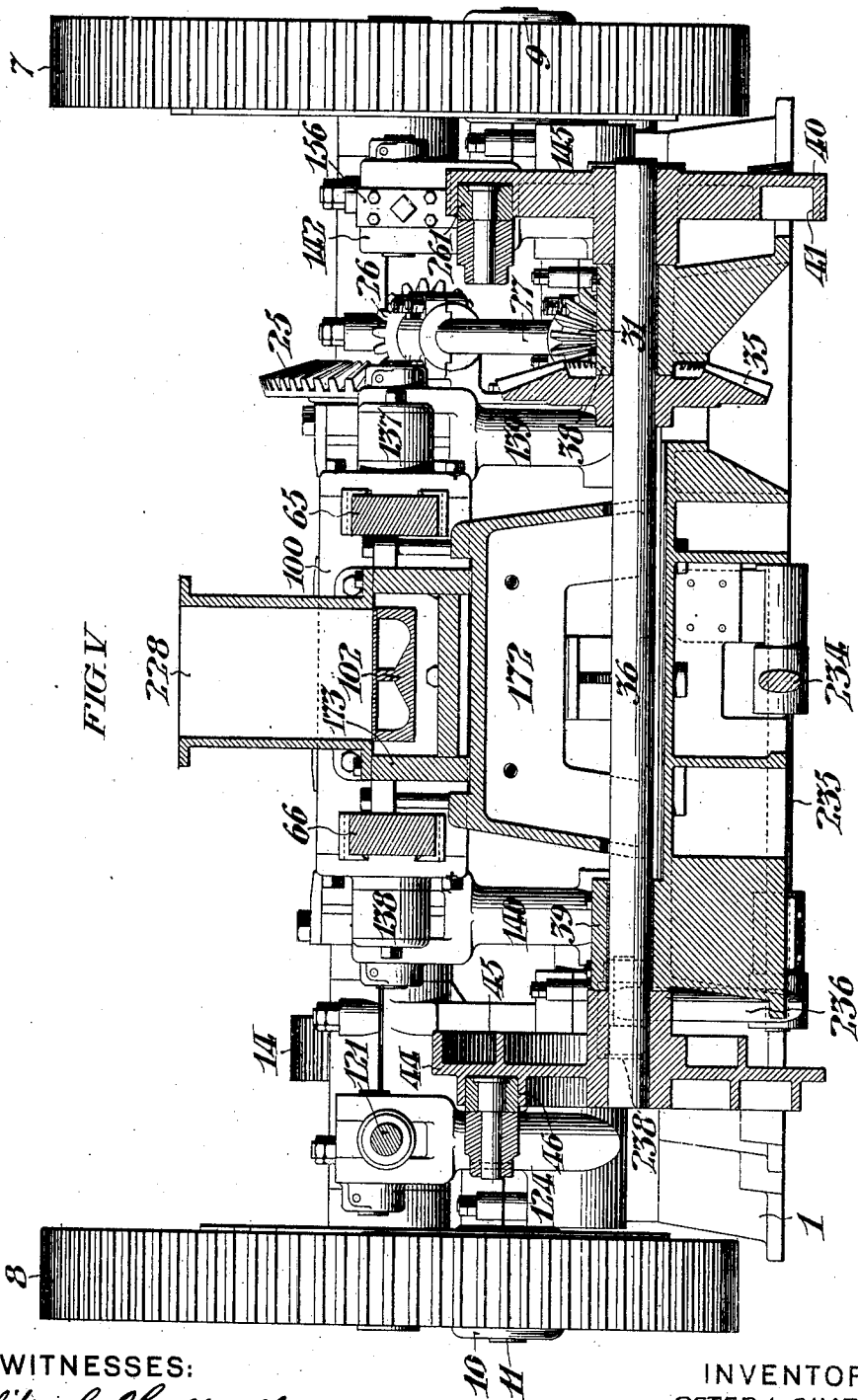


FIG. V.

WITNESSES:

*Clifton C. Halliwell*  
*John C. Bunker*

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P. L. SIMPSON.  
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APPLICATION FILED NOV. 22, 1904.

7 SHEETS—SHEET 6.

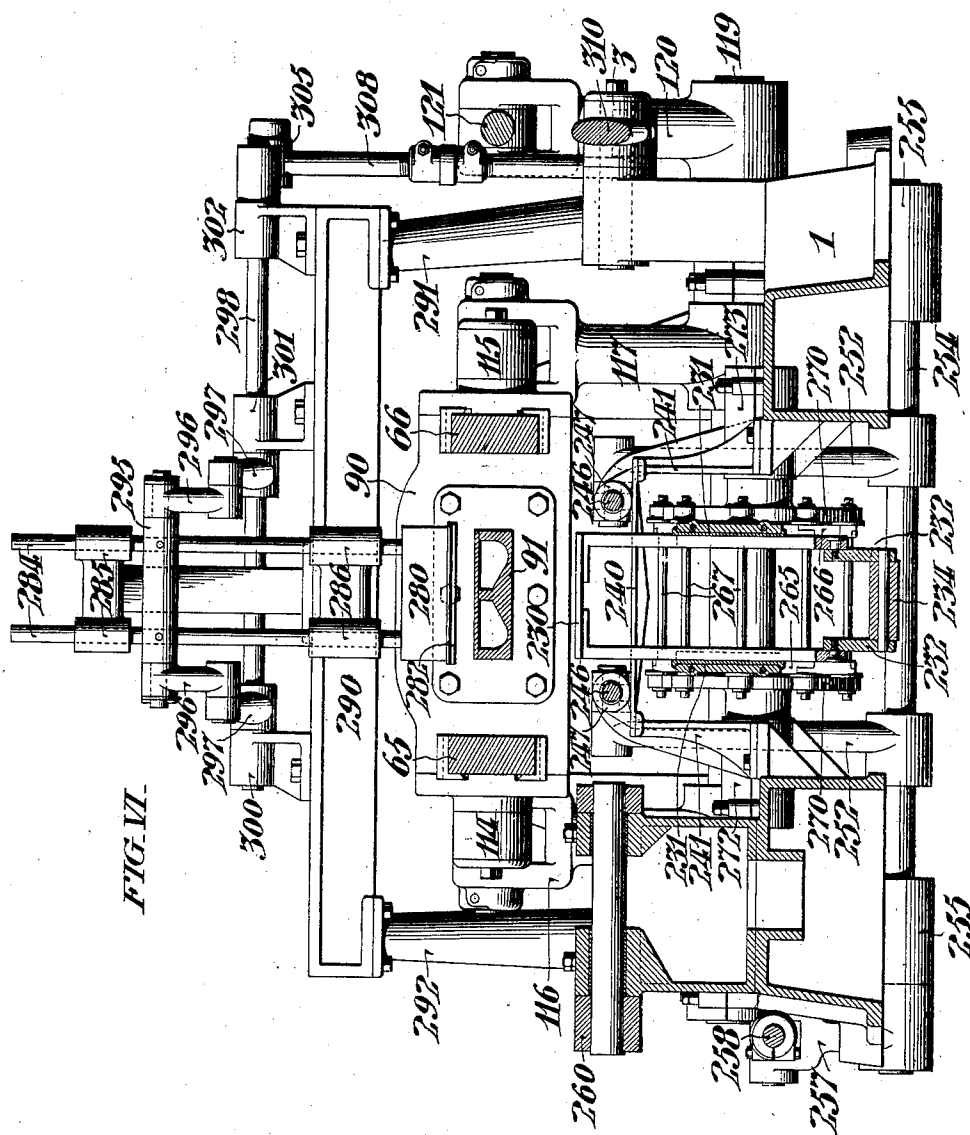


FIG. VI.

WITNESSES:

*Clifton C. Hallowell*  
*John C. Berger*

INVENTOR:

PETER L. SIMPSON,  
*By Craig, Paul & Halsey*  
*Attys.*



# UNITED STATES PATENT OFFICE.

PETER L. SIMPSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BARBER ASPHALT PAVING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

## BLOCK-PRESS.

No. 826,751.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed November 22, 1904. Serial No. 233,797.

*To all whom it may concern:*

Be it known that I, PETER L. SIMPSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Block-Presses, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to a press fitted for the compression of blocks of any suitable material, but especially designed for the formation of such blocks under conditions requiring the exertion of great pressure to effect the formation of the block. To this end in my invention the motion of the dies which carry the material into the mold-frame and there compress it is reinforced at the moment of compression by the compressive force of two cross-heads moving in line with but independently of the dies. The movement of the dies to carry the material into the mold and deliver it therefrom being a somewhat irregular one is effected by cam-controlled arms, while the movement of the cross-heads by the opposition of which the extreme compressive force is exercised is controlled by opposed cranks, and thereby enabled to afford a very great pressure.

My invention also relates to certain details of the press, as hereinafter described, including the connections between the dies and their actuating mechanism; the carrier for removing the block when it is formed; wiping mechanism for the surfaces of the dies; means for heating the mold-frame within which the block is formed, and means for cushioning the motion of the dies.

I have shown an embodiment of my invention especially adapted for the compression of blocks of asphalt; but it will be understood that it is applicable to blocks of other plastic material and that my invention is not limited to a press to be used for this class of material. It will also be understood that when I speak of a press for making a "block" I do not wish to confine myself to a press which forms only a rectangular product, as by altering the shape of the frame and dies other shapes may be compressed in a press built according to my invention.

In the accompanying drawings, Figure I is a plan view of a machine constructed in accordance with my invention. Fig. II is a side elevation of said machine. Fig. III is an

elevation view of the left-hand end of said machine as shown in Fig. I. Fig. IV is a central vertical longitudinal sectional view of said machine. Fig. V is a transverse vertical sectional view taken on the line V V in Figs. I, II, and IV. Fig. VI is a transverse vertical sectional view taken on the line VI VI in Figs. I, II, and IV. Fig. VII is a front elevational view of the mold and its supporting-pier. Fig. VIII is a plan view of the scraper-plate, showing a portion of the rods which carry it. Fig. IX is a detail view of the cam-disk, showing the groove for operating the block-elevator. Fig. X is a detail view of the opposite side of the cam-disk shown in Fig. IX, showing the groove for operating the mold-wiper. Fig. XI is a plan view of one of the dies and its plunger. Fig. XII is a transverse vertical sectional view of said plunger, taken on the line XII XII in Fig. XI.

In the figures, 1 is the bed-frame, provided with pedestals 2 and 3, comprising bearings 4 and 5 for the crank-shaft 6, which is conveniently driven by the master-gears 7 and 8, mounted on its outer ends, which mesh with pinions 9 and 10 on the counter-shaft 11, which shaft is journaled in bearings 12 and 13, and provided with the driving-gear 14, meshing with the pinion 15 on the driving-shaft 16. Said driving-shaft 16 is journaled in bearings 17 and 18 on the bed-frame 1 and the bearing 19 on the pier 20. Between the bearings 17 and 19 the driving-shaft 16 is provided with the pulley-wheel 21, arranged to be driven by a belt from any convenient source of power. The crank-shaft 6 is also provided with the bevel-gear 25, arranged to mesh with the bevel-pinion 26 on the shaft 27, which is disposed in angular relation to the bed-frame 1, as best shown in Fig. II. The shaft 27 is journaled in bearings 29 and 30 and is provided with the bevel-pinion 31, arranged to mesh with the bevel-gear 35 on the cam-shaft 36, which is journaled in bearings 38 and 39 and provided at one end with the cam-disk 40, having the cam-groove 41, and at its other end with the cam-disk 44, having the cam-grooves 45 and 46. The function of said cam-disks 40 and 44 will be hereinafter described.

The crank-shaft 6 comprises cranks 50 and 51, whose crank-pins 52 and 53 are in axial alinement, and the cranks 54 and 55,



whose crank-pin 56 is diametrically opposed to said crank-pins 52 and 53. The crank-pins 52 and 53 are connected by the connecting-rods 57 and 58 to the cross-heads 59 and 60, which are arranged to slide in suitable guides 61 and 62, mounted on the cross-head guide-piers 63 and 64, and the side bars 65 and 66 are integral, respectively, with said cross-heads 59 and 60. Said bars are secured together at their opposite ends by the cross-beam 69 and tie-rods 70. (Best shown in Figs. I and IV.) Said bars are slidably supported in suitable guides 72 and 73 on the side-bar guide-piers 75 and 76, which are secured to the bed-frame 1. Said side bars 65 and 66 carry the cross-heads 77 and are provided with lugs 78 and 79, arranged to secure said cross-head 77 thereto. The cross-head 77 is provided with the bumper-plate 82, seated on the coiled springs 83 and held in place by the bolts 84, as best shown in Fig. I. Said bumper-plate 82 is arranged to encounter the opposed bumper-plate 85, seated on the coiled springs 86 and held by the bolts 87 to the follower 90, which carries the plunger 91, to which the left-hand die-plate 92 is detachably secured. Said follower 90 is conveniently supported in slidable relation on the side bars 65 and 66.

The crank-pin 56 is connected to the cross-head 95 by the pitman 96, which is provided with the knuckle-shaft 97, journaled in suitable bearings 98 and 99 in said cross-head 95, which latter is arranged to slide in its reciprocatory motion on the slide-bars 65 and 66 and is arranged to engage the follower 100, which is also supported in slidable relation on said bars 65 and 66 and carries the plunger 102, to which the right-hand die-plate 103 is detachably secured.

As best shown in Figs. XI and XII, the die-plate 103 is provided with the stud-bolts 105, which are inserted through suitable apertures in the front wall 106 of the plunger 102 and secured by nuts 107 within the recesses 108, which are conveniently covered by the cover-plate 109, secured by the screws 110.

The followers 90 and 100 may be moved independently toward and away from their cross-heads 77 and 95, for which purpose the following mechanism is provided: The follower 90 is provided with the wrist-pins 112 and 113, which are connected by the connecting-rods 114 and 115 to the rocker-arms 116 and 117. Said rocker-arms are carried by the rock-shaft 119, which has the arm 120, connected by the connecting-rod 121 to the vertical arm of the bell-crank lever 124 on the rock-shaft 125. The horizontal arm of said bell-crank lever 124 is provided with a cam-roller 126, arranged to encounter the cams 128, 129, and 130 on the cam-plate 131, carried by the master-gear 8. Said rocker-arms 116 and 117 are limited in their move-

ment toward the left with respect to Figs. I and II by the rubber buffers 118, secured to the side-rod guide-piers 75 and 76. The follower 100 is provided with the wrist-pins 135 and 136, connected by the connecting-rods 137 and 138 to the rocker-arms 139 and 140, secured to the rock-shaft 141, which has the arm 142 connected by the connecting-rod 144 to the vertical arm of the bell-crank lever 145 on the rock-shaft 146. The horizontal arm on said bell-crank lever 145 is provided with the cam-roller 148, arranged to encounter the cams 150 and 151 on the cam-plate 153, carried by the master-gear 7. The rock-shaft 141 and the rocker-arms attached thereto are limited in the movement toward the left with respect to Figs. I and II by the rubber buffers 149, secured to said shaft and arranged to contact with the bed-frame 1. (Best shown in Fig. II.) The connecting-rod 144 engages the rocker-arm 142 with a limited degree of lost motion determined by the set-screw 155 in threaded engagement with the plate 156 on the bifurcated end 143 of said rod 144 and arranged to adjust the box 157, and thereby determine the length of the opening 158.

In order to cushion the motion of the follower incident to its reciprocation, I provide the follower 100 with brackets 160, carrying the cross-bar 161, to which is secured the piston-rod 162, having the piston 163 arranged to reciprocate within the dash-pot 165, supported on the bracket 166 and having the perforated head 167. I further provide said follower with the weights 169, secured thereto by the flexible connectors such as the chains 170, passing over the sheaves 171, which are mounted for rotation on the mold-pier 172.

As best shown in Fig. VII, the mold-pier 172 supports the mold-frame 173, which comprises the lower member or steam-jacket 174, inclosing the steam-cavity 175, having the inlet and outlet pipes 176 and 177, the side frame-plates 178 and 179, and the cap 180, which latter is provided with the ribs 181, arranged to slide in recessed guides 182 in the side plates 178 and 179 and is arranged for vertical adjustment upon the stud-posts 183, which are in threaded engagement with the mold-pier 172 and extend vertically through the apertures 184 in the wings 185 of said cap 180 and are provided with nuts 186. Said mold-frame 173 embraces the top and bottom liners 187 and 188, respectively, provided with recesses 189 and 190, arranged to receive the complementary ribs 191 and 192, respectively, on the cap 180, and the steam-jacket 174, as best shown in Fig. IV, and the side liners 194 and 195, which are also respectively provided with ribs 196 and 197, arranged to be engaged by the complementary recesses 198 and 199 in the side frame-plates 178 and 179. The side frame-plates are conveniently secured by the bolts 200

and 201, extending through apertures 202 and 203, respectively, in the cap 180 and steam-jacket 174 and projecting through vertical slots 205 and 206 in said frame-plates 178 and 179 and respectively provided with the nuts 208 and 209. It will be seen that the liners 187, 188, 194, and 195 may be readily removed and replaced by new ones or by liners of differing sizes, and thereby the size of the mold-aperture may be varied. To accomplish this, the nuts 208 and 209 on the bolts 200 and 201 are loosened to release the side frame-plates 178 and 179, and also the nuts 186 are loosened on the stud-posts 183, whereby the cap 180, which is conveniently provided with the handling-ring 212, may be lifted. The side liners 194 and 195 may be further secured by bolts 216, extending through the side frame-plates 178 179 and provided with nuts 218.

The hopper 228 is secured to said mold-frame 173 over the path of the die-plate 103 and is arranged to deliver a sufficient quantity of material to form a block between the die-plates 92 and 103, the delivery occurring when the latter is withdrawn to its maximum right-hand position with reference to the Fig. IV. At other times the upper side of the plunger 102 closes the bottom of the hopper. After the block is pressed it is carried by the further motion of the plunger 102 onto the elevator 230, which is arranged for vertical reciprocation in the guides 231 on the mold-pier 172. To effect this reciprocation, its lower end is connected by the link 232 to the horizontal rocker-arm 234, secured to the rock-shaft 235, on the outer end of which is the vertical arm 236, provided with the cam-roller 238, arranged to traverse the groove 45 in the cam-disk 44, carried by the cam-shaft 36, heretofore described. As said cam-disk 44 rotates it raises the elevator 230 until its upper surface is in contact with the lower surface of the plunger 91, and is therefore in position to receive the block from between the die-plates. When this is accomplished, it descends until the lower surface of the block is flush with the bridge 240, which is supported on standards 241, secured to the bed-frame 1. When the elevator 230 reaches its lower position, the block which it carries is scraped therefrom by the scraper-plate 245 across the bridge 240 and onto the conveyer, which will be hereinafter described.

The scraper-plate 245 is carried by the parallel slide-rods 246, which are supported in the guides 247 on the bed-frame 1 and the guides 248 on the mold-pier 172, which latter is recessed to receive said scraper-plate 245 when in its extreme right-hand position with respect to Fig. IV. The slide-rods 246 are connected by the links 250 to the rocker-arms 252, which are secured to the rock-shaft 254, journaled in bearings 255 on the bed-frame 1. The rock-shaft 254 is provided

at its outer end with the rocker-arm 257, connected by the connecting-rod 258 to the depending vertical arm of the bell-crank lever 260, whose horizontal arm is provided with the cam-roller 261, arranged to traverse the cam-groove 41 in the cam-disk 40, carried by the shaft 36.

The connecting-rods 121, 144, and 258 are preferably severed at some convenient point and respectively provided with adjusting-sleeves 122, 147, and 259, by the turning of which the length of the rods may be varied.

The conveyer is arranged to carry the finished block from the machine and comprises a pair of linked chains 265 and 266, connected together by cross-bars 267 at their joints. Said chains are carried by the sprockets 270, journaled in bearings 272 and 273 on the bed-frame 1 and may be driven at any desired speed.

To prevent the block from sticking to the die-plates 92 and 103, it is desirable to wipe said plates after each block has been formed, and for this purpose I provide the wiper 280, having disks 282, of leather or other suitable absorptive material. The wiper is arranged to be reciprocated vertically between the die-plates 92 and 103 immediately after the block last formed has been carried down by the elevator. Said wiper 280 is mounted upon the stems 284, supported in slidable relation in the guides 285 and 286, secured to the cross-beam 290, which is upheld by the standards 291 and 292 on the bed-frame 1. The stems 284 are both secured to the yoke 295, which is connected by the links 296 to the rocker-arms 297 on the rock-shaft 298, which is journaled in the bearings 300 and 301 302 on the beam 290 and is provided at its outer end with the oppositely-extending rocker-arm 305, connected by the link 308 to the lever 310, which is fulcrumed at 311 and provided with the cam-roller 312, arranged to traverse the cam-groove 46 in the cam-disk 44.

The operation of the machine is as follows: As shown in the drawings, the machine is in its intermediate position and in the act of pressing the block in the mold. In its initial position the cranks 50, 51, 54, and 55 will stand opposite to the positions shown in the drawings, and the cross-heads 77 and 95 will be moved to their maximum separation. The followers 90 and 100 will be moved to the right with respect to Fig. IV and occupy a position such that the die-plates 92 and 103 will be set at each side of the mouth of the hopper 228 ready to receive therefrom a charge of the material to be pressed. As the gears 7 and 8 are rotated in the direction of the arrows indicated in Figs. II and IV, the follower 100 and its die-plate 103 are moved to the left by the cross-head 95, while the follower 90 and its die-plate 92 are moved to the left at practically the same rate of speed

by the cam 130 until the bumper-plate 85 on said follower 90 encounters the bumper-plate 82 on the cross-head 77, which is moving to the right hand, and therefrom carries the follower 90 and its die-plate 92 in opposition to the follower 100 and its die-plate 103 to their minimum separation within the mold 173, as shown in the drawings, wherein the block is pressed to the desired dimensions. After said block is pressed the cross-heads 77 and 95 are retracted, and the followers 90 and 100, with the respective die-plates 92 and 103, are moved by their respective cams 150 and 128 to the left, with a slight accompanying separation, until the block is delivered onto the elevator 230, which is thereupon lowered by the traverse of the cam-roller 238 in its cam-groove 45 to a level with the bridge 240. The scraper-plate 245 (best shown in Figs. IV and VIII) is then drawn to the left with respect to Fig. IV by the cam-roller 261, traversing the cam-groove 41, and carries the block from the elevator 230 across the bridge 240, and delivers it onto the conveyer-bars 267, by which it is carried away from the machine and delivered to any desired place. After the block is discharged from the die-plates 92 and 103 the wiper 280, which is in alinement with the elevator 230, is carried down between said plates and wipes them and again rises to the position shown in the drawings by the cam-roller 312, traversing the cam-groove 46. The plates 92 and 103 being again ready to press the next block are moved, with their respective followers 90 and 100, to the right with respect to Fig. IV, by their cams 151 and 129, to their initial position at either side of the mouth of the hopper to again receive the requisite charge of the block-forming material from the hopper.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a block-press, the combination of the dies; a pair of followers each carrying one of the dies; means for imparting to the followers the requisite motion to carry the material, compress it into a block, and deliver it; a pair of cross-heads moving in line with but independently of the followers; and means for bringing the cross-heads into contact with the followers when the block is formed to add the force of their compression at that time to that of the followers, substantially as set forth.

2. In a block-press, the combination of the dies; a pair of followers each carrying one of the dies; means for imparting to the followers the requisite motion to carry the material to the mold, compress it into a block and deliver it, said means consisting of connect-

ing-rods pivoted to the followers, rocker-arms, a rock-shaft, and a cam-groove with connections to the rock-shaft; and a pair of cross-heads moving independently of the followers, but in contact with them when the block is formed and adding the force of their compression at that time to that of the followers, substantially as set forth.

3. In a block-press, the combination of the dies; a pair of followers each carrying one of the dies; means for imparting to the followers the requisite motion to carry the material to the mold, compress it into a block and deliver it; a pair of cross-heads moving independently of but in line with the followers; and a crank-shaft, with opposed cranks which are connected to the cross-heads and which force the cross-heads into contact with the followers when the block is formed, and add the force of their compression at that time to that of the followers, substantially as set forth.

4. In a block-press, the combination of a crank-shaft having three cranks, one of which is opposed to the other two; a pair of cross-heads connected by rods with the paired cranks and reciprocated by them simultaneously; a pair of side bars carrying a single cross-head connected one to each of the paired cross-heads; another cross-head connected by a pitman to the single crank and moved by it in opposition to the other cross-head for the purpose of exerting opposing pressure for the formation of a block, substantially as set forth.

5. In a block-press, the combination of a crank-shaft having three cranks one of which is opposed to the other two; a pair of cross-heads connected by rods with the paired cranks and reciprocated by them simultaneously; a pair of side bars connected to said cross-heads and carrying a single cross-head; another cross-head sliding on the side bars, connected by a pitman with the single crank, and moved by it in opposition to the other cross-head, substantially as set forth.

6. In a block-press, the combination of a pair of horizontal side bars carrying a cross-head between them; means for reciprocating said bars simultaneously to effect reciprocation of the cross-head; a second cross-head mounted upon said side bars and sliding thereon independently; and means for imparting to the second cross-head a reciprocatory motion opposed to that of the first-mentioned cross-head for the purpose of effecting the compression of a block, substantially as set forth.

7. In a block-press, the combination of the dies; a pair of followers each carrying one of the dies; a pair of cross-heads moved independently of the followers but in the same line; a main shaft provided with cranks and cam-disks; cam-grooves in said disks; connections between the cam-grooves and the fol-

lowers by which the requisite motion is imparted to the followers to receive the material, compress it, into a block, and deliver it; and connections between the cranks and the cross-heads, whereby they are independently reciprocated and brought into contact with the followers so as to add their force of compression to that of the followers when the block is formed, substantially as set forth.

8. In a block-press, the combination of the dies; a pair of followers each carrying one of the dies; means for imparting motion to the followers; a pair of cross-heads moving independently of the followers but in line with them; and spring bumper-plates interposed between the follower and the cross-head which comes in contact with it, substantially as set forth.

9. In a block-press, the combination of the dies; a pair of followers each carrying one of the dies; means for imparting to the followers the requisite motion to receive material, compress it into a block, and deliver it; and a dash-pot, the piston of which is connected to one of the followers, whereby the motion of the follower is cushioned, substantially as set forth.

10. In a block-press the combination of the dies; a pair of followers each carrying one of the dies; means for imparting to the followers the requisite motion to receive material, compress it into a block, and deliver it; a dash-pot the piston of which is connected to one of the followers and whereby its motion is cushioned; and a counterweight also attached to the follower and opposing itself to the descent of the piston into the dash-pot, substantially as set forth.

11. In a block-press, the combination with a mold-frame; a pair of opposed dies fitting said frame; means for imparting to the dies irregular reciprocatory motion requisite to enable them to receive material, carry it into the mold-frame, there compress it and carry the block thus compressed out of the frame and deliver it; and a pair of opposed regularly reciprocatory cross-heads moving independently of the dies but in contact with them at the moment of compression to increase their compressive force, substantially as set forth.

12. In a block-press, the combination of the mold-frame; a pair of dies fitting therein from opposite sides; plungers upon which said dies are mounted; a pair of independently-movable followers; means for imparting the requisite motion to the followers to

cause the dies to receive material, carry it within the frame, compress it, and carry it out at the other side of the frame and deliver it; a pair of cross-heads movable in line with but independent of the followers and adding their force of compression to that of the followers at the time when the block is pressed, but at other times not in contact with the followers, substantially as set forth.

13. In a block-press, the combination of a mold-frame; a die entering the same; a plunger by which the die is operated; a recess in said plunger; a plate covering said recess; and a bolt uniting the die with the plunger the nut of which is situated within the recess, substantially as set forth.

14. In a block-press, the combination of the mold-frame; dies fitting the same; means whereby the dies are passed out of the mold-frame carrying a block with them; an elevator upon which the block is delivered by the motion of the dies; means for depressing the elevator when the block has been received upon it; and means for transferring the block from the elevator to a carrier, substantially as set forth.

15. In a block-press, the combination of the mold-frame; a pair of horizontally-moving dies by the compression of which a block is formed within the frame; means for carrying the dies with the block between them horizontally through the frame; an elevator upon which the block is deposited by the movement of the dies which withdraws the block from the mold-frame; and means whereby the elevator is moved vertically to carry the block away from the dies, substantially as set forth.

16. In a block-press, the combination of a mold-frame; a pair of horizontally-moving dies passing through the mold-frame; a hopper; means for moving said dies from proximity to the hopper where material is fed to them, into the die, where a block is compressed, and out from the same where the block is released; and a wiper with means for passing the same vertically between the surface of the dies when the block is removed therefrom, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Chicago, in the State of Illinois, this 19th day of November, 1904.

PETER L. SIMPSON.

Witnesses:

EDWIN J. BOWES, Jr.,  
JOHN H. LONDRIGAN.