(Model.)

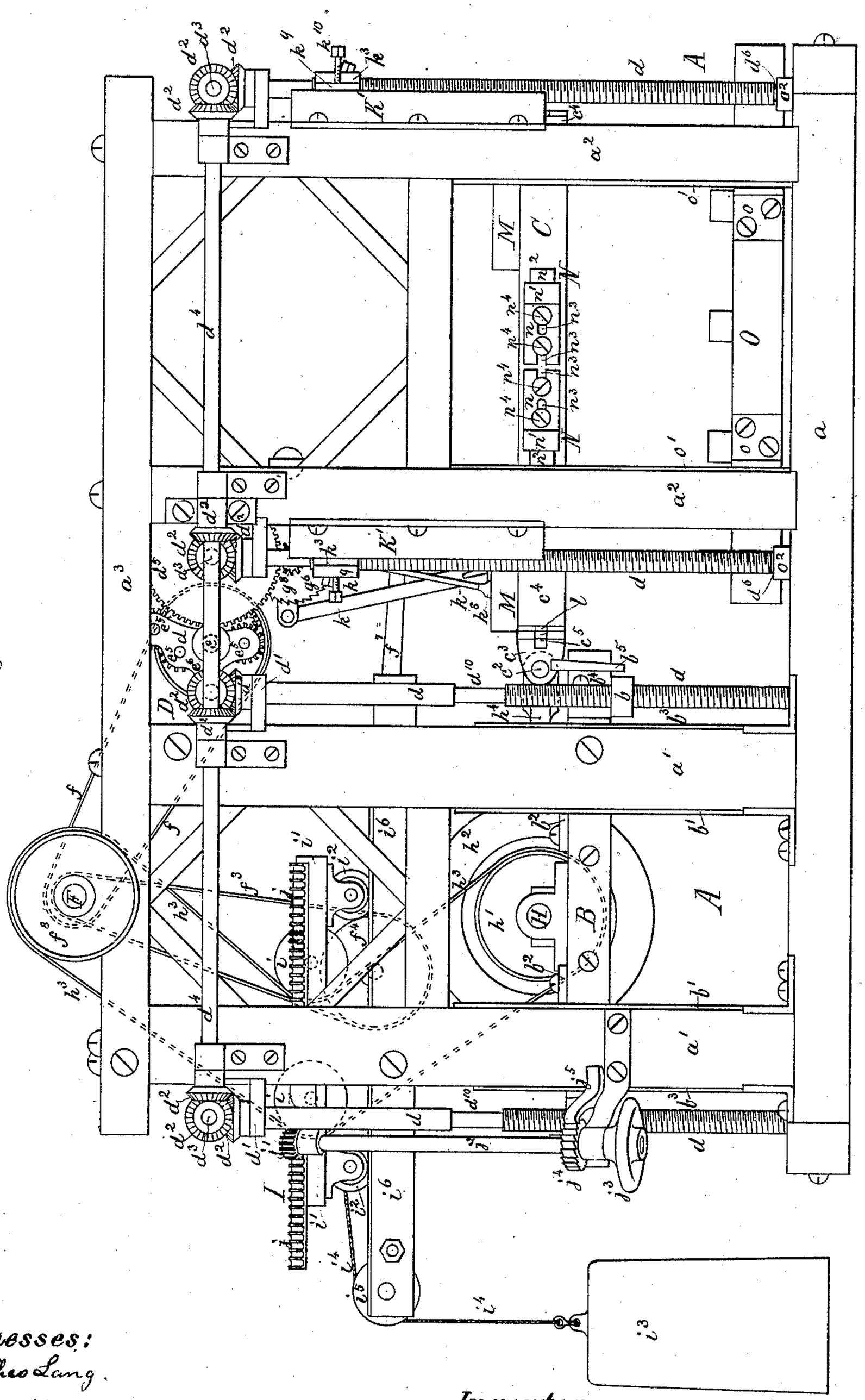
5 Sheets—Sheet 1.

D. SHORTSLEEVE.

MACHINE FOR SAWING STONE.

No. 283,929. Patented Aug. 28, 1883.

Fig 1.



Witnesses:
J. P. Theo Lang.
Robt L. Fenwick.

Inventor:
David Shortsleeve
by his attys
Fenwick & Lawrence

(Model.)

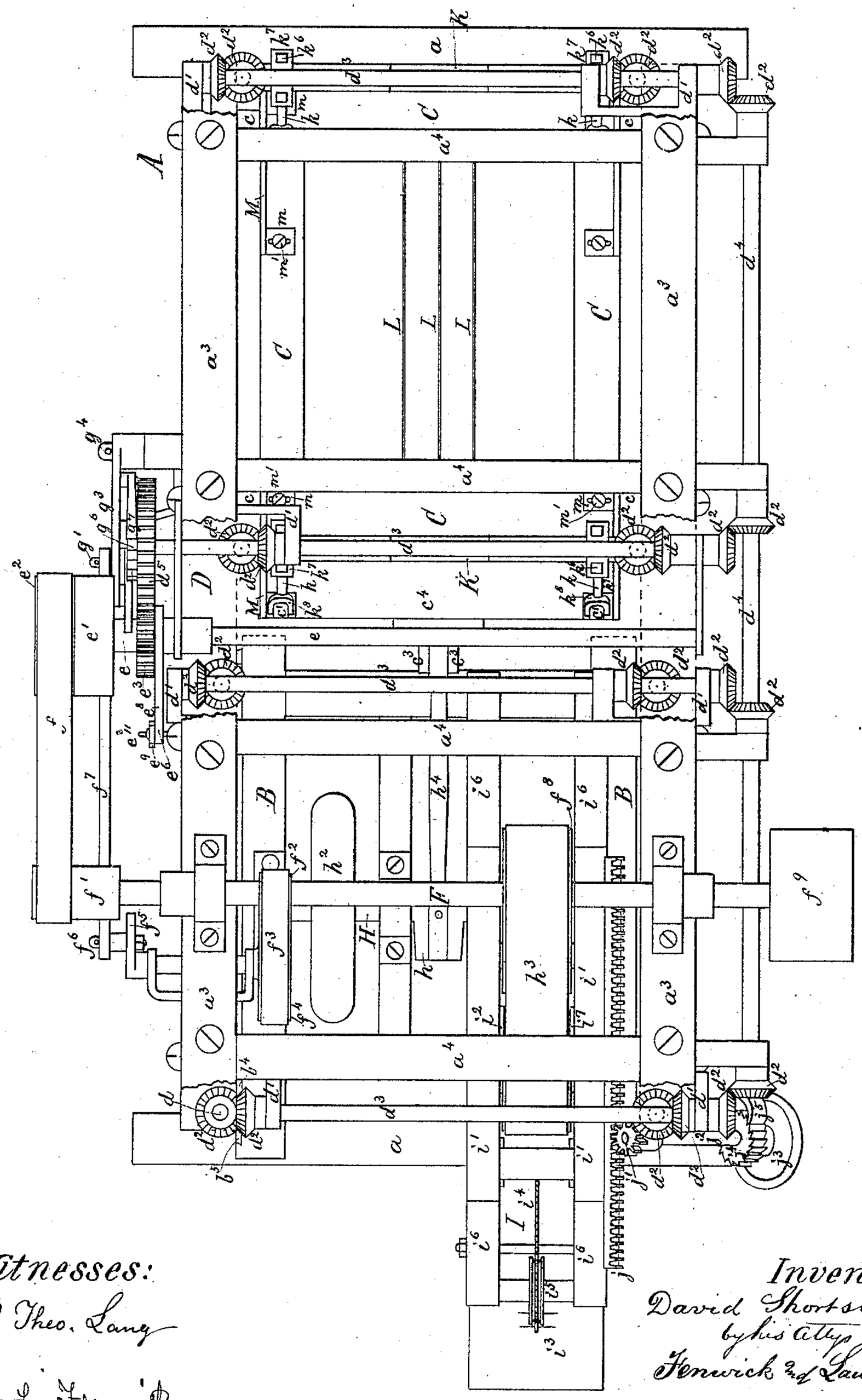
5 Sheets—Sheet 2.

D. SHORTSLEEVE.

MACHINE FOR SAWING STONE.

No. 283,929. Patented Aug. 28, 1883.

Fig 2.



Witnesses:

J. P. Theo. Lang

Robt. L. Fenwick

Inventor:

David Shortsleeve

by his Attys

Fenwick and Lawrence

(Model.)

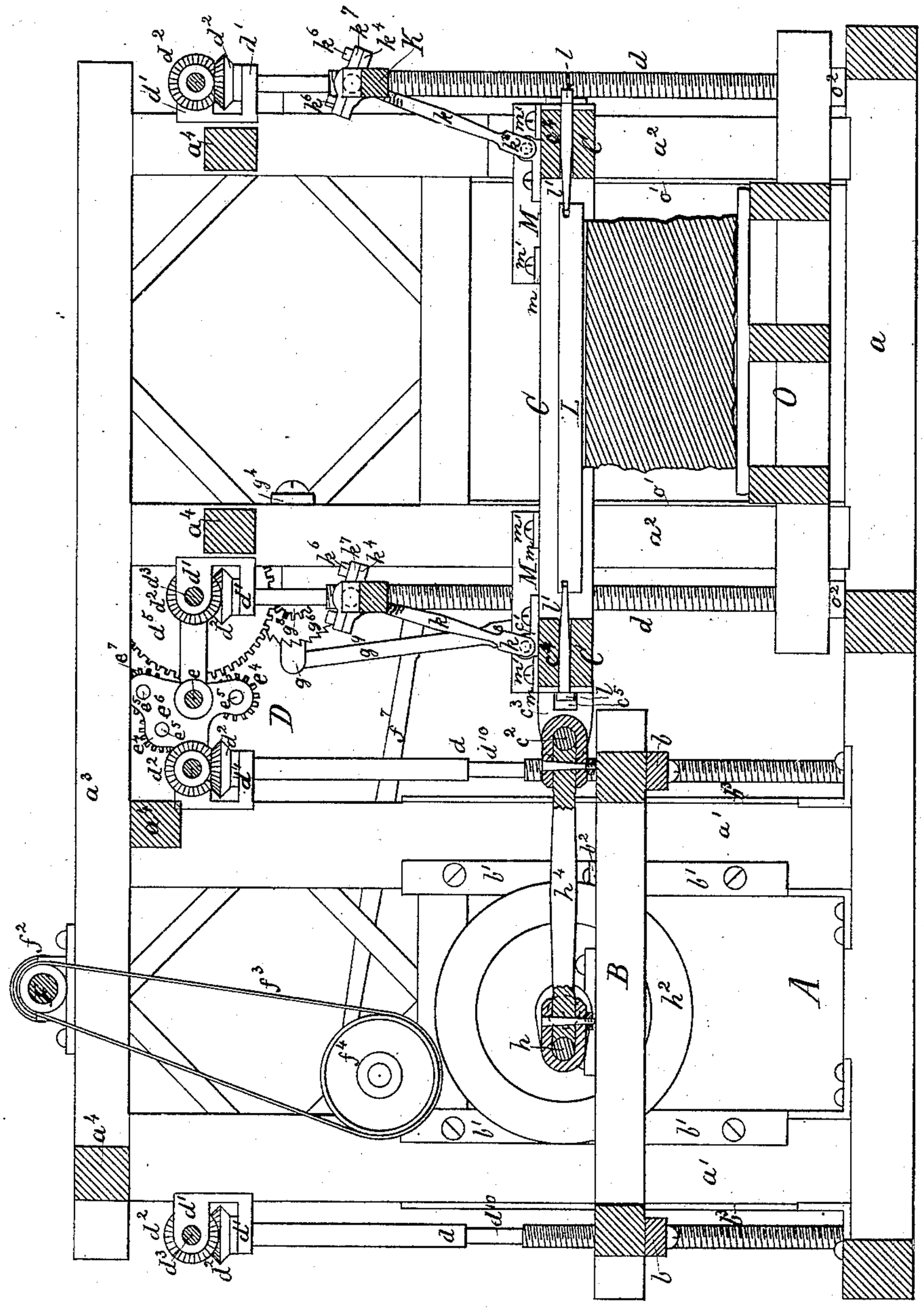
5 Sheets—Sheet 3.

D. SHORTSLEEVE.

MACHINE FOR SAWING STONE.

No. 283,929. Patented Aug. 28, 1883.

Fig 3.



Witnesses.
J. P. Theo. Lang.
Robt. L. Fenwick

Inventor:
David Shortsleeve
by his Attys.
Fenwick & Lawrence

(Model.)

5 Sheets—Sheet 4.

D. SHORTSLEEVE.

MACHINE FOR SAWING STONE.

No. 283,929. Patented Aug. 28, 1883.

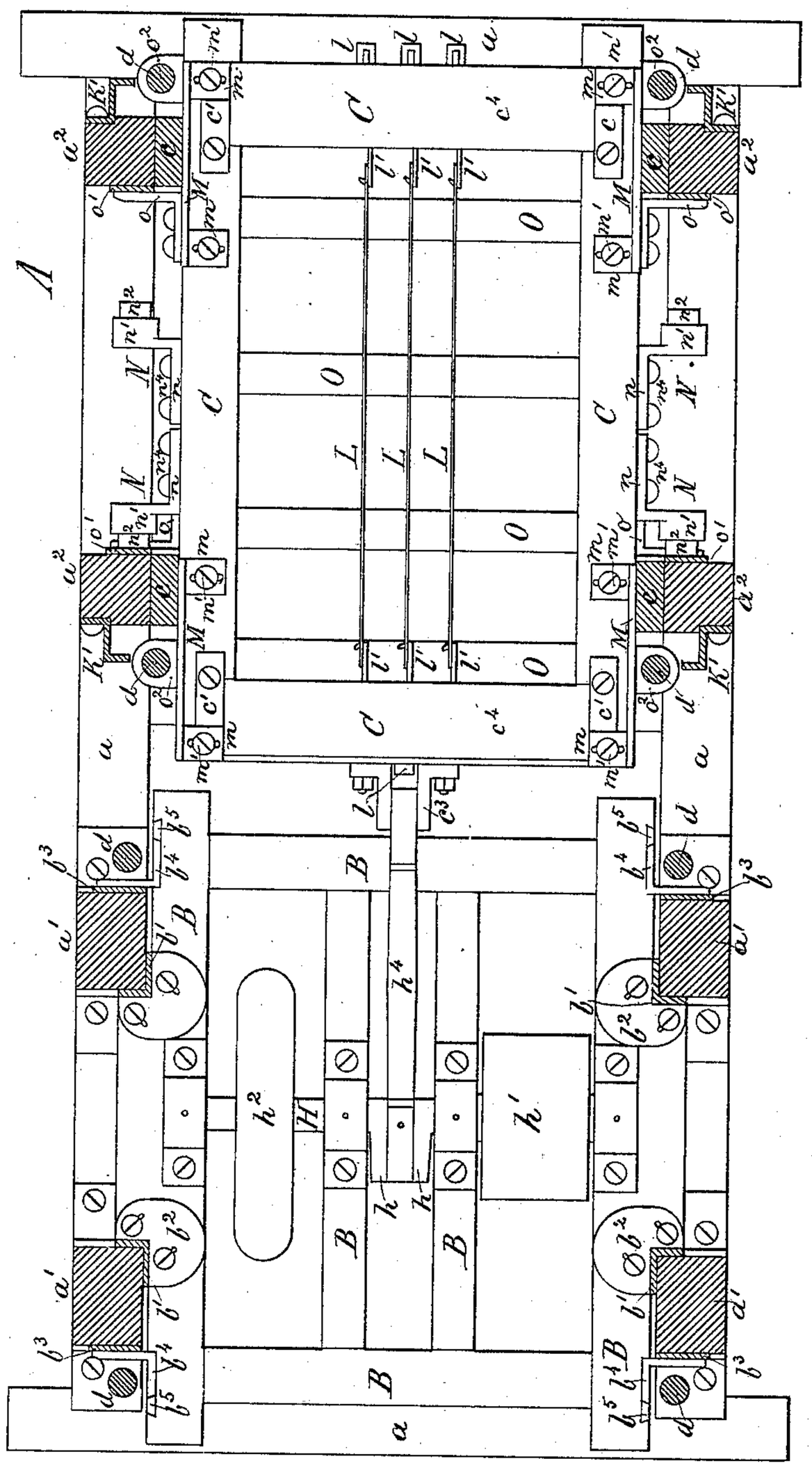


Fig 4.

Witnesses:
J. P. Theo. Lang.
Robt. L. Fenwick

Inventor:
David Shortsleeve
by his Attys
Fenwick & Lawrence

(Model.)

5 Sheets—Sheet 5.

D. SHORTSLEEVE.

MACHINE FOR SAWING STONE.

No. 283,929. Patented Aug. 28, 1883.

Fig 6.

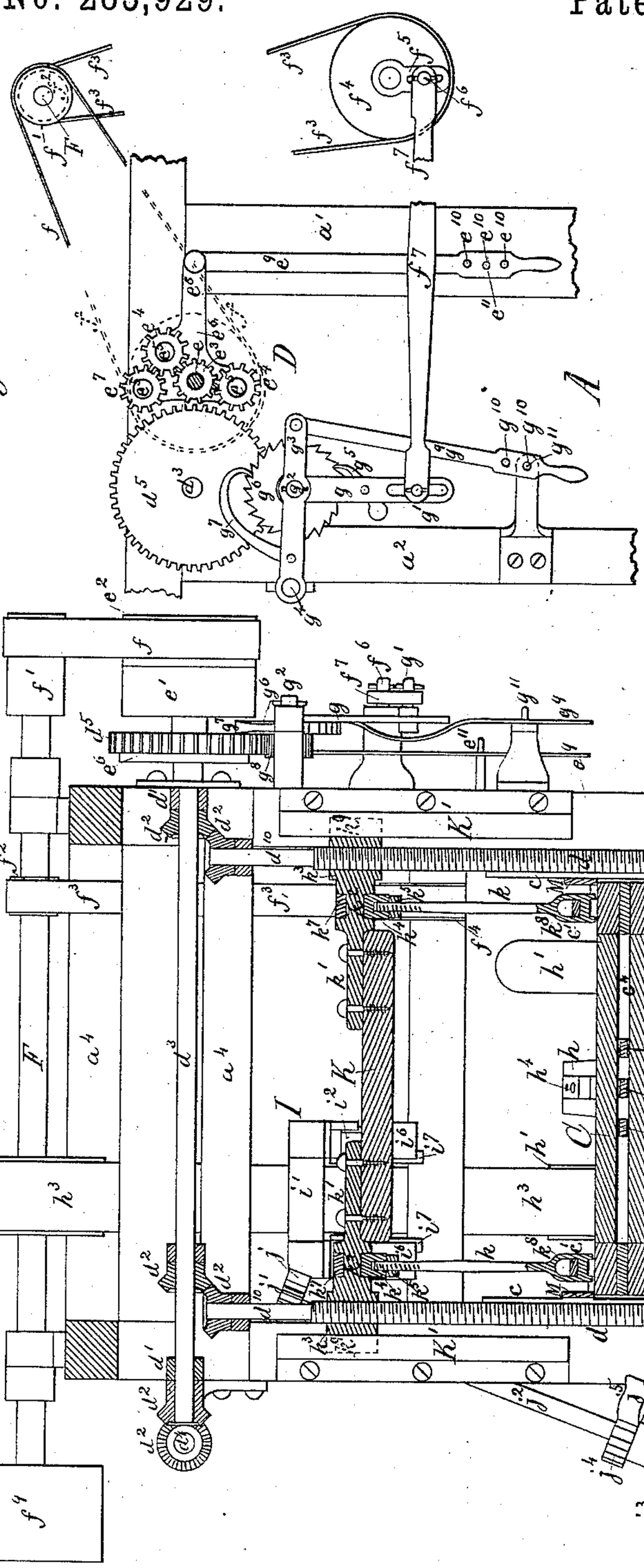


Fig 5.

Witnesses:
J. P. Theo. Lang.
Robt. L. Denwood

Inventor:
David Shortsleeve
by his attys
Fenwick and Lawrence

UNITED STATES PATENT OFFICE.

DAVID SHORTSLEEVE, OF RUTLAND, VERMONT, ASSIGNOR OF ONE-HALF TO EDMUND A. MORSE, OF SAME PLACE.

MACHINE FOR SAWING STONE.

SPECIFICATION forming part of Letters Patent No. 283,929, dated August 28, 1883.

Application filed February 27, 1883. (Model.)

To all whom it may concern:

Be it known that I, DAVID SHORTSLEEVE, a citizen of the United States, residing in the city and county of Rutland, and State of Vermont, have invented a new and useful Machine for Sawing Stone, of which the following is a specification.

My invention consists of certain novel constructions, combinations, and arrangements of parts in machines for sawing stone, and the nature of the same will be fully understood from the following specification, claims, and accompanying drawings.

In the accompanying drawings, Figure 1 is a side elevation of the entire machine. Fig. 2 is a top view of the same. Fig. 3 is a vertical central longitudinal section of the same. Fig. 4 is a horizontal section of the same, taken just above the saw-gang frame, exposing to view only the main frame, crank-shaft frame, gang-saw frame, and elevating-screws. Fig. 5 is a vertical cross-section in the line of the elevating-screws of the gang-saw frame at the end of the main frame, and Fig. 6 is a diagram of the elevating-gear.

In the figures of the drawings, A represents the main frame, consisting of oblong sills a, a number of upright guide-posts, a' a^2, two longitudinal top beams, a^3, and a suitable number of transverse brace-beams, a^4, the whole carefully fitted and firmly secured together, and serving for both the crank-shaft frame and the saw-gang frame. Between the guide-posts a' the crank-shaft frame B is supported by means of vertical screws d, and between the posts a^2 the saw-frame C is supported by means of the upright screws d. The threads of all these screws d are of the same pitch, and the screws are all simultaneously and uniformly operated by means of an elevating-gear, D, as will be seen. The upper portions of the screws d are secured in position by bearings d', which are fastened to the posts a' a^2 in a suitable manner. Above the said bearings d' bevel-gear wheels d^2 are provided on the screws d, and similar bevel-gear wheels d^2 on horizontal transverse shafts d^3 gear into wheels on the screws. The shafts d^3 are suitably supported by the said bearings d', and are each provided with a bevel-gear wheel, d^2, outside of the main frame, where they are operated by similar gear-wheels d^2 on a longitudinal shaft, d^4, suitably hung to the main frame. One of the shafts d^3 extends beyond the side of the main frame, and is there provided with a toothed wheel, d^5. An auxiliary transverse shaft, e, suitably hung to the main frame, and provided with a loose and a tight pulley, e' e^2, transfers motion to the wheel d^5 by means of a reverse gear. This reverse gear consists of a wheel, e^3, fastened to the shaft e, and gearing into a wheel, e^4, at either side of it. The wheels e^4 run on studs e^5, which are fastened to a plate, e^6, swinging around the shaft e. A wheel, e^7, on a stud, e^5, of the plate e^6 gears into one of the wheels e^4; and the two extreme wheels e^4 e^7 are so arranged that they are either out of range of the wheel d^5, or one or the other may be set into gear with the said wheel d^5 by swinging the plate e^6 either in one direction or the other. This latter operation of the plate e^6 is effected by means of an arm, e^8, extending from the plate e^6, and a rod, e^9, pivoted to the said arm and having three (3) holes, e^{10}, whereby it may be held in three different positions upon a rigid pin, e^{11}, on the main frame, to wit: The pin e^{11} being in the middle hole e^{10}, the wheel d^5 is not operated, and the whole elevating-gear is at rest. The pin e^{11} being in the lower hole e^{10}, the crank and saw frames are fed downward, and vice versa when the pin e^{11} is in the upper hole e^{10}. The tight pulley e^2 receives its motion by means of a belt, f, from a pulley, f', on the main shaft F. The shaft F is provided with another pulley, f^2, which, by means of a belt, f^3, revolves a pulley, f^4, suitably hung to the main frame. This pulley f^4 is provided with a slotted crank, f^5, and adjustable wrist-pin f^6, and a connecting-rod, f^7, which latter connects the crank f^5 with a slotted arm, g, by means of an adjustable wrist-pin, g'. The arm g swings around a stud, g^2, on an arm, g^3, which is pivoted at g^4 to the main frame. The arm g is provided with a pawl, g^5, which operates a ratchet-wheel, g^6, on the stud g^2, and another pawl, g^7, on the arm g^3 prevents back motion of the ratchet-wheel. The ratchet-wheel g^6 is provided with a pinion, g^8, matching the wheel d^5. To the end of the arm g^3 a shipping-rod, g^9, is pivoted, which is provided with two holes, g^{10}, for the entrance of a rigid pin, g^{11},

suitably fastened to the main frame. When the rod g^9 rests with the upper hole g^{10} on the pin g^{11}, the pinion g^8 is not in gear with the wheel d^5, and when the rod g^9 rests with the lower hole g^{10} upon the pin g^{11}, the pinion g^8 gears with the wheel d^5, and thus operates the feed or elevating device of the crank-frame and saw-frame. The ratchet-wheel g^6 is ordinarily used for the operation of the feed, while the reverse gear e^3 e^4 e^7 is chiefly used for adjusting the elevation of the crank-frame and saw-frame before and after sawing the marble block, or in case of an accident to the saws.

The crank-frame B is of rectangular shape, and is provided with transverse bars b, having threaded holes, to which the elevating-screws d are fitted. The inner corners of the posts a' are metal-plated, as at b', and the frame B is provided with diagonally-slotted bearing-plates b^2, bearing against the plates b', whereby an adjustable vertical bearing of great durability is procured. The end surfaces of the posts a' are also metal-plated at b^3, and the end portions of the frame B are provided with slotted adjustable angular metal bearings b^4 and adjusting dovetail-sided wedges b^5, whereby the bearings b^4 are kept in position. A crank-shaft, H, is suitably mounted upon the frame B, the crank h occupying a central position, and a pulley, h', being provided on one and a fly-wheel, h^2, on the other side of it. Pitmen on each side of a number of gangs have been used in machines of some constructions in order to gain room, while gangs with a pitman on one side only are the most commonly adopted; but with my improved construction of the main frame and bearings the central crank will prove to be the most advantageous. The pulley h' of the crank-shaft H is revolved by means of a belt, h^3, and a pulley, f^8, of the main shaft F. This main shaft may either be suitably hung to the main frame, as shown, and in this case is provided with a main pulley, f^9, or one of the line-shafts of the shop may be provided with the pulleys f' f^2 f^8, and thus may serve in lieu of the said main shaft.

Between the pulleys f^8 and h' a belt-tightener, I, is provided, which consists of two tightening-pulleys, i i, suitably hung to a carriage, i', having flanged wheels i^2, and having an outward tension by means of a weight, i^3, connecting-cord i^4, and pulley i^5. The carriage i' runs on a metal-lined track, i^6, suitably secured to the main frame, and is insured against vertical displacement by angular guide-plates i^7, bearing against the lower surfaces of the aforesaid track, as shown in Fig. 5. The pulley i^5, over which the cord i^4 passes, is hung to the end portions of the track i^6. The carriage i' is provided with a laterally-inclined rack, j, into which a pinion, j', at the end of an inclined shaft, j^2, gears. The shaft j^2 is suitably hung to one of the posts a', and is provided with a hand-wheel, j^3, and ratchet-wheel j^4. A pawl, j^5, is hung to the post a', and prevents backward movement of the ratchet-wheel and downward movement of the weight i^3, and it is only used when the crank-shaft is to be stopped. For this purpose the hand-wheel j^3 is turned back until the tension of the carriage i' ceases, and the belt h^3 becomes so loose as to be inoperative, whereupon the pawl j^5 is moved or allowed to fall into the teeth of the ratchet-wheel j^4, and thus the motion of the crank-shaft is stopped, while the main shaft continues to run.

The saw-gang frame, which comprises, mainly, a rectangular saw-frame, C, provided with suitable saws, and transverse supporting cross-bars K, to which the said frame C is hung, is connected to the crank h of the shaft H by means of a pitman-rod, h^4, and it is caused to oscillate or swing by means of the crank-shaft and pitman between upright guides c, suitably fastened to the inner side of the posts a^2. The saw-frame C is suspended by means of hanger-arms k on the supporting vertically-sliding cross-bars K of the saw-gang frame, said bars being provided with metallic head-pieces k', having journals k^2, to which the hanger-arms are attached, and nut-heads k^3, which are fitted upon the screws d and are operated by them. Opposite the screws d vertical guides K' are fastened to the posts a^2, and the nut-heads k^3 are provided with double flanges k^9, which slide upon the said guides, and thus protect the screws d' against lateral strains. The hanger-arms proper, k, are screwed into lower semi-bearings, k^4, and secured thereto by check-nuts k^5, and these lower semi-bearings, by means of set-screws k^6, are attached to upper semi-bearings, k^7, and the bearings k^2 are encircled by the said semi-bearings k^4 k^7. The lower parts of the hanger-arms k are provided with stirrups k^8, which, by means of suitable bearings, c', support the saw-frame. The connecting-rod h^4 is attached to a pin, c^2, in a slotted head, c^3, which is suitably fastened to the slotted end bar, c^4, of the saw-frame, and is provided with lateral openings c^5, whereby a free passage is provided for the heads l of the saw-hooks l'. The saws are fastened in the frame C by hooks l', which at one end of the saw-frame are made adjustable, as usual, by wedge-keys, or in any other suitable manner.

At the end portions of the saw-frame C ordinary adjustable bearing-plates, M, are provided, which, as usual, by means of slotted angular foot-plates m and set-screws m', are fastened to the frame C and bear upon the guides c, thereby, as usual, keeping the frame and saws laterally steady. Between the posts a^2 the saw-frame C is provided with longitudinally-adjustable bumpers N, which consist of plates n, having socket-heads n', with elastic concussion-blocks n^2, longitudinal slots n^3, and set-screws n^4, whereby said bumpers may be set nearer together or farther apart, and thus allow the concussion-blocks n^2 to strike the posts a^2 with more or less force, as desired. This device of the bumpers prevents the saw-frame, which is run much faster than in ordi-

nary machines, from straining and injuring the wrist-pins and connecting-rod by its inertia at the end of each stroke; also enables the gang-frame posts to assist the crank-shaft-frame posts to receive a part of the shock of the crank-shaft, and also saves power.

The frame O, which supports the stone block to be sawed, is made to bear on the guides *c*, and has angular bearings *o* bearing against metallic linings *o'* on the posts a^2, and is in this manner insured against lateral displacement, while it may move vertically. For the latter purpose the frame O is provided with nuts o^2, fitting the screws *d*. In order to prevent the frame O from moving vertically when it is required to lie steady upon the foundation part *a* of the main frame, the lower portions, d^6, of the respective screws *d* are so reduced in diameter as not to affect the nuts o^2 when turning. When the frame O is to be operated by the screws *d*, it is lifted up until the threads of the revolving screws have entered the nuts o^2 sufficiently to operate them properly. Before the frame O is elevated the saw-frame and crank-frame are raised above the termini of the screw-threads of the corresponding screws, *d*, which threads are at those points reduced in thickness to the depth of screw-threads of *d*, as seen at d^{10}, so that the threaded ends of the bars *b* and the nut-heads k^3 sit loosely on the said reductions. In this position the two frames are then held by locking their bearings, the crank-frame being locked by pressing the bearing-plates b^2 b^4 against the posts *a'*, and the saw-frame being locked by forcing a set-screw, k^{10}, especially provided for this purpose in each outer flange, k^9, against the bearings K'.

From the foregoing description it will be seen that either the gang-saw frame, together with the crank-shaft, can be fed down by the screw-rods, or the stone on the platform fed up to the gang-saw frame and crank-shaft by the said rods, during either of which modes of operation means are provided whereby either the stone-supporting platform or the gang-saw frame and crank can be held stationary. The construction of my machine is such that the crank is brought inside of the main frame, instead of requiring to be placed outside of the same, which arrangement of the crank is the most advantageous in such machines. Other devices than screws—such as an endless chain or rope—may be adopted for raising the block of stone.

By having the gang-frame posts and crank-frame posts all framed into the same sills and top pieces, the crank-shaft frame, where there is the most strain, will not be able to yield unless the gang-frame support yields. In other words, these long uniting sills and top pieces insure steadiness and firmness during the operation of the machine.

It will further be seen that the saw-gang frame and the crank-shaft frame, although moved up and down together uniformly, are made separately from one another, and each furnished with its own special guides, which can be adjusted to suit the necessities of each frame, and that this construction admits of the saw-gang frame swinging or oscillating while both it and the crank-shaft frame are sliding either down or upward.

It will further be seen that the bumpers, ratchet or intermittent feeding mechanism, the reversing continuous feeding mechanism, and the tension mechanism, as shown, render the machine very convenient and expeditious of operation, while the main frame and guides and central crank and pitman give great steadiness and durability to the operating parts.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a stone-sawing machine, a saw-gang frame applied within the main frame, and swinging back and forth while sliding up and down, in combination with a crank-shaft and pitman-connection applied to a frame which slides up and down, and with the means whereby the two frames are moved up and down, can be reversed in their movement, and accelerated or slackened in their movement when necessary, substantially as and for the purpose described.

2. A stone-sawing machine comprising, in combination, the belt tightening and slackening or stopping mechanism, the power-gearing, two sets of vertical screws and nuts, the sliding and swinging saw-gang frame and the sliding crank-shaft frame, and a pitman-connection between the two frames, substantially as and for the purpose described.

3. The combination of the supporting main frame A, separate sliding crank-supporting frame B, separate swinging and sliding saw-gang frame C K, crank-shaft H, and pitman-connection h^4, applied to the frame B, two sets of vertical screws and nuts for feeding down and up the crank-shaft, pitman, and their frame, and the saw-gang frame simultaneously and uniformly, ratchet feeding mechanism, and suitable connecting and driving mechanism, substantially as described.

4. A stone-sawing machine comprising a main supporting-frame, A, a vertically-sliding and longitudinally-swinging saw-gang frame, C K, a sliding crank-shaft frame, a crank-shaft and pitman mounted on the sliding frame and connected to the saw-gang frame, two sets of screws and nuts for feeding down and up the crank-shaft frame and saw-gang frame simultaneously and uniformly, the power gearing and reversing mechanism, by which the up and down movements of the crank-shaft and saw-gang frames can be made continuous instead of intermittent, and said movements can be changed from down to up and up to down, substantially as described.

5. The combination of the ratchet feed mechanism for producing an intermittent downward feed, the reversing continuous feed mechanism for producing a continuous up or

down feed, the power-gearing, vertical screws and nuts, sliding and swinging saw-gang frame, sliding crank-shaft frame, and main frame, substantially as and for the purpose described.

6. The reversing-gear mechanism consisting of the wheel e^3 on shaft e, wheels e^4 e^4 and e^7 on studs e^5 e^5 e^5, swinging plate e^6, and wheel d^5 on extension of shaft d^3, in combination with power-shaft F, suitable connecting-gearing, as e' e^2 f f', vertical screws d, having bevel-wheels d^2, and working in nuts of bars b and K, connecting-shafts d^3 d^4, provided with gear-wheels d^2, crank-shaft frame B, saw-gang frame C, suitable connecting mechanism between the crank-frame and saw-frame, and suitable driving mechanism between the crank-shaft and power-shaft, substantially as and for the purpose described.

7. The combination, with the crank-shaft frame and the saw-gang frame, of the swinging arm g^3, carrying a ratchet-wheel, g^6, fastened to a pinion, g^8, and supported by pivot g^4 of frame A, the arm g, carrying the pawl g^5, for operating the ratchet-wheel g^6, the connecting-rod f^7, attached to arm g, the wheel d^5 on extension of shaft d^3, and gearing into wheel g^8, vertical screws, nuts, and connecting-gearing by which the crank-shaft frame and saw-frame are operated, and the reversing gear-wheels e^3 e^4 e^7 on a swinging plate, e^6, and suitable devices for forming a connection with the power-shaft, substantially as and for the purpose described.

8. The vertical screws d of the main frame, upon which the saw-gang frame, crank-shaft frame, and the stone-platform are applied, provided with the reductions d^6 and d^{10}, clamping bearing-plates b^2 b^4 on posts a' of the frame, nuts for the screws d to work in, vertical guide-bearings K′ of posts a^2 of the frame, and set-screw k^{10} in the outer flanges, k^9, of the nut-heads k^3, whereby either the stone-platform may be kept stationary or be moved, or the crank-frame and saw-gang frame may be kept stationary or be moved during the operation of sawing stone, substantially as described.

9. The combination, with the main frame A, vertically-sliding and longitudinally-swinging saw-gang frame C K, and the vertically-sliding crank-shaft frame connected by pitman with the saw-gang frame, of the adjustable bumpers N, applied on the saw-gang frame between posts a^2 a^2 of main frame, and consisting of angular slotted and socketed plates n, having elastic concussion-blocks n^2 fitted upon them, substantially as and for the purpose described.

10. The saw-gang frame consisting of the cross-bars K, provided with head-pieces k', journals k^2, semi-bearings k^4 k^7, screw-threaded hanger-arms k, and arranged to slide and swing within the main frame A, and connected with a crank-shaft frame, B, which slides simultaneously with it in said frame A, substantially as described.

11. The combination of the main frame A, saw-frame C, having cross-bars K, provided with guides K′, having guiding nut-heads k^3, with double flanges k^9, the elevating-screws d, having reductions d^{10} and the set-screws k^{10}, applied to the flanges k^9, for holding the saw-gang stationary, substantially as and for the purpose described.

12. The vertical screws d, provided with reductions d^{10}, upon which the crank-shaft frame is adjusted to a stationary position, in combination with the sliding crank-shaft frame and the adjustable guiding and clamping plates, by which said frame is prevented from descending when the stone-platform is being moved upward, substantially as described.

13. In a stone-sawing machine, the combination of a main frame, A, a separate vertically moving and guided crank-shaft frame, B, a separate vertically moving and swinging saw-gang frame, C K, a pitman-connection between said frames, and two sets of vertical screws and nuts for operating said frames simultaneously and uniformly, substantially as described.

DAVID SHORTSLEEVE.

Witnesses:
ORRICK L. ROBBINS,
EDMUND R. MORSE.