(No Model.) 3 Sheets—Sheet 1.

D. SHORTSLEEVE.

SAND AND WATER FEED MECHANISM.

No. 315,848. Patented Apr. 14, 1885.

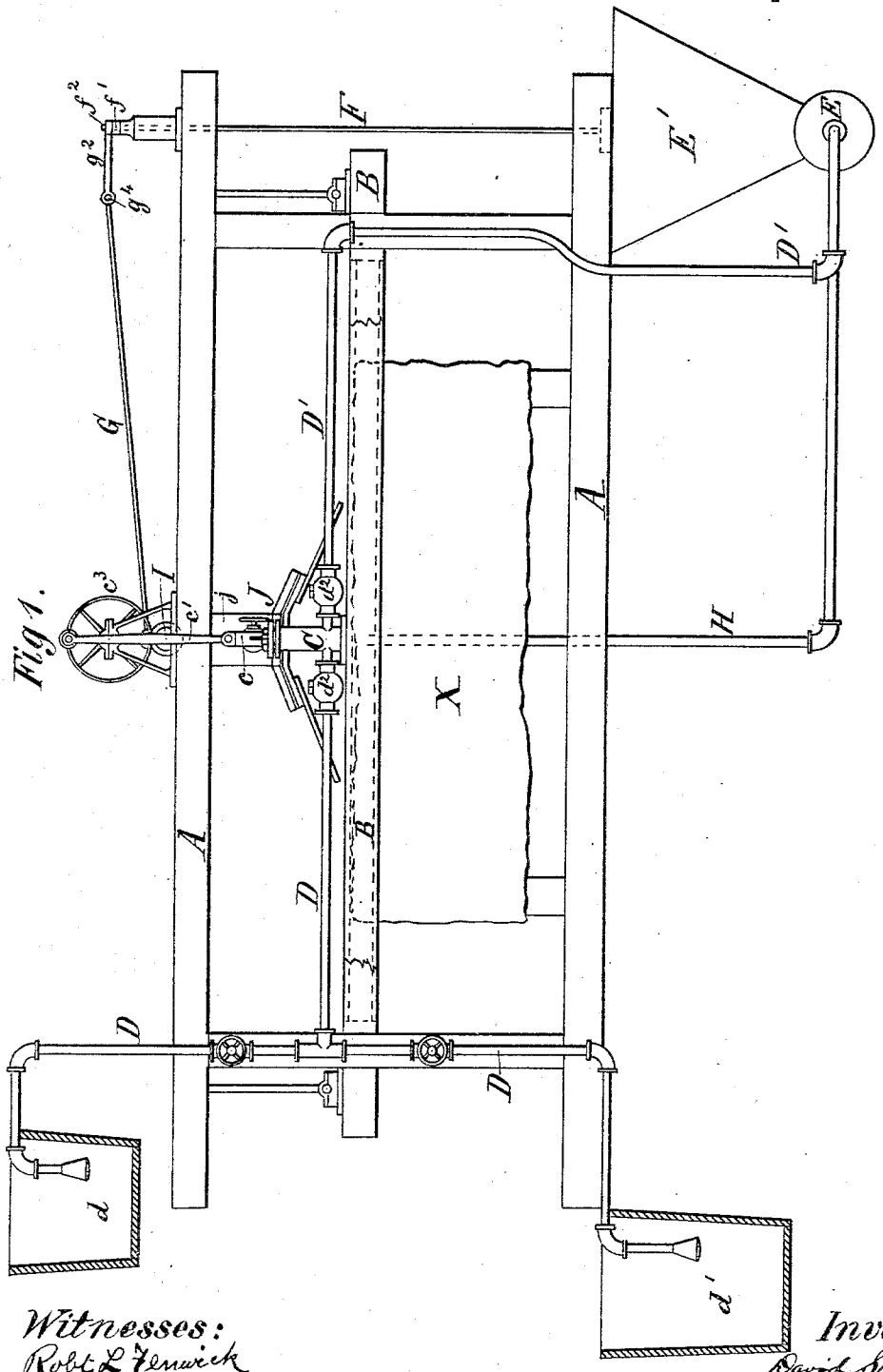


Fig. 1.

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A Lockhart

Inventor:
David Shortsleeve
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Fenwick & Laurence

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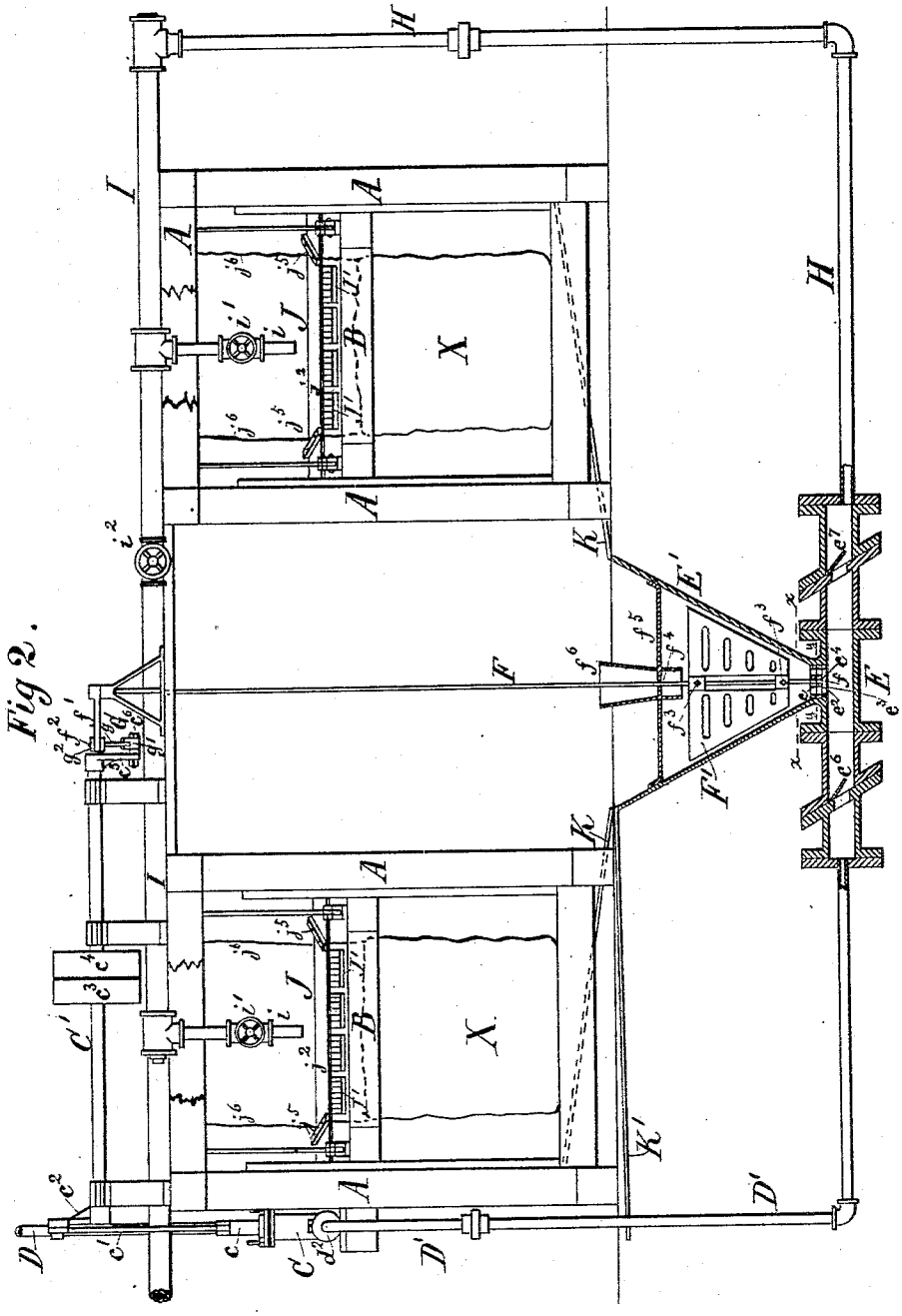
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Fig 2.



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D. SHORTSLEEVE.

SAND AND WATER FEED MECHANISM.

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Fig 9.

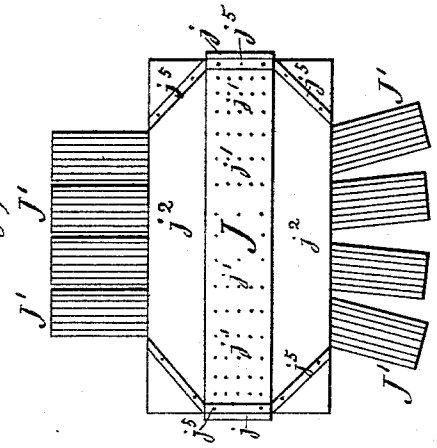


Fig 10.

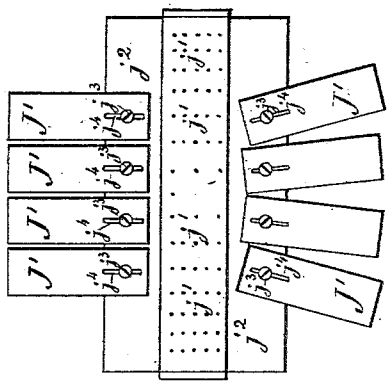


Fig 3.

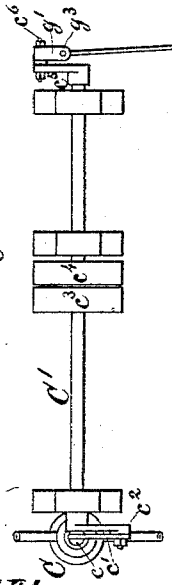
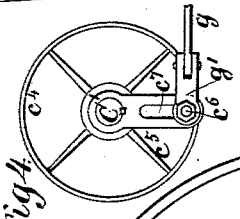


Fig 4.



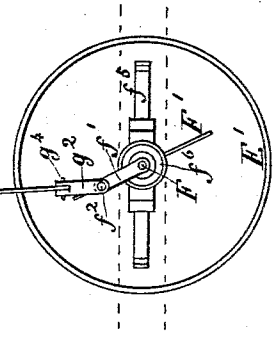


Fig 5.

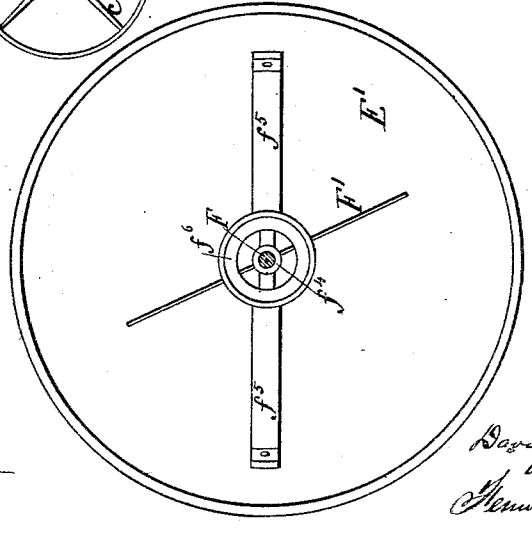


Fig 8.

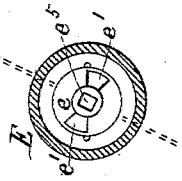


Fig 7.

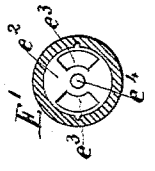
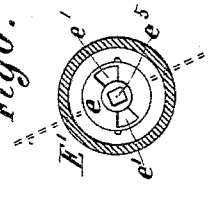


Fig 6.



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UNITED STATES PATENT OFFICE.

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

SAND AND WATER FEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 315,848, dated April 14, 1885.

Application filed October 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID SHORTSLEEVE, a citizen of the United States, residing at Rutland, in the county of Rutland and State of Vermont, have invented a new and useful improvement in sand and water feed mechanism for feeding water and sand or water and shot mixed to stone-sawing or stone-rubbing or stone-dressing machines, of which the following is a specification.

My invention consists in certain constructions and combinations of mechanical devices, as will be hereinafter described and specifically claimed, whereby a machine is produced with which water and sand or water and chilled-metal shot can be continuously fed or moved by a forced circulation thereof through valved chambers and pipes from a receiving and discharging chamber or hopper to points where stone-saws or stone-rubbers or stone-dressers are acting upon stone and there distributed properly upon the stone, and, after aiding the saws in cutting the stone, are automatically and continuously returned to the chamber or hopper for reuse.

This invention is such that either one, two, or more frames containing stone-saws or stone-rubbers or stone-dressers may be continuously supplied with water and sand or with water and chilled-metal shot, by means of a separate pump for each frame or one large pump for several frames, and the said fed substances may be kept in circulation, returned for continuous reuse, agitated, and deprived of all mud and refuse on their way through the receiving and discharging chamber or hopper.

In the accompanying drawings, I have represented my invention as applied to two saw-frames, each having a gang of saws; but this is only done as an illustration of one among many other ways in which it may be utilized for supplying water and sand or water and shot to stone-sawing or stone-rubbing or stone-dressing machinery, the same principle of operation being involved whether one, two, or more frames or gangs of saws, or one, two, or more sets of rubbers or dressers are supplied in accordance with my invention.

In the drawings, Figure 1 is a side elevation of a sawing-machine frame, gang of saws, and stone to be sawed, with a force-pump, water-supply tank, receiving and discharging chamber, agitator, and distributing-apron applied in accordance with my invention. Fig. 2 is an end view of two sawing-machine frames arranged parallel to each other, each being supplied with a gang of saws and stone to be sawed, this view also showing a force-pump, a receiving and discharging chamber, and an agitator, the latter two being in section. Fig. 3 is a top view of the crank-shaft and driving-pulleys for operating the force pump and agitator. Fig. 4 is a detail view of the crank-connection of the said crank-shaft and the connecting-rod of the agitator. Fig. 5 is an enlarged top view of the agitator. Fig. 6 is a horizontal section in the line $x\,x$ of Fig. 2 of the receiving and discharging chamber below the agitator. Fig. 7 is a horizontal section of the same in the line $y\,y$. Fig. 8 is a section similar to Fig. 6, but showing the upper valve therein in a different position. Fig. 9 is a top view of the distributing-apron, and Fig. 10 is a bottom view of the same.

A in the drawings represents a sawing-machine frame for sawing stone; B, a saw-frame, and C a force-pump of ordinary construction. The force-pump may be attached to the frame A, and its plunger c operated by means of a connecting-rod, c', and a crank, c^2, of a crank-shaft, C', suitably hung over the frame A, and provided with a driving-pulley, c^3, and loose pulley c^4, and the supply-water may be drawn through a pipe, D, from either an elevated tank, d, a cistern, d', or other suitable source, and be forced through a pipe, D', into a valve-chamber, E, which is below and in communication with a water and sand or water and shot receiving and discharging chamber or hopper, E'. The pipes D D', at points near the pump C, are provided with check-valves d^2, in order to facilitate inspection or repair thereof. The valve-chamber E supports the conical receiving and discharging chamber or hopper E', and the communication of said chamber with the valve-chamber E is effected by means of an oscillating valve, e, having a port or ports, e', and resting upon a fixed valve-seat, e^2, having a port or ports, e^3, and being secured at the bottom of the receiving and discharging chamber. The valve-seat e^2 supports, by means of an ordinary socket-bearing, e^4, the cylindrical foot f of a vertical

shaft, F, and the valve *e* is operated through said shaft by means of a square formation thereon, fitting a square hole, e^5, in the center of the valve *e*. Above this valve a winged agitator, F′, is fitted to the shaft, and at the upper end of the shaft a crank, *f′*, is provided, which, by means of a suitably-jointed connecting-rod, G, is operated by a crank, c^5, of the crank-shaft C′. The connecting-rod G consists of a rod, *g*, and two links, g' g^2, the rod *g* being connected with said links by means of pins g^3 g^4, standing at a right angle to each other, and each of them standing at a right angle to the wrist-pin of its link. In other words, the link-pin g^3 of the link g' and wrist-pin f^2 of the agitator-crank f' are vertical, and the link-pin g^4 of the link g^2 and the wrist-pin c^6 of the crank c^5 are horizontal, and thus a connecting-rod with universal joint is provided for the vertically-revolving crank c^5 and the horizontally-oscillating crank f'. The crank c^5 is provided with a slot, c^7, in which the wrist-pin c^6 can be adjusted, so as to give the connecting-rod G and the agitator more or less stroke, as may be found necessary, and open the valves, Figs. 6, 7, 8, more or less, as desired. The winged agitator F′ is so fitted upon the shaft F that it can be adjusted to any desirable height, and there fastened by means of pins or set-screws f^3. The shaft F is kept steady by means of an ordinary bearing, f^4, in a cross-bar, f^5, fastened to the inner portion of the receiving and discharging chamber E′ above the agitator, and in order to keep the sand in the said chamber from entering the bearing f^4, I surround it with a funnel, f^6, of sufficient depth and of greater height than the chamber, which funnel prevents the sand from descending upon or laterally packing around said bearing and spoiling it by grinding. The valve-chamber E is at either end provided with a flap or check-valve, e^6 and e^7, with a suitable seat or cushion for valve, whereby the back-flow of water and sand between the strokes of the pump is prevented. From the discharging end of the valve-chamber E a pipe, H, of greater diameter than the pipe D′, conducts water and sand to a suitable elevation into a pipe, I, of still greater diameter; and from discharge-pipes *i*, having valves *i′*, of this latter pipe, the water and sand are conducted upon a distributing-apron or dash-board, J, and thereby spread and distributed together over the stone X being sawed. This dash-board or apron J is suitably hung to the frame A by means of pendent boards *j* or otherwise, and is provided with holes *j′* for the discharge of water and sand, and with adjustable fluted distributing-chutes J′, which are fastened to the lower or under sides of the inclined portions j^2 of the apron J by means of set-screws j^3, passed through slots j^4, and can be set parallel or spread like a fan, and moved inward or outward, so as to be long or short to suit the requirements of the case. If the stone block is large, the distributer must be expanded, and if small contracted. The under-hanging chutes J′ offer no obstruction to the flow of water and sand. The ends of the apron are provided with ordinary rims, j^5, in order to prevent the water and sand from overflowing longitudinally at either side of the stone. The splashing of water and sand to either side of the stone may be prevented by canvas screens j^6, suspended from the frame A and touching the upper surface of the stone just outside the gang of saws. In case only one machine is to be operated, the supply of water and sand is cut off from the other machine or machines by means of a cock, valve, or valves, i^2, provided on the pipe I.

For the collection of the water and sand flowing from the saw-grooves of the stone an ordinary chute, K, is provided, as shown, and by this chute they are conducted to the chamber E′, and the surplus of water, with the mud or other substances lighter than the sand, and stirred up by the agitator, are conducted away from the chamber E′ by an inclined gutter, K′, placed at the top or overflow passage of said chamber.

The object of making the pipes H and I of successively greater diameter than the pipe D′ is to lessen the strain on the force-pump, which strain is due to the friction of the elevated and propelled sand against the inner surfaces of the said pipes and to the speed at which it is moved.

Operation: When a stone is to be sawed, the chamber E′ is filled with water and sand and the pump started, and when the water and sand begin to discharge from the pipe *i* the saws are started. The sand, which is gradually washed down by the water delivered from the apron J and chutes J′ in fine streams, is pushed, together with the water, over the ends of the stone, from whence both the water and sand descend along the stone upon the chute K, and from thence into the chamber E′. In this chamber the agitator F′ stirs up the sand, so as to prevent it from downward packing, and separates from it any mud or soft matter which may be mixed therewith. This stirring and washing of the sand is further promoted by upward jets of water being admitted through the opening of the valve-ports e', during the latter part of the downward or forcing-pump stroke, in which case the rear valve, e^7, in the valve-chamber E, is closed by the back action or weight of water and sand in the pipes H and I. During the upstroke of the pump the valve-ports e' are open and the valves e^6 e^7 are closed, thus giving the sand in the chamber E′ an opportunity to sink into the valve-chamber E previous to the next forcing stroke of the pump. When the pump begins again to force water into the valve-chamber E, the valve-ports e' are closed and the sand therein is forced into the pipe H. Near the end of this water-supply stroke the valve-ports e' are opened again, and the rest of the water-supply is forced up into the chamber E′, with the result above described, while the surplus muddy water runs through the

overflow of the chamber into the gutter K′, and is conducted away from the machine. As the sand is gradually crushed up and becomes too fine for use, it is removed from the chamber E by the overflowing water, and the necessary supply is kept up by throwing from time to time a lot of fresh sand or shot into the chamber E. The valve of the receiving and discharging chamber might be changed in its construction and form, so that instead of being a horizontally-moving disk it might be a conical plug fitted in a conical seat, and under such construction of the valve its lower end or other portion could be set upon an inclined plane, so that as the valve-rod is turned in a forward and backward direction by the connections of the pump for the purpose of vibrating the agitator, the valve would be caused by the inclined plane to rise for the purpose of opening the discharge-passage for the sand and water or shot and water outside the valve between the wall of the chamber and the periphery of the valve, and for allowing it to descend and close said passage.

A screw or other suitable device other than an inclined plane for raising and lowering the valve simultaneously with the vibration of the agitator might be adopted. In this case the valve is made with a slip-joint above the valve.

The above-described improved sand and water feed can with advantage be applied to all machinery which is used for cutting, grinding, or polishing with the aid of wet sand.

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

1. An automatic water and sand or water and shot feed, consisting of a water-supplying pump having suitable conducting-pipes and valves, and a valved sand-supplying chamber having its valve connected with the machinery of the pump and operated simultaneously with the pump, whereby water and sand are first mixed and then moved together to the points where they are required for use, substantially as described.

2. The combination, with stone-sawing, stone-rubbing, stone-dressing, or other analogous machinery requiring a water and sand or water and shot feed, of a water-supplying force-pump having suitable conducting-pipes and valves, a valve-chamber having valves for preventing the backflow of water, and a valved sand and water chamber or hopper, the valve of which is connected with the machinery of the pump and operated simultaneously with the pump, substantially as described.

3. In combination with a water-supplying pump, a valve-chamber, E, having valves e^6 e^7, for preventing the backflow of water and sand between the strokes of the pump, a receiving and discharging chamber, E′, having valve-seat e^2, oscillating valve e, and operating-shaft F, substantially as and for the purpose described.

4. The chamber E′, having agitator F′, valve e, and seat e^2, in combination with the valve-chamber E of a feed-pump, and valves e^6 e^7, for preventing the backflow of water and sand between the strokes of the pump, substantially as and for the purpose described.

5. The sand receiving and discharging chamber E′, having cross-bar f^5, bearing f^4, and guard-funnel f^6, in combination with the valve-operating shaft F, valve e, and seat e^2, and valve-chamber E, having valves e^6 e^7, for preventing backflow of water and sand, substantially as and for the purpose described.

6. The combination of the pump-operating shaft C′, a sand and water forcing-pump having suitable conducting-pipes and valves, and a sand and water chamber E′, having a discharge-valve and in communication with said pipes, valve-shaft F, flexible connecting-rod G, and cranks f' and c^5, whereby the valve-shaft arranged in one plane can be operated by the pump-shaft arranged in a reverse or different plane, and the valve e is operated at the proper time with respect to the strokes of the pump, substantially as and for the purpose described.

7. The combination, with an automatic water and sand or water and shot feed, comprising a pump, feeding-pipes having suitable valves, a sand and water chamber having a valve, e, and in communication with the pump, of a pump-operating shaft, C′, a valve-operating shaft, F, the flexible connecting-rod G, composed of the parts g g' g^2, and the cranks c^5 f', the shafts C′ and F being arranged in reverse or different planes, substantially as and for the purpose described.

8. The sand and water apron for stone sawing, grinding, and polishing machines, comprising the permanent dash-board or apron J, and adjustable distributing-chutes J′, attached to its under side by screws and slots, whereby the length and width of the apron may be varied, substantially as and for the purpose described.

9. The combination of the water-supply pump C, having suitable conducting-pipes and valves, the valved water and sand chamber E′, valve-chamber E, having valves e^6 e^7, for preventing backflow of water and sand, and the chute K, substantially as and for the purpose described.

10. The combination of the pump C, having suitable conducting-pipes and valves, valved water and sand chamber E′, valve-chamber E, having valves e^6 e^7, for preventing the backflow of water and sand, chute K, and the overflow-chute K′, substantially as described.

11. The combination of the water-supplying pump C, having suitable conducting-pipes and valves, valved sand and water chamber E′, valve-chamber E, having valves e^6 e^7, for preventing backflow of water and sand, apron or dash-board J, guards j^6, and frame A, substantially as described.

DAVID SHORTSLEEVE.

Witnesses:
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E. R. MORSE.