

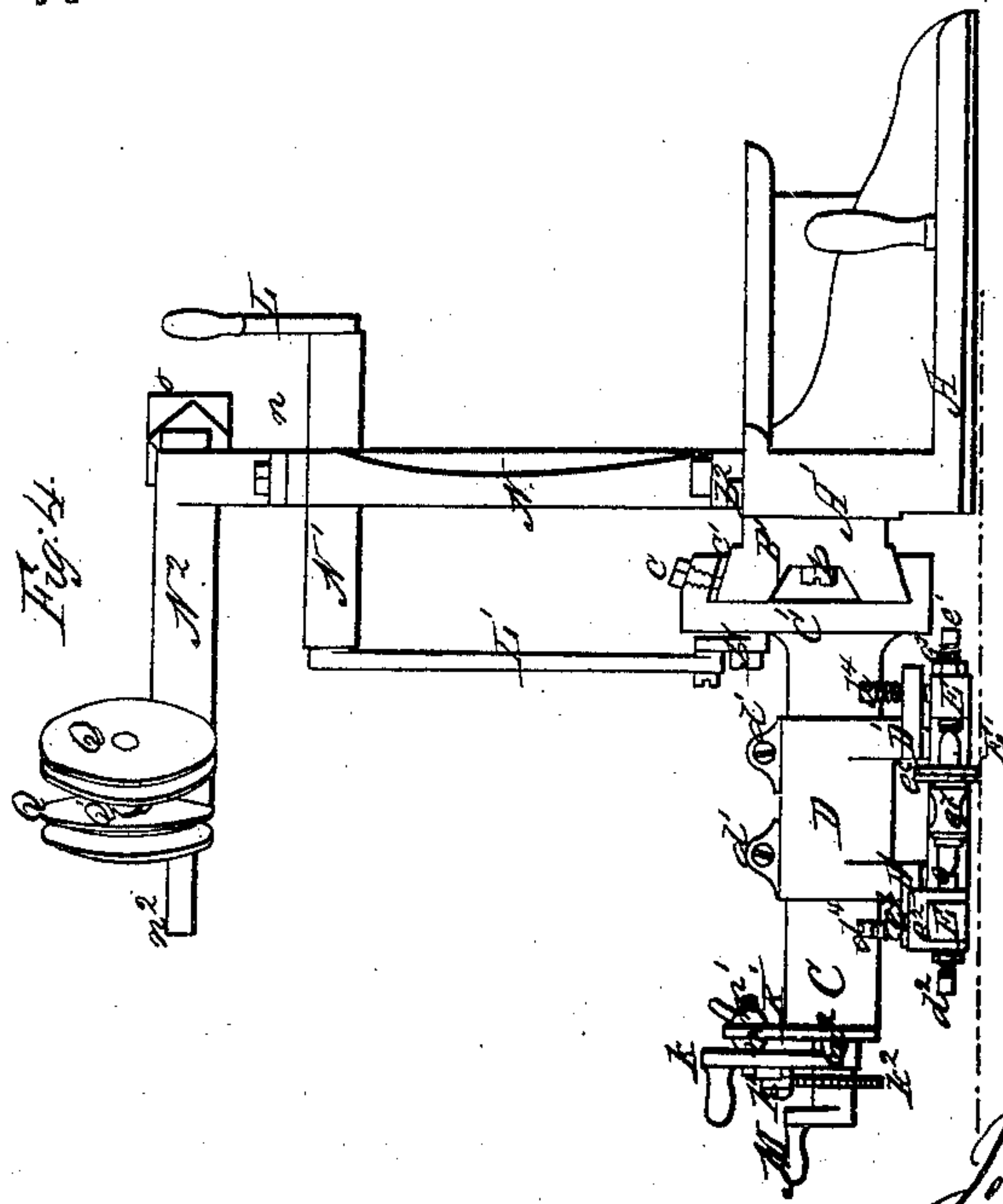
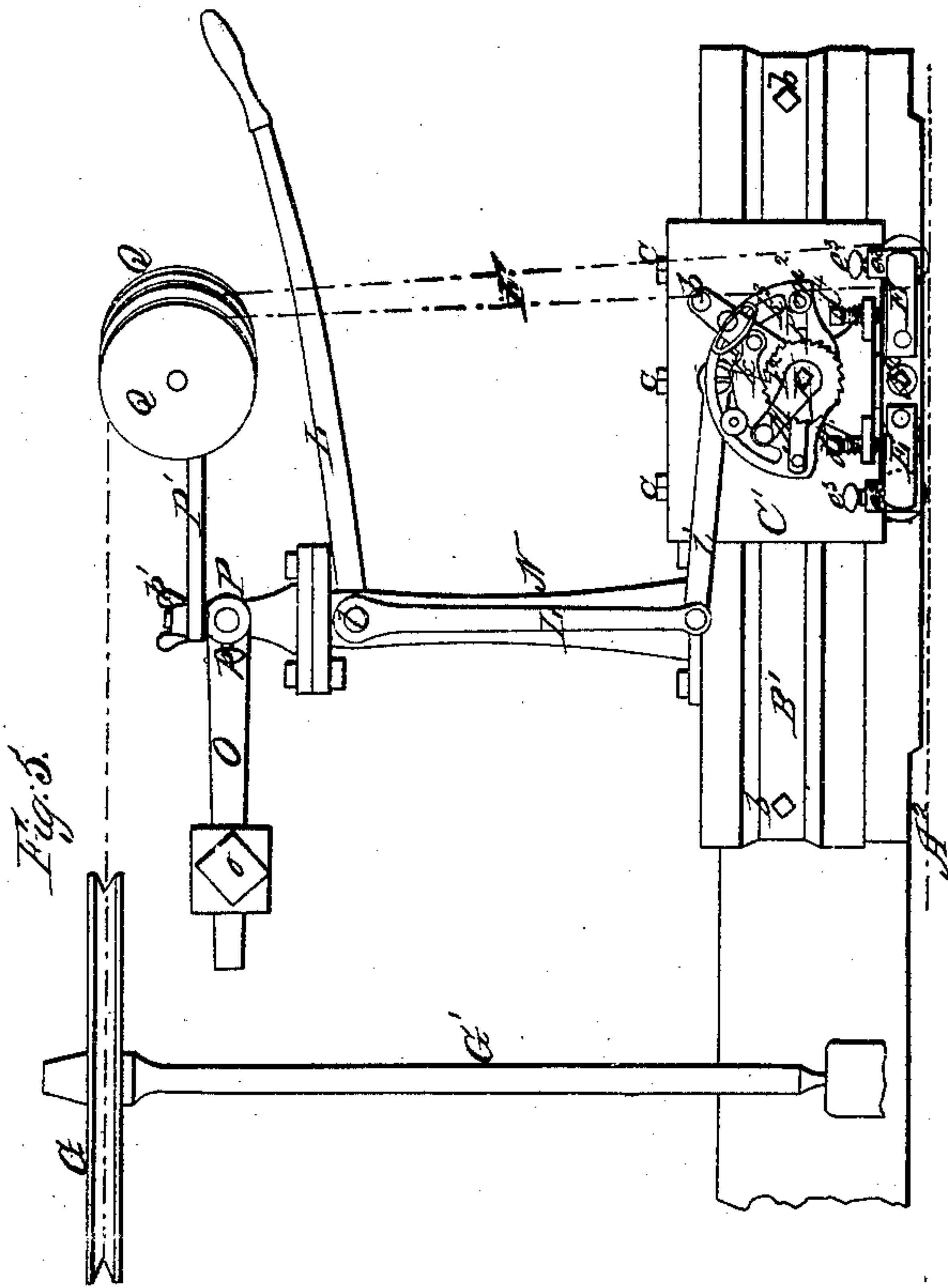
Sheet 2
2 Sheets.

J. Norman.

Dressing Millstones.

N^o 113,914.

Patented Apr. 18, 1871.



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UNITED STATES PATENT OFFICE.

JOHN NORMAN, OF GLASGOW, SCOTLAND, ASSIGNOR TO WILLIAM H. HOWLAND.

IMPROVEMENT IN MACHINES FOR DRESSING MILLSTONES.

Specification forming part of Letters Patent No. **113,914**, dated April 18, 1871.

To all whom it may concern:

Be it known that I, JOHN NORMAN, of Glasgow, in the county of Lanark, Scotland, have invented certain new and useful Improvements in Machines for Dressing Millstones, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan or top view of the machine. Fig. 2 is a longitudinal sectional view of the tubular carrying-arm and cutting apparatus through line *x y*, Fig. 1. Fig. 3 represents a guide or rest for centering the machine upon the stone. Fig. 4 is an end view, and Fig. 5 is a front elevation, of one-half of the machine.

Similar letters indicate like parts in all the figures.

The principal difficulty hitherto met with in dressing millstones by the employment of machinery, in which the cutting or picking is effected by revolving shafts armed with diamonds or similar hard substances, has been the great amount of care required to so adjust the machine upon the face of the stone as to produce a true and perfect guiding-surface—that is, one in which all those portions which are equidistant from the center of the stone, and occupying the same circle, shall be in exactly the same plane.

It is a well-known fact that by use the different lands in the same circle wear unevenly, and that when we come to dress a stone with one of the machines in common use, and which is mounted upon a tripod formed with three feet, it is a very difficult matter to effect a proper adjustment of the arm or way upon which the cutters are moved back and forth, from the fact that all the feet will rarely rest upon lands of the same height, necessitating a leveling up of so nice a character as to make their use in the hands of the employés in ordinary mills entirely impracticable, and this difficulty is still further complicated by the fact that more than one adjustment is required in dressing each stone.

My invention has for its object the remedying of this serious defect; and consists in mounting the arm or carriage which carries

the cutters back and forth in the direction of the furrows upon a bed-piece or base, which takes its level directly from the face of the stone itself without any intervening devices, and requiring no skill on the part of the operator with reference to this point of leveling up.

The invention further consists of certain new features of construction and combination, which will be fully understood from the following description of its construction and operation.

In the drawings, A is the bed-piece or base, of any suitable metal. The exact shape of this base is not essential. I may cover an entire semicircle, or even more; but I find that in practically operating the machine the shape and proportions represented in the drawings furnish a sufficiently large bearing surface to obtain an average level, which is accurate enough for all ordinary purposes. At each end of this bed-piece is a flange, A¹, occupying a position at right angles to the lower face of the bed-piece, as shown in Fig. 4. B B' are ways dovetailed in shape, as in Fig. 4, and of a length equivalent to flanges A¹, and secured to them by bolts *b b'*, plainly shown in dotted line, Fig. 1. The slots in each end of ways B, through which bolts *b* pass, are elongated vertically, while the perforations through which bolts *b'* pass are just large enough to admit said bolts. These ways B are each free to vibrate about bolt *b'* as a center, for a purpose which will be hereinafter explained. *b*² are flange-headed set-screws, the flanges of which overlap way B, and assist in effecting a close adjustment of it. C is a tubular carrying-arm formed upon or attached to carriage C', adapted to traverse ways B B'. Set-screws *c* and gib *c'* are employed to adjust carriage C' upon way B. D is a sleeve surrounding arm C, and provided with pendent brackets D'. The sleeve D is divided longitudinally upon its upper side, and, being slightly elastic, may be tightened or loosed upon arm C by means of screws *d*, which pass through lugs *d*¹. E is a cutter-frame, suspended from brackets D' by means of center-pointed screws *d*², which pass through the sides of said frame and enter or engage with lugs *d*³, projecting from the under side of brackets D'. The frame E is free to oscillate

upon the points of screws d^2 , and the extent of this oscillation is regulated by means of set-screws d^4 .

E' is a cutter-spindle mounted in pivot-bearings e e^1 in frame E. The pivots e are secured in place by means of stirrup e^2 and thumb-screw e^3 in such manner that they can be easily replaced when worn, and pivots e^1 are provided with a thread and jam-nut, e^5 , which holds the pivot in place.

The diamonds or other cutters employed are confined in sockets formed in disks e^6 , as is customary in this class of machines.

An elongated belt-groove, e^7 , is wrapped by belt F, driven by pulley G. The tubular arm D is slotted on its under side, as shown at I, Fig. 2, and through this slot projects stem I' of sleeve D.

K is a feed-screw rotating in sector-plate K^1 on end of arm C, and serving to shift the cutting apparatus. k is a lever pivoted upon screw K, and provided with a reversible spring-pawl, k^1 , which takes into toothed wheel k^2 , rigidly attached to screw K. Sector-plate K^1 is provided with a slot, k^3 , Fig. 5, in which moves the stop m , held in such place as may be required by thumb-nut m^1 , for a purpose which will be hereafter explained. Near one edge of plate K^1 is a fixed stop, m^2 .

M is a crank rigidly attached to screw K. m^3 is a spring, one end of which is attached to plate K, while the other end presses against toothed wheel K^2 . N is a standard rising from bed-piece A, and has at its upper end a slotted sector-plate, n n^1 , plainly shown in Fig. 1. Standard N is further provided with a tubular cross-arm, N^1 , which, for the sake of additional rigidity, I prefer to cast upon said standard.

L is a hand-lever, connected with lever L' by means of a shaft, l , Fig. 5. l' is a link connecting lever I' with carriage C'. Attached to or formed upon standard N is a second tubular arm, N^2 , in which is a shaft, n^2 , projecting some distance beyond said arm, as at Figs. 1 and 4.

To one end of shaft n^2 is secured lever O and adjustable poise o . Shaft n^2 is prevented from sliding back and forth in arm N^2 by means of thimble n^3 and set-screw n^4 .

P is a hub secured upon shaft n^2 by means of set-screw p . P' is an arm mounted upon and vibrating about a spur projecting from hub P. p' is a thumb-nut for holding arm P' in such position as may be required. Q Q are grooved pulleys or sheaves, mounted loosely upon the flaring blocks Q', which are pivoted upon the outer end of arm P'. G' represents a shaft, and G a grooved driving-wheel, from which the motion is communicated to the cutters. This driving-wheel may be located at any point which shall be most convenient.

S is a slotted guide-bar, perforated at one end to slip over the spindle or a center established in the eye of the stone to receive it. This guide is attached to bed-piece A by means of bolts S', and the arched portion A^2 A^2 is

cut away upon the under side, as shown at A^2 , Fig. 5, to allow the bed-piece to move freely over the guide S while the latter lies flat upon the surface of the stone.

T is another form of guide, having lip T' at one end, adapted to abut against the spindle or center above referred to instead of slipping over it whenever circumstances may make it more convenient to use this construction.

The operation of my machine is as follows: In preparing it for operation I make the several adjustments according to the part of the work which I propose to do. For instance, in order to dress the face of the stone entirely true and level, I set way B B', whichever one is to be used, and this will be determined by the direction in which the stone is to run—that is, with the sun or against it. This way must be set so that its lower face shall be parallel with the lower face of bed-piece A, and then place the machine upon the stone, adjusting it by means of guide-bars S or T, so that way B B' shall be parallel to the land which I decide to commence upon, and at such distance from one edge of said land that the disk e shall stand directly over one edge of it. Next let down, by means of set-screw d^4 , one side of the cutter-frame E until one of the disks shall rest upon the face of the land; then thrust carriage C' far enough toward one end of way B or B', so that the disk above referred to shall clear the end of the land; then further depress said disk such distance as will cut a line to the required depth. Having decided how many lines I will cut to the inch I proceed to adjust the feeding devices accordingly.

It will be observed that the throw of lever k in one direction is limited by fixed stop m^2 , while its throw in the opposite direction is determined by the movable stop m ; thus, by restricting the travel of lever k and pawl k^1 the feed-screw K is rotated just enough to move sleeve D and cutter-frame E such distance as will give the required number of lines to the inch.

Driving-wheel G or some equivalent having been provided, I pass belt F around said wheel and also around the cutting-disk and over guide-pulleys Q Q. These pulleys and the devices which are connected with them serve a number of purposes:

First, they deflect the belt, taking it from a horizontal rotating wheel and presenting it properly to spindle E; second, they maintain a proper tension of the belt while carriage e' is traversing way B; and, third, they furnish a ready means of throwing the cutters out of action by loosening thumb-nut and swinging them in toward wheel G, thereby loosening the belt sufficiently to let the cutters remain at rest.

Motion being now imparted to wheel G the disks e^6 are rotated rapidly, and said disks being moved up to the edge of the land the cutting apparatus is made to traverse the length of the land by means of levers L L' and link

l, after which the lever k is moved from one stop to the other, pawl k¹ being in proper relation to toothed wheel k², thus placing disk e⁶ in proper position for cutting another line by carrying the cutters across the land in an opposite direction.

In dressing the furrows I use the cutting apparatus represented in Fig. 2, in which the tubular carrying-arm C projects from carriage C' at an angle corresponding to the angle presented by the face of the furrow; and in case it is desired to dress one end of the furrow deeper than the other it can be done by raising one end of way B or B' and lowering the other, said way swinging upon bolt b¹ as a center, the slots at the ends of the way admitting of the desired adjustment.

From the above description of the construction, arrangements, and operation of my machine it will be readily seen that when the pitch of the way B or B' has been decided upon, and the way has been properly secured in place by means of screws, no further attention need be paid to the height of tubular arm C' relative to the stone, from the fact that bed-piece A will always rest upon the highest land, and will cover surface enough to establish for carriage C' and arm C a path or line of travel which shall correspond accurately with the average face of the stone, thus enabling the operator to dress an entire face of a stone or all the furrows of one without making any further adjustment of the cutting apparatus, and dispensing with the leveling up, which has rendered that class of diamond machines entirely impracticable except in the hands of the most expert workmen.

It is obvious that by transferring the cutting apparatus and accompanying devices from one end of bed-piece A to its opposite end I can dress stones which run either with or against the sun.

Having now described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. The construction of a machine, substantially in the manner described, for dressing millstones, so that the part A¹, or its equivalent, to which is attached the track or way, B or B', traversed by the cutting apparatus, shall always remain at a uniform height from that part or face of the machine which rests upon the stone.

2. The combination of the flange A¹, or its equivalent, upon which is mounted the way or track traversed by the cutting apparatus, with the base A, substantially in the manner described, so that said flange A¹ shall maintain a fixed horizontal relation to said base, substantially as set forth.

3. In a machine for dressing millstones, the combination of the standard N, sector-plate n, and tubular arm N².

4. In a machine for dressing millstones, the standard N, provided with suitable supports for the shifting-lever L and pulleys Q Q.

5. The combination of standard N, shaft n², hub P, arm P', pulleys Q Q, lever O, and poise o.

6. The combination of standard N, slotted sector-plate n n¹, arm N², shaft n², hub P, arm P', collar n³, pulleys Q Q, lever O, and poise o.

7. In a machine for dressing millstones, the combination of standard N, lever F, shaft l, arm L', and link l'.

8. The construction of the sleeve D, whereby it is made adjustable, substantially as set forth.

The above specification of my invention signed by me this 19th day of April, 1869.

JOHN NORMAN.

Witnesses:

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ALEX. SCOTT,
Law Clerk, Glasgow.