

(No Model.)

2 Sheets—Sheet 1.

E. R. WARE.

GRINDING AND POLISHING MACHINE.

No. 287,744.

Patented Oct. 30, 1883.

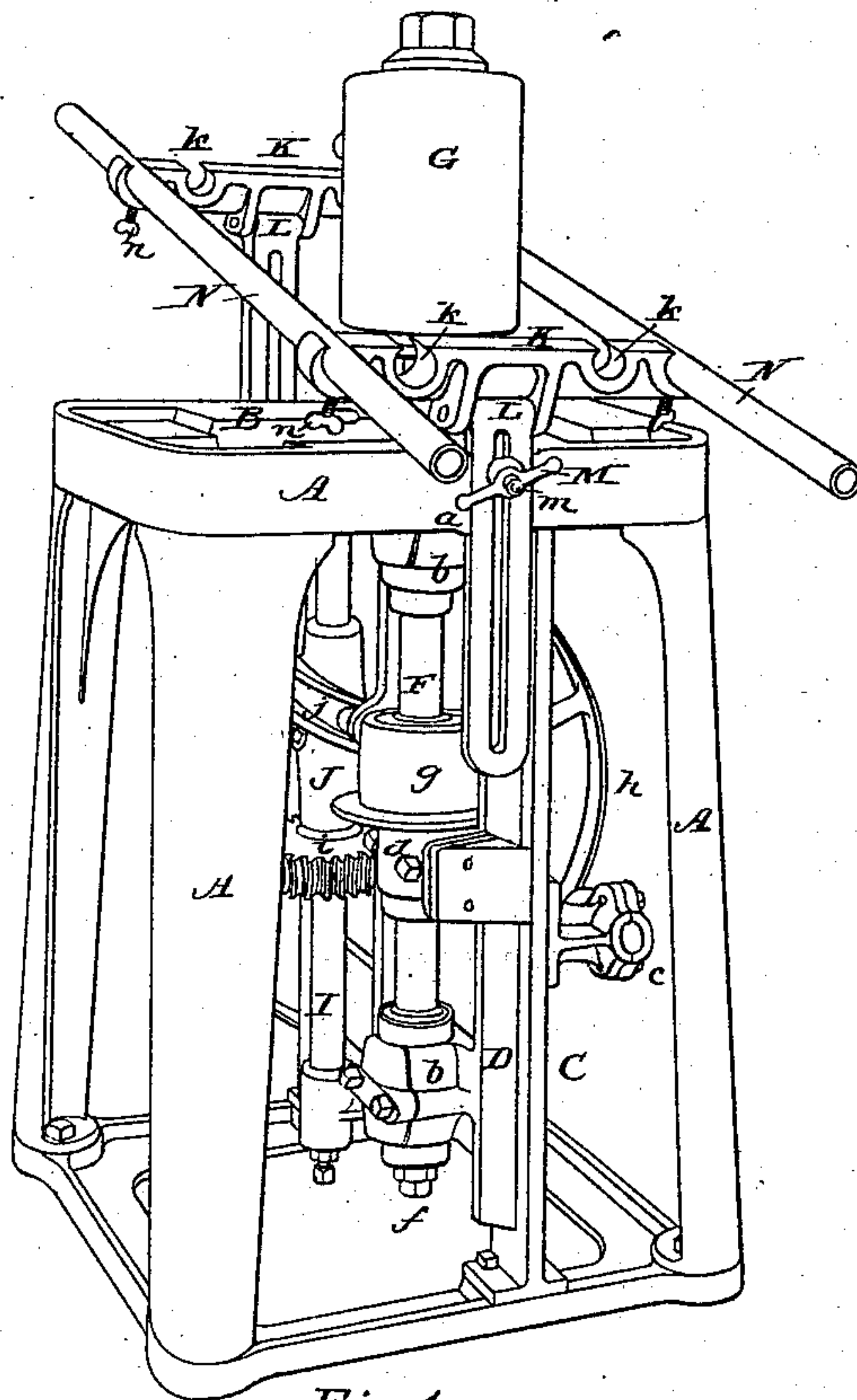


Fig. 1.

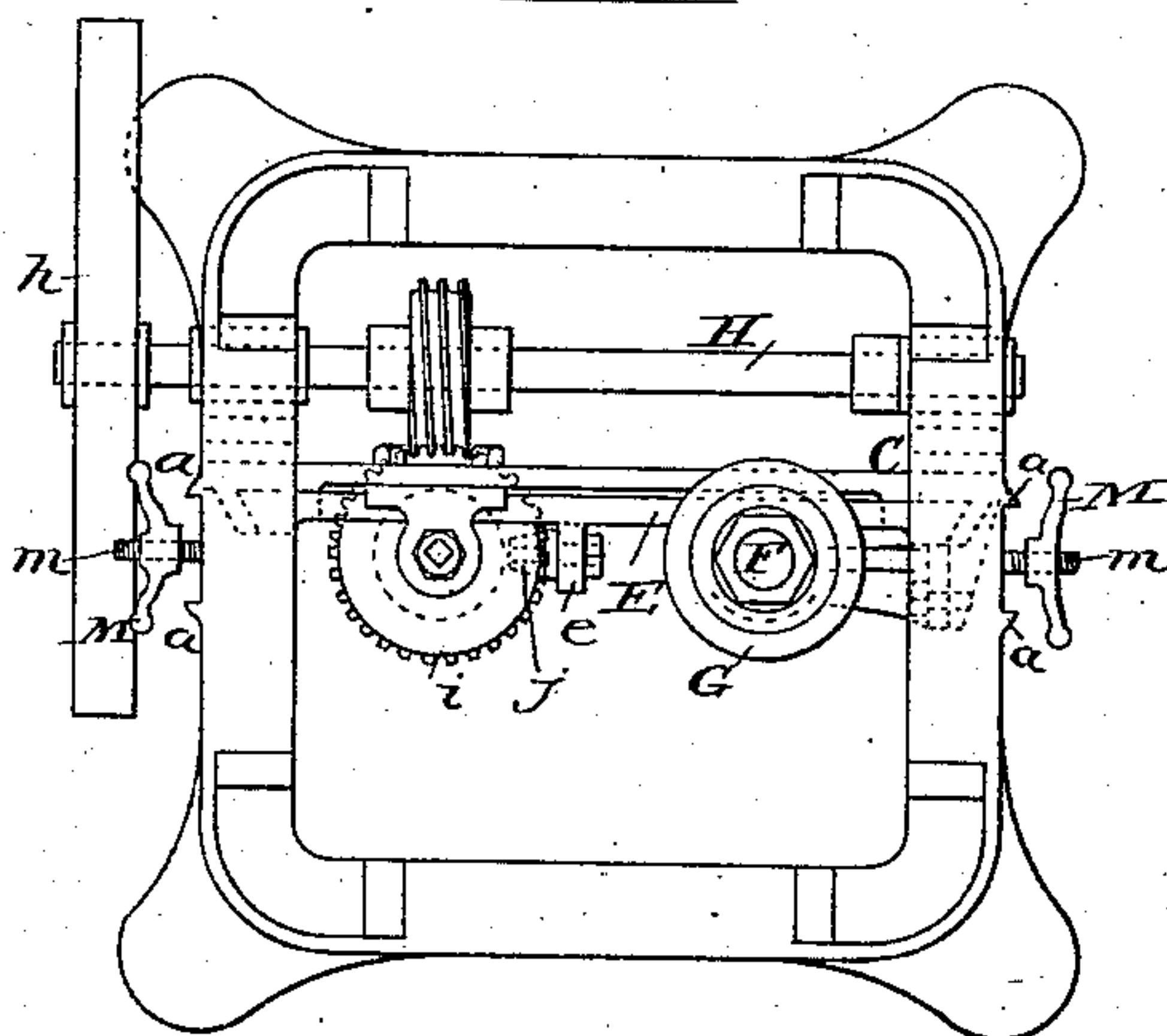


Fig. 2.

WITNESSES:

L. H. Marshall.
N. H. Low.

INVENTOR

Edmund R. Ware
by Doubleday & Bliss

ATTORNEYS

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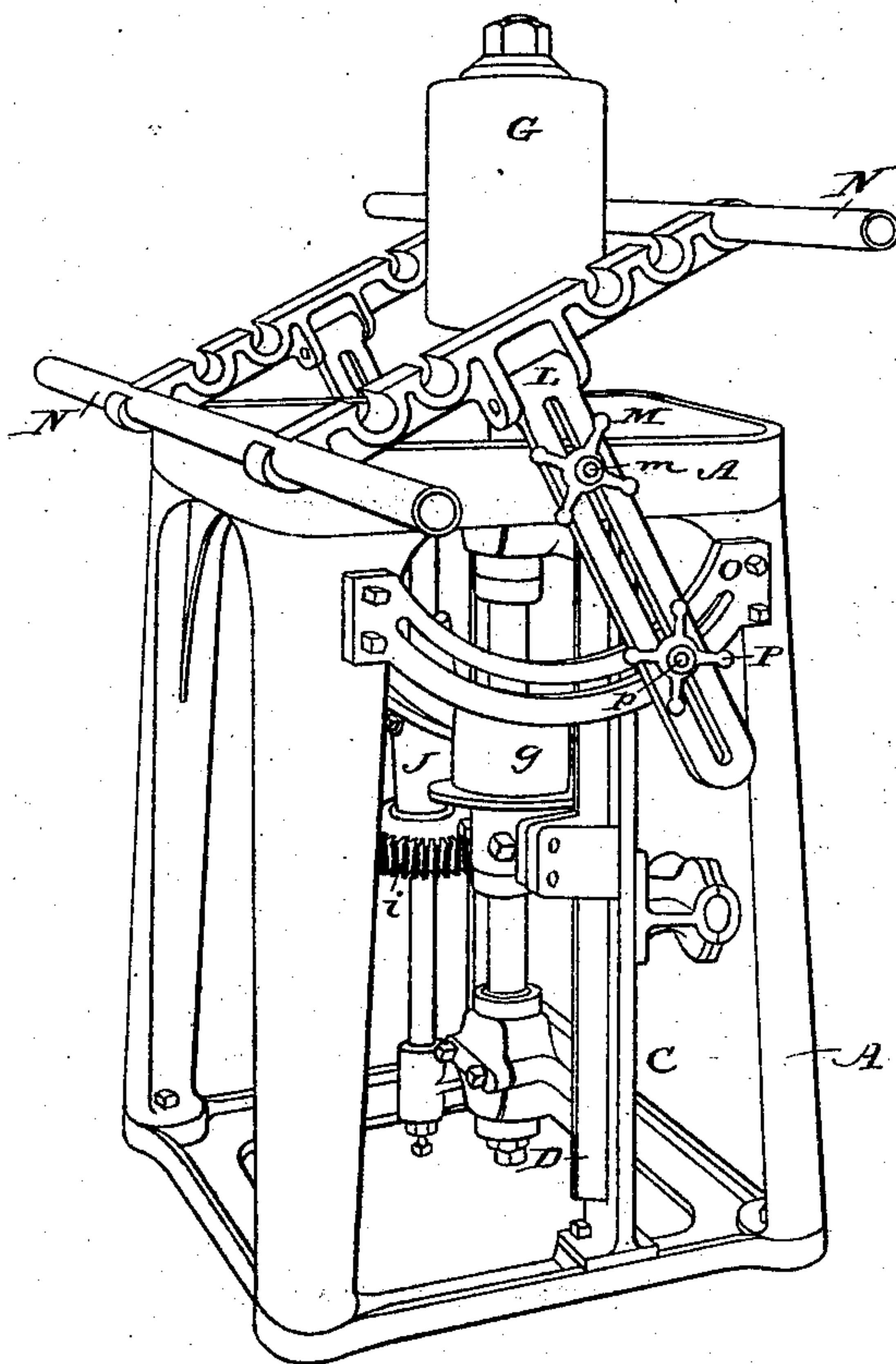


Fig. 3.

WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

EDMUND R. WARE, OF WORCESTER, MASSACHUSETTS.

GRINDING AND POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 287,744, dated October 30, 1883.

Application filed March 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDMUND R. WARE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Grinding and Polishing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a perspective view of a machine embodying my invention. Fig. 2 is a top or plan view, the supporting skeleton or frame having been removed; and Fig. 3 is a perspective view, showing a modification of the supporting skeleton or frame.

Referring to the drawings, A A represent the frame-work which supports the operative parts of the machine, and B is a bed-plate.

C C are vertical posts arranged upon the opposite sides of the machine, and about midway between the lugs or posts of the frame.

D D E E e constitute a frame mounted to slide vertically upon the posts C C when actuated by certain devices, to be hereinafter described.

F is an emery-wheel shaft mounted in bearings b, which project horizontally from the sliding frame, the shaft being stepped upon and adjusted by a set-screw, f, in the lower end of the lower bearings.

G is an emery-wheel or other suitable polishing or grinding wheel, mounted upon and carried by the upper end of shaft F, to which a rapid rotary motion is given by means of a belt connecting a belt-pulley, g, on the shaft with any suitable motor.

H is a driving-shaft mounted in bearings c, which project from the post C, the shaft being driven by a pulley, h, and belt. (Not shown.)

I is a vertical shaft, mounted upon the frame A A in suitable bearings, and carrying a worm-wheel, i, which is actuated by a worm on the driving-shaft H.

J is a grooved cam mounted on vertical shaft I, and secured thereto by the set screw (see Fig. 1) or otherwise.

j is a stud projecting from the vertical bar e of the sliding frame, and entering the groove of the cam, the stud, by preference, being provided with an anti-friction roller.

By means of the mechanism thus described a rapid rotary motion and also a rising-and-falling motion may be imparted to the shaft F and the emery-wheel or other grinding or polishing wheel mounted thereon, as will be readily understood from an examination of the figures without further explanation.

I will now describe the mechanism for supporting the article to be ground or polished.

Referring to Fig. 1, K K are horizontal bearers, provided upon their upper faces with a series of circular seats or recesses, k k, and upon their under faces with set-screws n n. L L are slotted supporting-arms, each pivoted at its upper end to the central part of one of the bearers K. These supporting-bars slide vertically between projecting lips a a, (see Fig. 2,) which are cast upon the frame A. m m are screw-threaded studs arranged about centrally between each adjacent pair of lips a a; and M M are thumb-screws on the threaded bolts m m, the bolts passing through the slots in the supporting-arms L L. N N are carrying-bars, circular in cross-section, and seated in the circular recesses k k. As will be seen in Fig. 1, the recesses are open each at the top; but their walls overlap and engage with the upper faces of the bars, so as to resist the upward thrust of the set-screws n n, and thus confine the bar in position, while its upper face projects above the level of the bearer, and thus receives the wear of the article which is being ground. Any desired number of bars N may be used, and it will be readily seen that the devices just described constitute a skeleton or supporting frame which may, by means of threaded bolts m m and thumb-nuts M M, be placed in various positions, to provide for grinding the desired angles or bevels.

Referring to Fig. 3, O is a curved bar bolted upon one side of the main frame, and provided with a slot formed in an arc of a circle which is described from the threaded bolt m. p is a threaded bolt passing through the slot in the curved bar O and through the straight slot in the supporting-arm L. P is a thumb-nut upon bolt p, the head at the other end of the bolt being by preference seated in a recess upon the inner face of the curved bar O, upon both sides of the curved slot, whereby the

bolt is free to traverse the curved slot, but is prevented from turning around. Of course there is a similar slotted curved bar, O, bolt p, and thumb-nut P on the opposite side of the machine, for supporting the other bar L, and by means of these devices the skeleton frame can be supported in a much greater variety of positions than the corresponding frame shown in Fig. 1 can be by the devices illustrated in said Fig. 1.

I do not wish to be limited to the employment of round carrying-bars N N, as bars of other form in cross-section might be used with correspondingly-shaped seats in the bearers K K; but I prefer round ones, because, among other reasons, they can be made of gas-pipe, and therefore are very light, and, further, because, when their upper surfaces become worn, I can turn them around a little, and thus present new surfaces, whereas with bars which are many-sided in cross-section—say triangular—if turned around at all, they must be turned, say, a third or a quarter or so, depending upon the number of their sides. One advantage which this construction possesses over an ordinary slotted table is this: The position of the bars may be varied to correspond with the inclination of the bearers relative to the grinding-wheel, so that under varying inclinations a support for the article to be ground may be had in close proximity to the emery-wheel. Another advantage which my construction possesses is that the carrying-bars N N can slide longitudinally in the bearers K K, thus enabling the operator to extend the support for the article to be ground in either direction upon opposite sides of the grinding-wheel and in the direction of the length of the carrying-bars, and by reason of the bearers being provided with a series of seats for the carrying-bars the width of the support upon either side of the grinding-wheel and in the direction of the length of the bearers may be increased at will. It will be seen that the stationary bolt m and the movable bolt p, seated in the slot of the supporting-arm L, serve as guides to determine the line of reciprocation of said bar in substantially the same manner as do the lips a a in Figs. 1 and 2, the construction shown in Fig. 3 having the advantage that the line of reciprocation may be varied by shifting the position of the lower bolt, p. The combination of an adjustable inclined support for the article to be ground with a reciprocating cylindrical grinding-wheel possesses many advantages over the combination of an adjustable support with a non-reciprocating grinder, whether cylindrical or conical.

I do not wish to be limited to the precise construction of parts shown in the drawings for supporting and adjusting the bars N, as many modifications thereof might be made without departing from the spirit of that part of my invention which relates to the construction of the skeleton support to the article to

be ground and the combination therewith of devices for supporting the same in different positions relative to the grinding-wheel.

I am aware that grinding and polishing machines have been constructed with central wheels mounted upon vertical shafts and surrounded by substantially horizontal and adjustable tables.

I am also aware that this class of machines have been provided with substantially horizontal and adjustable bars for supporting the article to be ground, and therefore do not claim such constructions, broadly; but I believe I am the first to construct a support for the article to be ground, consisting of a skeleton or frame consisting, essentially, of parallel bars arranged upon opposite sides of a grinder under such construction and arrangement of parts that the bars may be so adjusted that one end of each bar shall be higher than its opposite end, thus inclining the bars to the plane of revolution of the grinder, and so that the bars, while retaining their parallelism to the horizon, may be arranged in different planes, so that a bar lying transversely of these parallel bars will be inclined to the plane of rotation of the grinder. This construction possesses many advantages over a flat table having a continuous surface, even though such table be capable of adjustment in all directions. For instance, by reference to Fig. 1 it will be seen that the carriers K K may be so adjusted that the lower ends of the parallel bars N N shall be at a comparatively obtuse angle to the grinder, and then the bars may be moved endwise and downward in their bearers, so as to give the desired length of support below the grinder. Again, in case the bearers be adjusted to the position indicated in Fig. 3, the parallel bars may be removed from above the grinder and placed below it, for the purpose of furnishing a wide support for the article to be ground. Again, it will be found desirable to use such an adjustable skeleton supporting-surface on account of irregularities in the outline of the article to be ground, because such projections from their upper surface or their lower surface, which would interfere with properly manipulating them upon a smooth flat surface, can enter between the parallel bars N N, thus facilitating a proper handling of them.

What I claim is—

1. In a machine for grinding and polishing, the combination, with the main frame, of the bearers pivotally attached to the adjustable vertical supporting-arms, in combination with the longitudinally-adjustable carrying-bars, substantially as set forth.

2. In a machine for grinding and polishing, the combination, with the main frame, of the series of parallel carrying-bars, two bearers arranged on opposite sides of the grinding-wheel and below the carrying-bars, and two independently-adjustable supporting-arms, each pivoted at its upper end to one of the bearers, substantially as set forth.

3. In a machine for grinding and polishing, the combination, with the main frame, of the carriers, each provided with a series of seats open at the top, in combination with a series
5 of parallel carrying-bars mounted in the seats, and having the upper surfaces projecting above the seats, substantially as set forth.

4. In a machine for grinding and polishing, the combination, with the main frame, of parallel carrying-bars, bearers below the carrying-bars and at right angles thereto, supporting-arms, each pivoted at its upper end to the central part of one of the bearers and slotted longitudinally, guides to regulate the line of
10 reciprocation of the supporting-arms, and clamping-screws securing the arms to the main frame of the machine, substantially as set forth.

5. In a machine for grinding and polishing, a support for the article to be ground, consisting of the carriers, each provided upon opposite sides of the grinder with a series of seats, in combination with a series of removable parallel carrying-bars mounted in the
20 seats, and mechanism for tilting the bearers relative to the grinder, while the carrying-bars remain in substantially horizontal planes, substantially as set forth.

6. In a machine for grinding and polishing, the combination, with the main frame, of the bearers, the supporting-arms, each pivoted at its upper end to one of the bearers, pivots connecting the supporting-arms with the main frame, laterally-adjustable clamping-screws securing the lower ends of the arms to the main
30 frame, and the parallel carrying-bars, substantially as set forth.

7. In a machine for grinding and polishing, the combination, with the main frame, of the bearers, the supporting-arms, each pivoted at
40 its upper end to one of the bearers and slotted longitudinally, pivots connecting the carrying-bars to the main frame, longitudinally-adjustable clamping-screws arranged in the slotted arms, and the parallel carrying-bars, substantially as set forth.

8. In a machine for grinding and polishing, the combination, with the main frame, of a support for the article to be ground, constructed with a central opening to receive the grinder,
50 and supported on its opposite sides upon vertically-adjustable swinging supporting-arms, whereby both sides of the support may be tilted to vary the inclination of the support relative to the grinder, substantially as set
55 forth.

9. In a machine for grinding and polishing, the combination, with the main frame, of a support for the article to be ground, constructed of substantially parallel bars arranged to
60 form a skeleton, means for adjusting them by raising one end of each bar above its opposite end, and means for adjusting them by raising one bar bodily above the adjacent bar while in a parallel plane therewith, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND R. WARE.

Witnesses:

H. H. DOUBLEDAY,
J. S. BARKER.