

(No Model.)

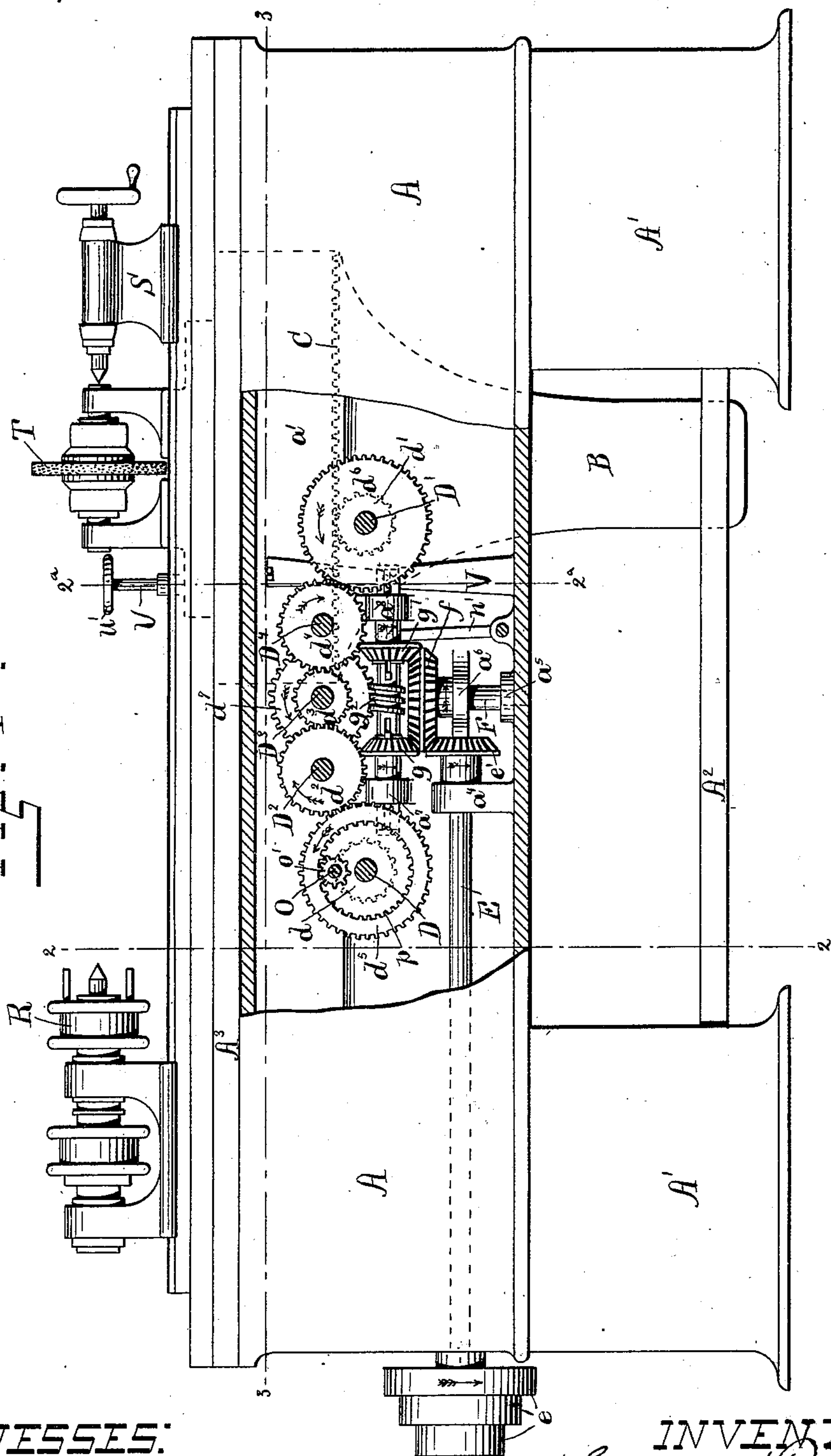
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E. H. PARKS.
GRINDING MACHINE.

No. 333,478.

Patented Dec. 29, 1885.

Fig. 1



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(No Model.)

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Fig. 2.

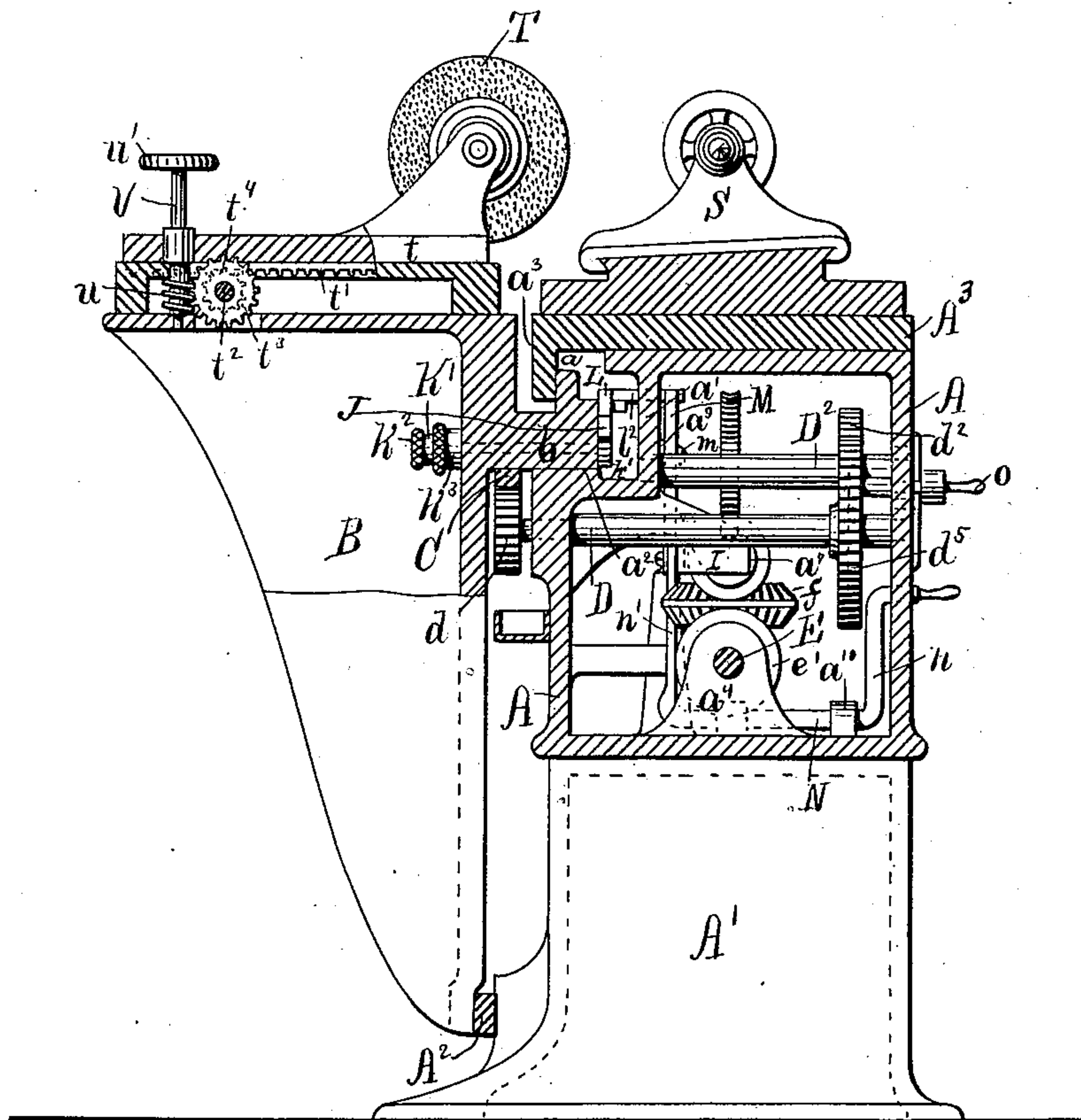
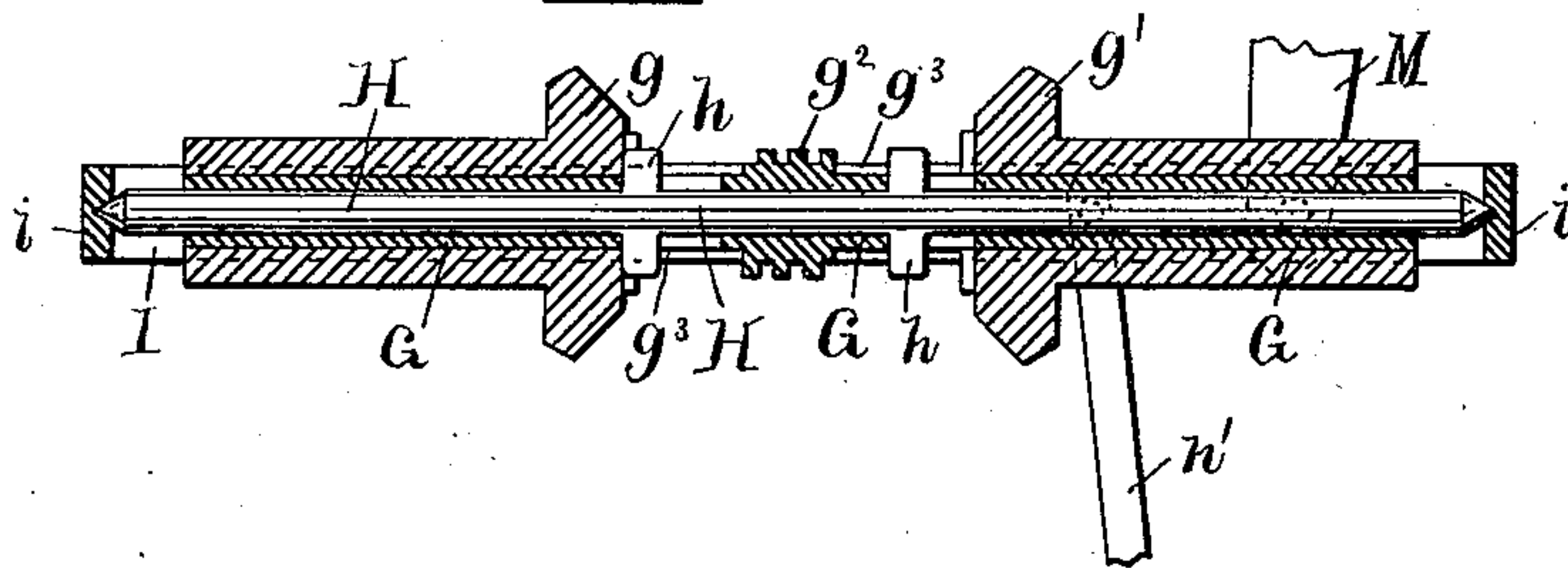


Fig. 5.



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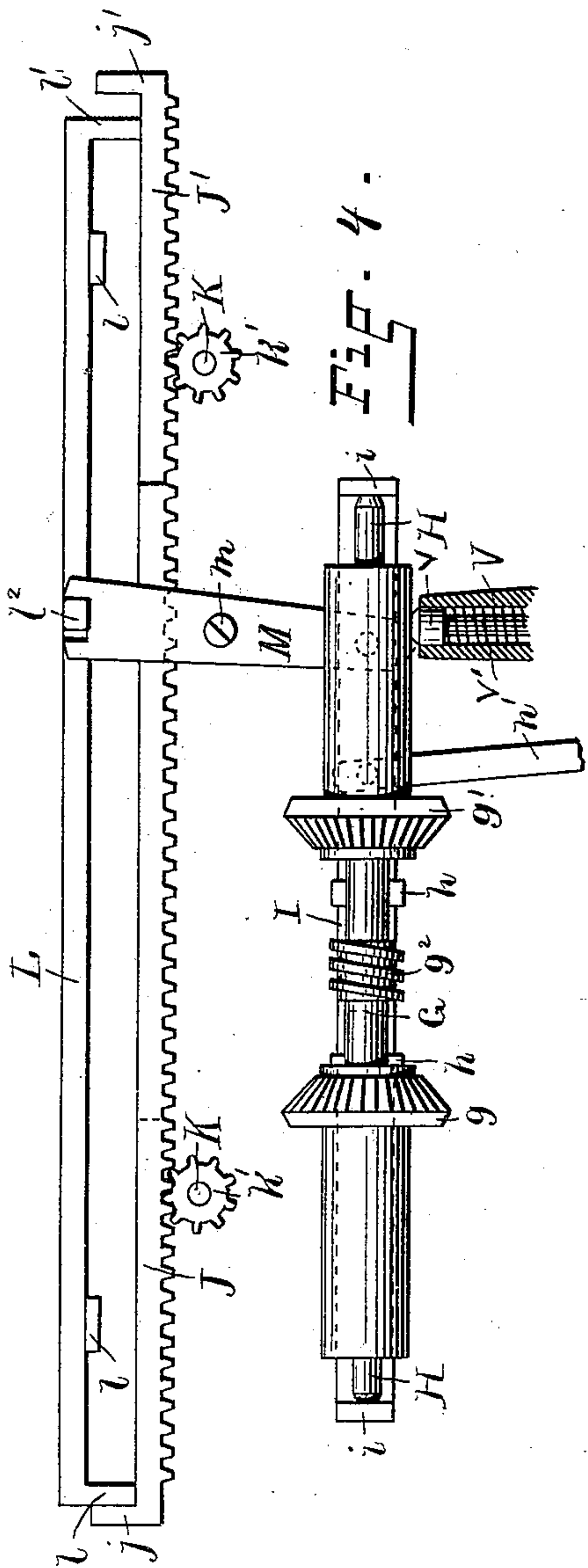
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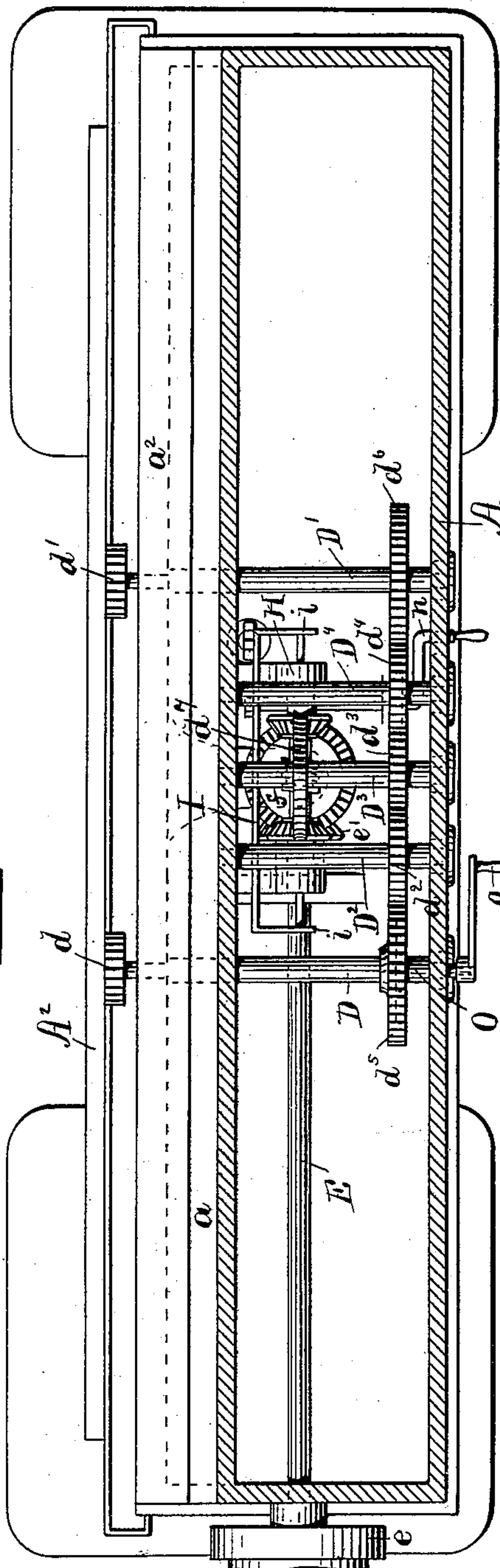
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3-11



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UNITED STATES PATENT OFFICE.

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GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 333,478, dated December 29, 1885.

Application filed May 13, 1885. Serial No. 165,336. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. PARKS, of the city and county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Grinding - Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

10 The objects of my invention are to increase the length of travel of the carriage which carries the grinder, and to so mount said carriage upon the machine - frame as to protect the ways against the entrance of dirt, grit, &c.

15 A further object of my invention is to provide the machine with suitable gearing for actuating the grinder - carriage in its movements, and for reversing the direction of said movements.

20 To the above purposes my invention consists in the peculiar and novel construction of the grinder - carriage, and in the provision for the same of a rack and a pair of pinions meshing with said rack, for the purpose of lengthening its travel.

25 My invention also consists in certain peculiar and novel features of construction and arrangement relating to the gearing for producing the required length of travel of the grinder - carriage, and for reversing the movements of the same within the said limits of travel, as hereinafter described and claimed.

30 In order that my invention may be more fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

35 Figure 1 is a front elevation of my improved machine, the machine-frame being shown as partially broken away in front in order to expose the internal gearing. Fig. 2 is a transverse vertical section of the machine-frame and grinder-carriage, taken on the lines 2 2 and 2^a and 2^a, respectively, of Fig. 1. Fig. 3 is a horizontal section of the same on the line 45 3 3 of Fig. 1, the grinder - carriage being removed. Fig. 4 is an enlarged detailed detached view of the gearing for actuating and reversing the grinder-carriage, shown partly in section. Fig. 5 is a longitudinal vertical section of the clutch-gearing.

In the said drawings, A designates the ma-

chine-frame, which, as shown, is of oblong rectangular shape.

A' designates two supports upon which the two ends of frame A rest.

55 A² designates a brace forming a part of the machine-support, and extending horizontally between and connecting the two supports A'.

At the rear of the frame A is formed a recess, *a*, which is closed at back and bottom by 60 a vertical wall, *a'*, and a horizontal wall, *a''*. The front of this recess *a* is partially closed by a downward extension, *a'''*, of a top piece, A³, which rests upon the top of the frame A.

B designates the carriage of the grinder, 65 which is formed at the upper part of its front with an L-shaped extension, *b*, entering the recess *a* of the frame A. The under side of the horizontal portion of extension *b* forms a covered bearing upon the upper side of wall *a''*, 70 while the outer side of the vertical portion of said extension forms a covered bearing against the inner side of the extension *a'''* of top piece, A³, the said bearings serving as the ways upon which the grinder-carriage travels, 75 and also as the means for supporting said carriage upon the machine - frame. The lower end of carriage B bears against the outer side of the brace A², as is shown in Fig. 2.

80 Upon the under side of the projection *b*, and near to its junction with the body of carriage B, is formed or secured a rack, C, as shown in Fig. 2, and said rack is engaged by the teeth of two gear-pinions, *d d'*, which are mounted, respectively, upon two shafts, D D', mounted 85 in turn horizontally in the front and rear sides of the machine-frame A, and extending transversely of said frame. Between these shafts D D' are mounted three horizontal parallel shafts, D² D³ D⁴, and upon these five shafts 90 are mounted, respectively, gear-wheels *d''*, *d'''*, *d''''*, *d'''''*, and *d''''''*, intermeshing, as shown. The middle shaft, D³, also carries a worm-gear, *d'''''''*, the purpose of which will be presently explained.

95 E designates the main driving-shaft, which extends longitudinally about half of the length of the machine-frame, the outer end of said shaft having a bearing in the end of the machine-frame and the inner end having a bearing in a bracket, *a''''*, on the bottom of said frame. The driving-shaft extends horizon-

tally, and at its outer end carries suitable driving-pulleys, *e*, while at its inner end said shaft carries a beveled gear-wheel, *e'*.

F designates a shaft, which is set vertically in the machine-frame, the lower end of said shaft resting in a step, *a⁵*, upon the bottom of the machine-frame, and said shaft extending upward through a bracket or boss, *a⁶*, on the side of said frame. At its upper end said shaft F carries a double beveled gear-wheel, *f*, with the lower set of teeth of which the gear-wheel *e'* meshes.

G designates a tubular shaft, the ends of which have bearings in two bosses or brackets, *a⁷* *a⁸*, on the side of the machine-frame A. This shaft carries two beveled pinions, *g* *g'*, which mesh with the upper set of teeth on the double beveled wheel *f*, and said shaft carries also a worm, *g²*, which meshes with the teeth of the worm-wheel *d'*, before described. A locking-bar, H, extends longitudinally through the tubular shaft G, and said bar is formed with extensions *h*, passing through slots *g³* in shaft G. The collars of the two pinions *g* *g'* have each a recess in line with the corresponding slot in shaft G. The locking-bar H is longer than the shaft G, so that said bar may extend beyond one or both ends of said shaft.

I designates a shifting-bar having two bent ends, *i*, so placed as to rest at all times against the ends of locking-bar H. Thus it will be seen that when the locking-bar H is pushed in one direction by the shifting-bar I one of the gears *g* *g'* will become fast and the other loose on the shaft G, and that when locking-bar H is pushed in the opposite direction the fast gear will become loose and the loose gear will become fast, so that the beveled wheel *f* operates the shaft G by only one beveled gear, *g* or *g'*, at any given time. As the driving-shaft revolves, its beveled gear *e'* actuates the beveled gear *f*, this in turn the shaft G, through either gear *g* or *g'*, and its worm *g²*, which in its turn actuates the shaft D³ through the medium of the worm-gear *d'*. The revolution of shaft D³ is communicated by the gears *d²* *d³* *d⁴* *d⁵* *d⁶* to the shafts D D', and the gear-pinions *d* *d'* of said shafts actuate the carriage B by engaging with its rack C. When the carriage has reached the limit of its travel in one direction, the shifting-bar I is to be shifted to throw out one gear *g* or *g'* and lock the other, in order to reverse the direction of rotation of the shafts D D' for the purpose of reversing the direction of movement of carriage B. In order to accomplish this reversal of movement, I employ the following mechanism: J J' designate two rack-bars the teeth of which are on their under sides, and which are secured upon the inner end of extension *b* of the carriage B. The inner parts of these bars overlap each other, and said rack-bars are so secured upon the extension as to permit of longitudinal movements. Thus the two rack-bars constitute an extensible rack. (See Fig. 4.) At its outer end each of these rack-bars is formed with a bent portion, *j* *j'*. The rack-

bars J J' rest, respectively, upon two pinions, *k* *k'*, which are secured rigidly upon the inner ends of two stems, K K', extending laterally through the extension *b*. At its outer end each stem K carries a head, *k²*, and a clamp-collar, *k³*, the latter surrounding the stem within the head *k²* and working in a recess in the outer side of extension *b*. Thus, in order to extend or contract the rack-bars, it is only necessary to loosen the clamp-collars, then rotate the stem till the pinions have moved the rack-bars sufficiently, and then tighten up the clamp-collars, after which the rack-bars J J' will be held rigidly by the pinions *k* *k'*.

L designates a rod, which is secured upon the outer side of walls *a'* by brackets *l*, so as to have a slight longitudinal movement relative to said wall. The ends of this rod are bent, as at *l'*, so as to lie within the bent ends *j* *j'* of bars J J'. Rod L is also formed with a stud, *l'*, the inner end of which engages in a notch in the upper end of a lever, M. This lever is pivoted at *m* to a boss, *a⁹*, upon the inner side of wall *a'*, and at its lower end said lever is attached to the shifting-bar I. Thus it will be seen that as the carriage B travels it will cause the ends of rack-bars J J' to alternately strike the opposite ends of rod L, and thus tilt the lever, which will in turn throw shifting-bar I with the results before stated. The length of travel of the carriage B will be greater or less according as the rack-bars J J' are extended or contracted. By the above arrangement the travel of the carriage B is automatically reversed.

I also employ an arrangement for sliding the carriage to a greater or less extent by hand. This arrangement is as follows: N designates a crank-bar, which is bent into U shape and passes through lugs *a¹⁰* *a¹⁰* upon the bottom of frame A. The upper end of the arm *n* passes through the front of the frame and carries a handle, while the upper end of arm *n'* is secured to shifting-bar I.

While the machine is running the travel of the carriage may be reversed at any time by simply throwing bar-crank N in one direction or the other.

I have also shown an arrangement for moving the carriage B a greater or less extent by hand when the machine is not running, the locking-bar H being set so as to throw both gears *g* *g'* out of engagement. This arrangement is as follows: O designates a crank-shaft the outer end of which is bent to form a crank, *o*, extending outside the front of frame A. At its inner end crank-shaft O carries a gear-pinion, *o'*, which meshes with a gear-rim, *p*, cut in one side of the gear-wheel *d⁵*. Thus by turning the handle the train of gearing will be set in motion and the carriage will be moved as required.

R designates the head-stock, S the foot-stock, and T the grinder. The grinder is mounted upon a sliding bed, *t*, beneath which is a rack, *t'*. A shaft, *t²*, carries a pinion, *t³*, which meshes with the rack, and also a worm-gear, *t⁴*, which

meshes with a worm, *u*, on a worm-shaft, U. Through the medium of hand-wheel *u'* thereon the sliding bed is moved toward or away from the work, as desired. It will be seen that the travel of the bed B is not limited in extent to the length of its rack C, but that the rack is carried off of one pinion, *d* or *d'*, by the opposite pinion after the rack has left the first pinion. Thus greatly-increased length of travel is secured.

V designates a column set upon the bottom of frame A and carrying at its upper end a stop, *v*, pressed outward by a spring, *v'*. The stop *v* engages the lower end of lever M, so as to hold it at the limits of its movements to maintain the clutches in engagement.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a grinding-machine, a grinder-carriage reciprocating upon the machine-frame and provided with a rack, in combination with gearing-pinions operating and meshing with said rack to increase the length of travel of the carriage beyond the length of the rack, substantially as described.

2. The combination, with a reciprocating carriage mounted upon the machine-frame and provided with a rack, and with gearing-pinions operating and meshing with said rack to increase the travel of the carriage beyond the length of the rack, of extensible rack-bars provided with adjustable pinions for limiting and reversing the movements of the carriage, substantially as set forth.

3. The combination, with the machine-frame and a carriage reciprocating upon said frame and provided with a rack, of a power-shaft, a reversible clutch geared with said shaft, a shifting-lever operating said clutch, and an extensible rack operating said lever and operated by the carriage, substantially as specified.

4. The combination, with the machine-frame,

of a grinder-carriage having covered bearings upon said frame and reciprocating longitudinally upon said bearings and reversible thereon, substantially as and for the purposes specified.

5. The combination, with a reciprocating carriage mounted upon the machine-frame and provided with a rack and with gearing-pinions operating and meshing with said rack to increase the travel of the carriage beyond the length of the rack, of extensible rack-bars provided with adjustable pinions for limiting the movements of the carriage, and a rod, a lever, a shifting-bar, and a locking-bar engaging a reversible clutch-gearing, all substantially as described, and all operated by the said rack-bars for changing the direction of the clutch-gearing to accord with changes in movement of the carriage, as set forth.

6. The combination, with the frame A, supports A', brace A², and carriage B, of the shafts E F D D' D² D³ D⁴, the clutch G H I, the lever M, and the gears *d d' d² d³ d⁴ d⁵ d⁶*, as set forth.

7. The combination, with the gearing, clutch, and driving-shaft, of the carriage B, the rack C, and the pinions *d d'*, as described.

8. The combination, with the carriage having the rack, the gearing, the clutch, and the power-shaft, substantially as set forth, of the hand-bar for reversing the machine and the hand-shaft for operating the gearing, as specified.

9. The combination, with the carriage B, reciprocating longitudinally and carrying the sliding bed *t*, having the rack *t'* and grinding-disk T, of the shaft *t²*, having the gears *t³ t⁴*, and the shaft U, having the worm *u*, as described.

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Witnesses:

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