

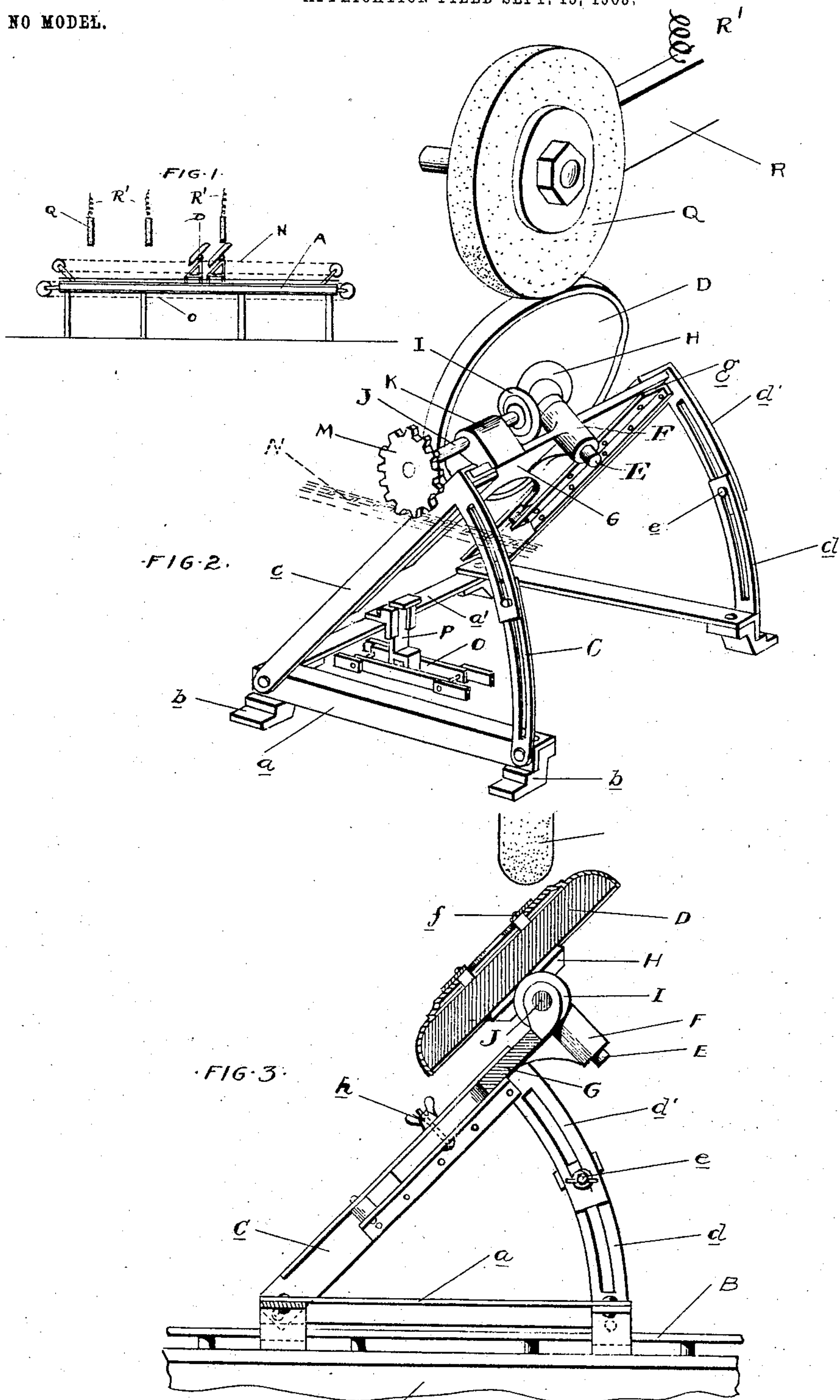
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W. V. ROBINSON.
GRINDING AND POLISHING MACHINE.

APPLICATION FILED SEPT. 15, 1903.

NO MODEL.



WITNESSES

Geo. H. Laver
Jas. P. Barry

INVENTOR

WILLIAM V. ROBINSON.

BY

James Whittier
ATT'Y.

UNITED STATES PATENT OFFICE.

WILLIAM V. ROBINSON, OF DETROIT, MICHIGAN.

GRINDING AND POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 765,199, dated July 19, 1904.

Application filed September 15, 1903. Serial No. 173,255. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM V. ROBINSON, a subject of the King of Great Britain, residing at Detroit, in the county of Wayne and State of Michigan, 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.

It is the special object of the invention to provide a construction of automatic grinding and polishing machine adapted for operating upon annular or circular pieces of work in which the surface to be ground has a double curvature.

It is a further object to provide means whereby the work when once placed in the machine will be carried successively into operative relation to grinders or polishers of different grades, so that the complete operation from the rough grinding to the highest polishing is performed during the passage of the work through the machine.

The invention consists in the construction of a rotary work-holder; further, in the means for feeding said holders successively to the grinders, and, further, in the peculiar construction, arrangement, and combination of parts, as hereinafter set forth.

In the drawings, Figure 1 is a diagrammatic elevation of the machine. Fig. 2 is a perspective view of one of the work-holders in operative relation to a grinder. Fig. 3 is a longitudinal section therethrough.

A is a suitable frame having arranged longitudinally thereof the guides B, with which the work-holders C are detachably engaged. Each of these work-holders comprise a frame *a*, having lugs or feet *b* for engaging with the guides B on the bed.

c is a second frame, which is pivotally secured at one end to the frame *a* and is adjustably held in an inclined position in relation to the frame A. As shown, the adjustable support is formed by segmental braces *d* and *d'*, projecting upward and downward, respectively, from the frames *a* and *c*. These braces are slotted longitudinally, and the clamping-

screw *e*, passing through said slots, is arranged to lock them in any position of adjustment.

Upon the frame C is journaled a rotary work-holder D, the axis of which is perpendicular to the plane of the frame *c*, and consequently is inclined to the plane of the frame *a* and of the bed. In the construction shown the holder D is adapted for supporting annular pieces of work, such as stove-rings. For this purpose it is of substantially disk-shaped form, having its edges rounded to form a seat for the rounded rings and being provided with clamps *f* for locking the work thereon.

E is a spindle secured to the holder D and journaled in a bearing F. This bearing is connected to a cross-head G, which is adjustably secured in the frame *c*, preferably by forming the grooved guides *g* on said frame. The cross-head G is locked in the frame in different positions of adjustment by suitable clamping means, such as the screws *h*.

H is a beveled gear-wheel secured to the spindle E, and I is an intermeshing beveled gear-wheel upon the shaft J, journaled in the bearing K, also upon the cross-head G. The shaft J extends to the side of the frame C and has secured to its outer end the sprocket M. This sprocket is adapted to engage with the chain N, extending longitudinally of the bed and driven to impart a rotary motion to the sprocket during the longitudinal movement of the frame C along the bed.

The frames C are engaged with the guides B on the bed and are fed to the opposite end by a suitable feed mechanism, such as the sprocket-chain O, having lugs or dogs P thereon for engaging the cross-bar *a'* of the frame *a*.

Q represents grinder-wheels in horizontally-adjustable bearings R, yieldably supported by a suitable spring R' above the bed A. These grinder-wheels are so positioned as to be centrally above the work as it is fed on the holders D longitudinally of the bed. The edge of the grinder is rounded, as shown in Fig. 3, and in normal position is slightly lower than the upper edge of the work supported on the holder D. Thus as the holders are moved past the grinders the grinder-wheels will

mount upon the surface of the work and remain in contact therewith during its movement thereby.

The construction being as described, in operation the various pieces of work are first fitted to holders D, which are fashioned to form supporting seats for the work. These holders are then engaged with the frame C by sliding the spindles E into the bearings F, by which movement the beveled gear-wheels H and I will be thrown in the mesh. The frames C are then adjusted in inclination by moving the brace members d and d' in relation to each other, and the cross-head G is also adjusted in the guide-bearings g on the frame. The adjustments made are such as to arrange the curved cross-section of the work as nearly as possible to the plane of travel—that is, to a horizontal plane. When the frame C is adjusted to receive a particular holder D for work of a definite size and shape, it may be permitted to remain in this adjustment and to be used successively for carrying any number of holders of that size and shape. Inasmuch as the holders D are attached or detached from the frame C merely by engaging or disengaging the spindles E with the bearings F, it is evident that holders bearing finished work may be quickly replaced by others having work to be ground. After the adjustment of the frames they may be successively engaged with the guides B on the bed, so that in the rotation of the chain O the dogs P will engage with the frames and feed them longitudinally of the bed. In this movement the edge of the central upper portion of the work will first be brought into contact with the rounded edge of the grinder, and at the same time the holder D is rotated by the action of the chain N, engaging with the sprocket M and communicating motion through the shaft J and beveled gear-wheels I and H to the holder D. This will cause the grinding of the work completely around the ring during the longitudinal movement of the holder past the grinder. Inasmuch as the grinders Q are supported in vertically-yielding bearings, said grinders will mount up the curved surface of the work and will remain in contact with the surface until the opposite edge is reached. The work is thus successively presented to the various grinders until after passing the last one of the series it is as highly finished as desired. When the holder reaches the end of the bed, the frame is removed, the holder detached therefrom and replaced by another with an unground piece of work, and the frame is then reengaged with the bed at the opposite end thereof.

What I claim as my invention is—

1. In a grinding-machine, the combination with a grinder of a longitudinally-traveling work-carrier arranged to pass in adjacency to

said grinder, and a rotary work-holder on said carrier having its axis of rotation inclined to the plane of travel of said carrier, and adapted in the movement of the latter to feed the work in rotating contact with said grinder.

2. In a grinding-machine, the combination with a vertically-yielding grinder, of a work-carrier having its path of travel beneath said grinder, a work-holder revolvably mounted on said carrier, with its axis of rotation inclined to the path of movement of the carrier, and supporting the work in the path of said grinder, and means for simultaneously feeding said carrier and rotating said holder.

3. In a grinding-machine, the combination with a vertically-yielding grinder, of a work-carrier having its path of movement beneath said grinder, a rotary work-holder carried by said carrier, and having its axis inclined to the path of movement and means for adjusting said holder upon said carrier to arrange the upper portion of the rotary carrier in the path of said grinder.

4. In a grinding-machine, the combination with a grinder of a work-carrier comprising a base portion, and a portion hinged to said base portion, and adjustable in angular relation thereto, and a rotary work-holder journaled on said upper portion with its axis inclined to the path of movement of said carrier, and means for adjusting the height of the work-holder.

5. In a grinding-machine, the combination with a bed and a grinder above the same, of a work-carrier comprising the frame C adapted to travel longitudinally over said bed, the frame c hinged thereto, means for adjustably securing said hinged frame in angular relation to the main frame of said carrier, a rotary work-holder, and a cross-head in which said holder is journaled adjustably secured in said hinge-frame, whereby the height and inclination of said rotary holder may be adjusted.

6. In a grinding-machine, the combination with a grinder, of a work-support, comprising a base portion, a hinged member secured to said base portion, and adjustable in angular relation thereto, a bearing adjustably secured to said hinged member, and a rotatable spindle detachably mounted within a socketed portion of said bearing.

7. In a grinding-machine, the combination with a bed and grinder adjacent the same, of a work-carrier comprising a base portion, outwardly-extending arms hinged thereto at its respective ends, an adjustable connection between the upper portion of said arms and said base, and a work-holder secured intermediate said arms.

8. In a grinding-machine, the combination with a bed and grinder adjacent the same, of a work-carrier comprising a base portion, upwardly-extending arms hinged thereto at its

respective ends, an adjustable connection between the upper portion of said arms and said base, a cross-bar adjustably secured to said arms, and a work-holder revolubly mounted
5 upon said cross-bar.

9. In a grinding-machine, the combination with a bed and a plurality of grinders arranged thereabove, of a work-carrier arranged to travel beneath said grinder, a plurality of
10 work-holders rotatably mounted upon said

carrier, and having their axis inclined to the path of movement, and means for independently adjusting said holders upon said carrier.

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

WILLIAM V. ROBINSON.

Witnesses:

JAS. P. BARRY,
H. C. SMITH.