No. 765,198. PATENTED JULY 19, 1904.

W. V. ROBINSON.

GRINDING AND POLISHING MACHINE.

APPLICATION FILED SEPT. 15, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

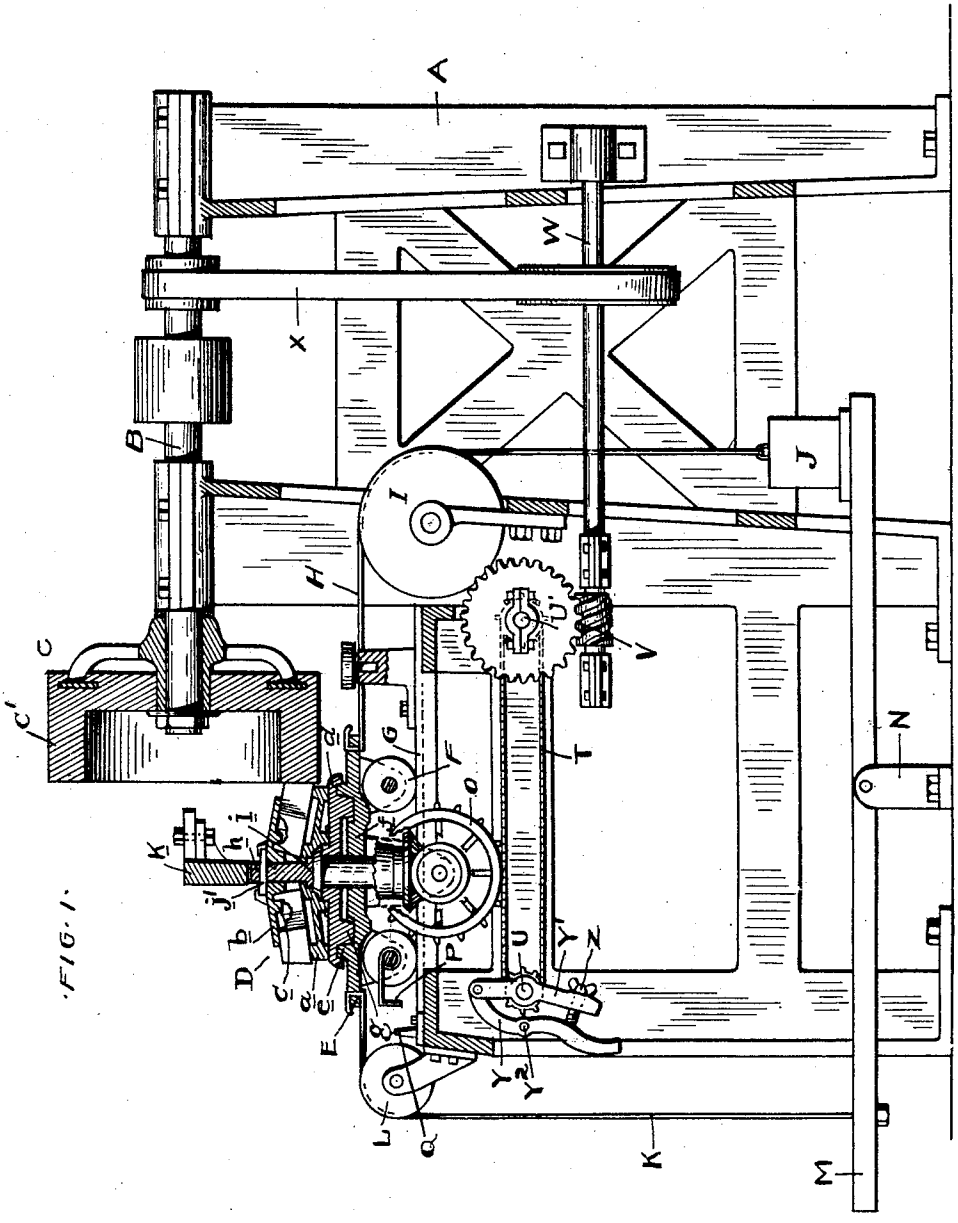


FIG. 1.

WITNESSES

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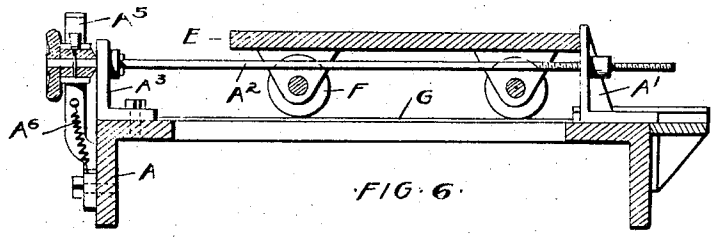


FIG. 6.

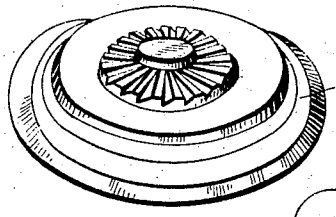


FIG. 4.

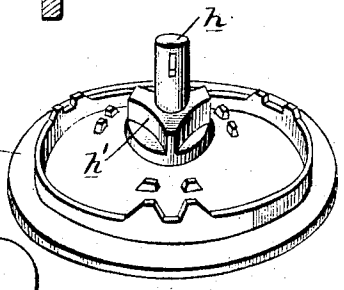


FIG. 3.

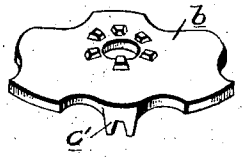


FIG. 5.

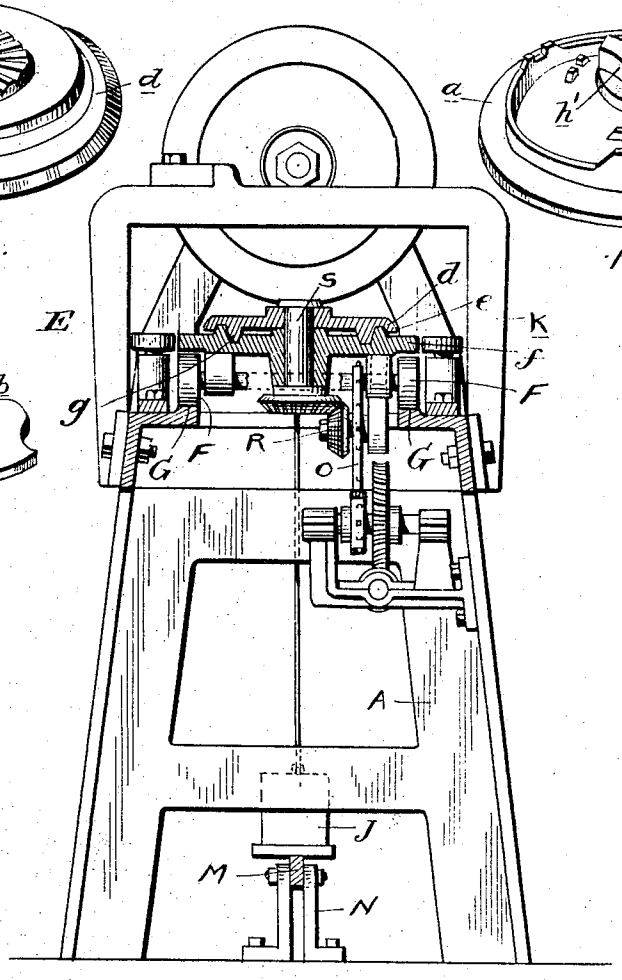


FIG. 2.

WITNESSES

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No. 765,198. Patented July 19, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM V. ROBINSON, OF DETROIT, MICHIGAN.

GRINDING AND POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 765,198, dated July 19, 1904.

Application filed September 15, 1903. Serial No. 173,253. (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.

The invention relates to machines for polishing the edges of articles of irregular contour—as, for example, sad-irons.

It is the object of the invention to obtain a construction of holder which will automatically present the work to the grinder so that the latter will exactly follow the eccentric contour.

It is a further object to provide means for quickly engaging and disengaging the work.

The invention consists in the peculiar construction, arrangement, and combination of parts, as hereinafter set forth.

In the drawings, Figure 1 is a longitudinal section through the machine. Fig. 2 is a cross-section taken in the plane of the revoluble holder. Fig. 3 is a perspective view of the bottom member of the detachable chuck. Fig. 4 is a perspective view of the base-plate for supporting the chuck. Fig. 5 is a perspective view of the top plate of the chuck. Fig. 6 is a sectional view showing the adjustable stop for the work-carriage.

A is a suitable frame upon which is journaled the arbor B, provided with the rotary grinder C. The latter, as shown, is preferably in the form of a wheel which is centrally recessed to form an annular flange C′, the edge of which forms the grinding-surface.

D is the work-holder. In the construction shown the holder D is particularly designed for use in grinding and polishing sad-irons. These as usually formed are pointed at opposite ends, besides being formed by arcs of circles which meet to form the pointed ends. These sides are also inclined to the base of the iron, so as to form, in effect, segments of cones. In order to present these conical segments to the annular grinding-surface, holder D is provided with a base *a* of substantially circular form and having supporting-bearings for the irons thereon which are inclined upward from the periphery to the center. Upon this base a number of irons, preferably three, may be arranged so that one edge of each will project slightly beyond the base and will be substantially perpendicular to the axis of the grinder. The irons thus arranged are clamped in position by an upper member *h*, which preferably has downwardly-projecting lugs *c* for fitting into the recesses usually provided at the top of the irons. This plate may also be provided with the bifurcated lug *c′* for engaging a projecting lug on the top of the iron, and thereby locking the latter from movement on the base.

Holder D is revolubly mounted upon a support, preferably a carriage E, which is movable toward and from the grinder C′. This, as shown, is provided with supporting-wheels F, engaging with tracks or ways G upon the frame. The work is yieldingly pressed against the grinding-surface by a tension device attached to the carriage, which, as shown, is formed by a flexible connection H, passing over the sheave I and having attached thereto the weight J. K is a connection at the opposite end of the carriage for retracting the same from the grinding-wheel, which passes over the sheave L and downward, connecting at its lower end with a foot-lever M. This lever is fulcrumed at N and preferably extends beneath the weight J, so that when its forward end is depressed to retract the carriage its rear end will simultaneously lift the weight J. P is a hook upon the carriage which is adapted to engage with a suitable detent, such as the lug Q on the frame, thereby holding the carriage in its retracted position. The holder D is revolved by suitable mechanism which is arranged to permit of the free movement of the carriage E. This, as shown, comprises a sprocket O, which is connected by the beveled gear-wheels R with the rotary spindle S, which revolves the holder D. The sprocket O engages with a chain T, which extends horizontally and passes around sprockets on the shafts U and U′. The shaft U′ is connected by a worm-wheel and worm connection V with a shaft W, the latter having a drive connection X from the arbor B. The shaft U is

preferably adjustably secured to the hanger Y by link Y′ and screw Z to the frame A by the pivot Y^2, the object being so that when the work-holder D is drawn forward, secured by hook P, the hanger Y is raised, which will disengage the sprocket O with chain T. The work may then be removed or supplied. The adjustment of the screw Z permits the taking up slack in the chain, so that the latter is always maintained in engagement with the sprocket.

In order that various shapes of work may be accommodated, it is necessary that a number of the holders D should be provided, any one of which may be quickly placed in position on the carriage or detached therefrom. To this end the rotary spindle S has secured thereon a revoluble base-plate *d*, which is supported upon bearings *e* on the bed-plate *f* of the carriage E. The base-plate *d* is adapted to receive and support the base *a* of the holder D, and to provide a rotary drive for the holder radially-extending lugs *g* on the bottom plate *d* are arranged to engage with corresponding bearings on the bottom of the base *f*. Thus when the former base is placed upon the latter it will be centered with the spindle S and will be driven thereby. The upper plate *b* of the holder is clamped to the lower plate by means of a central post *h*. This post has a head *i*, engaging with a central recess in the base *a*, and at the upper end of the post is a slot or keyway with which the key *j*′ is adapted to engage. This key is tapering and bears upon the top of the plate *b*, so that when driven into the keyway it will clamp the two plates *a* and *b* upon the irons therebetween. Concave bearings *h*′ are preferably formed on the central post for engagement with the inner face of the iron. As the base *a* of the holder merely rests upon the base *d* on the carriage, means must be provided for preventing the lifting of the holder D when the work is pressed against the grinder. For this purpose an arm or member *k* is secured to the frame and extends above the carriage E, so that when the work-holding chuck D is in its grinding position said arm *k* will be above the central post *h* of the chuck. Thus disengagement of the chuck from the revoluble base on the carriage is prevented.

The parts being constructed and described, in operation the irons or other work to be ground may be engaged with the work-holding chuck D when the latter are detached from the carriage. The clamping of the work is quickly effected, as it merely requires the placing of the separate irons on their respective seats around the periphery of the base *a* and this clamping-plate *b* by driving in the key *j*′. The work thus engaged with the chuck is placed in position on the carriage by retracting the latter through the depression of the foot-lever N. This will permit of seating the bottom plate *a* of the chuck upon the revoluble base *d* of the table, the radial lug *g* interlocking with the corresponding bearings on the base. When pressure on the foot-lever is relieved, the weight J will draw the carriage toward the grinder until the edge of the work is pressed against the grinding-surface. This movement will also shift the chuck, so that the pin *h* is beneath the arm *k* on the frame.

Rotary motion is imparted to the revoluble base *d* through the mechanism already described, comprising a belt-shaft W, worm-gear connection U′, sprocket-chain T, sprocket O, beveled gear-wheels R, and spindle S. This drive connection does not in any way interfere with the movement of the carriage toward or from the grinder.

As soon as one edge of the work is ground the chuck may be removed and replaced by another chuck with other work. The work in the first chuck may then be removed, the irons reversed in position and again clamped for the polishing of the opposite sides.

To limit the backward movement of the carriage E toward the grinder C, an adjustable stop A′ is slidingly secured to frame A and is controlled by a threaded rod A^2, which is sleeved in bearings A^3, having at its outer end a locking-head A^4, locking-catch A^5, normally held in a locked position by a spring A^6. The inner end of said rod has a threaded engagement with stop A′, by which the latter may be moved backward or forward as adjusted.

What I claim as my invention is—

1. In a grinding-machine, the combination with a revoluble base or table, of a work-chuck removably seated thereon and having a shouldered engagement therewith, and a stationary arm above said chuck for maintaining the same in engagement with its shouldered seat.

2. In a grinding-machine, the combination with a grinder of a rotary table movable toward or from said grinder, a removable chuck seated upon said table, and having a shouldered engagement therewith, and a stationary arm extending above said chuck when in grinding position, and adapted to hold the same in engagement with its shouldered seat, and to be spaced therefrom when out of grinding position.

3. In a grinding-machine, the combination with a revoluble base or table, of a chuck removably seated thereon, comprising a base-plate having work-seats thereon, and upwardly-projecting central post, a top plate centrally apertured to engage said posts and means for drawing said plate downward upon said post to clamp the work, inclined tapered key arranged to engage a slotted portion of said central post.

4. In a grinding-machine the combination with a revoluble base or table, of a chuck removably seated upon said base, and comprising a bottom plate having work-seats thereon, inclined from center to periphery of the plate,

a central post projecting upward from said plate, a top plate sleeved on said post and means for drawing said plate downward to clamp the work.

5. In a grinding-machine, the combination with a rotary base or table of a chuck removably seated on said base and comprising a bottom plate having work-seats thereon, inclined downward from center to periphery, a central post rising from said plate, and having concave bearings thereon for said work, a top plate sleeved on said post, and means for drawing said plate downward to clamp the work.

6. In a grinding-machine the combination with a rotary base or table, of a chuck removably seated thereon, comprising a base-plate having an annular seat on said table, and the radially-extending interlocking shouldered engagement therewith, the work-seats on said bottom plate inclined from center to periphery, a post projecting upward centrally of said plate, a top plate sleeved on said base and a tapering key-engaging keyway in said pin and adapted to clamp said plate upon the work.

7. In a grinding-machine, the combination with a grinder of a work-carriage movable toward and from said grinder, a revoluble base or table on said carriage, a work-chuck removably seated upon said base, means for yieldingly drawing said carriage toward said grinder to press the work thereagainst, and means for simultaneously imparting a rotary motion to said revoluble base, whereby said chuck and the work held thereby is revolved.

8. In a grinding-machine, the combination with the grinder of a carriage, a track for said carriage, extending transverse to the grinding plane, a revoluble base or table on said carriage, an automatic chuck removably engaging said base, a weight and flexible connection for drawing said carriage toward said grinder, a flexible connection for returning said carriage, and a foot-lever to which the latter connection is attached, adapted when operated to simultaneously retract said carriage, and promptly lift said weight.

9. In a grinding-machine, the combination of a grinder comprising a rotary wheel recessed to form an annular, laterally-projecting flange, a carriage movable toward and from the plane of the edge of the said flange, a revoluble work-holder mounted on said carriage, and having its axis transverse to the axis of the grinder, and means for yieldingly drawing said carriage to contact the work with the plane edge of said annular flange.

10. In a grinding-machine, the combination with the grinder, of a carriage movable toward and from said grinder, a revoluble work-holder mounted on said carriage, means for clamping the work in said holder arranged around and projecting beyond the periphery thereof, means for yieldingly drawing said carriage toward the grinder, and an adjustable stop for limiting the movement of said carriage to prevent injury to the ends of the work.

11. In a grinding-machine, the combination with a grinder of a revoluble base or table, and a work-chuck removably seated thereon and having a shouldered engagement therewith, whereby the work is revolved in operative relation to the grinder, the inner surface of said chuck inclining from its center to its periphery.

12. In a grinding-machine, the combination with a grinder, of a work-carriage movable toward and from said grinder, a revoluble base on said carriage, a work-chuck upon the base, means for normally retaining said work into yieldable contact with the grinder, and means for simultaneously imparting a rotary motion to said revoluble base.

13. In a grinding-machine, the combination with a grinder, of a laterally-movable work-carriage, a revoluble base on said carriage, a work-chuck on the base, means for normally retaining said work into yieldable contact with the grinder, means for moving the work from said grinder, and means for limiting said movement of the carriage in either direction.

14. In a grinding-machine, the combination with a grinder, of a work-carriage, means for moving said carriage away from the grinder, and means for automatically returning the carriage into operative relation to the grinder and for yieldably retaining the work thereagainst.

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

WILLIAM V. ROBINSON.

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