

No. 725,142.

PATENTED APR. 14, 1903.

W. V. ROBINSON.
GRINDING MACHINE.

APPLICATION FILED MAR. 5, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

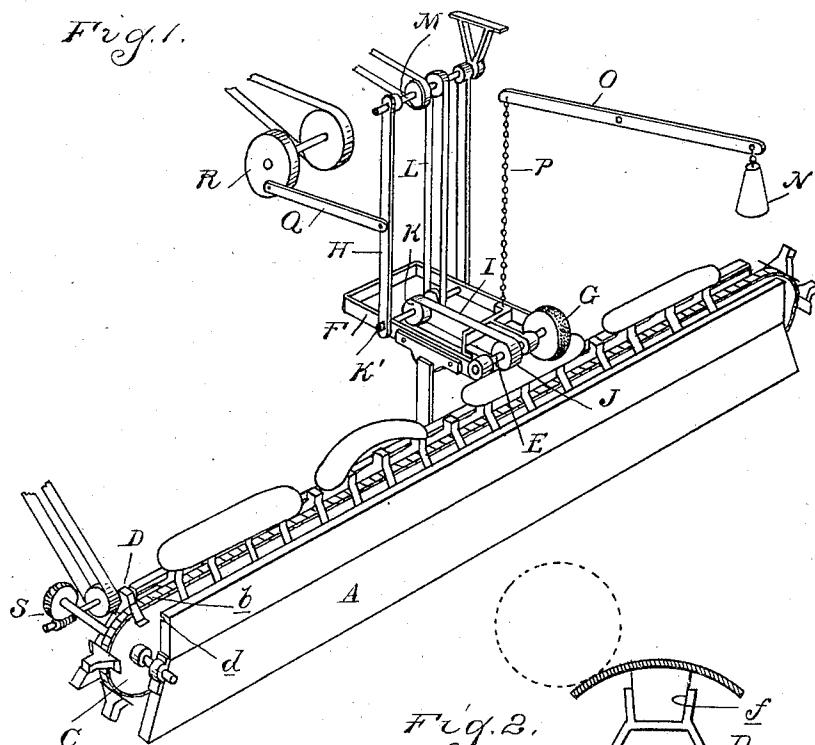


Fig. 2.

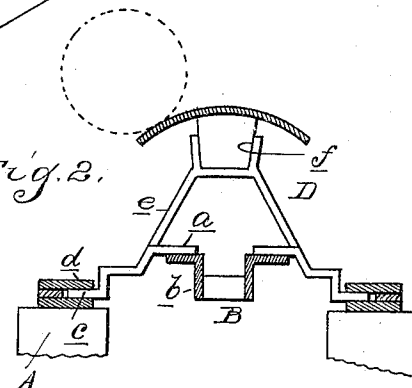
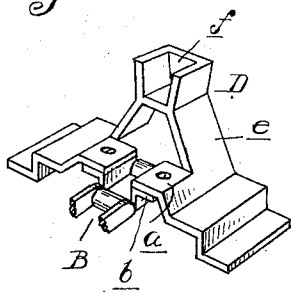


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 3.

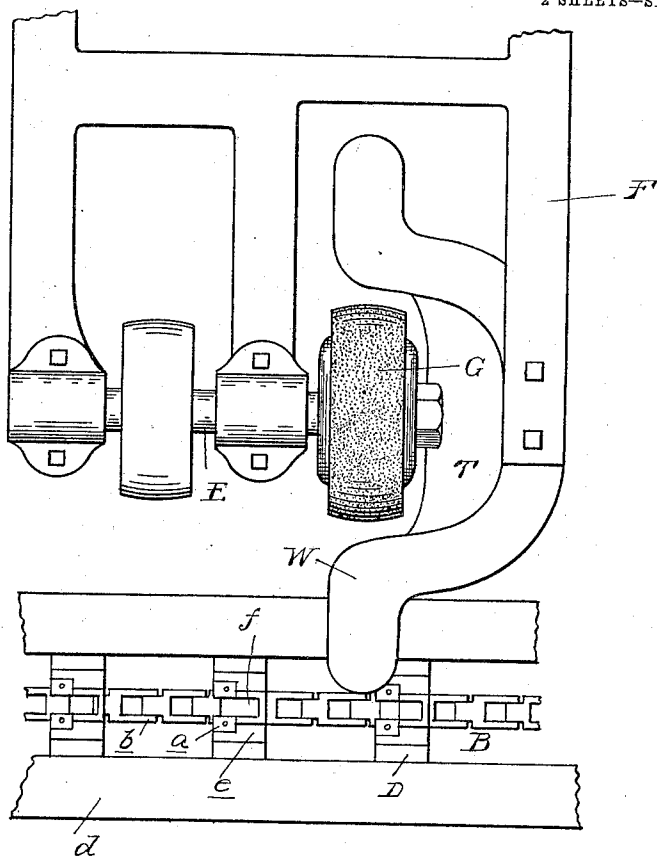


Fig. 5.

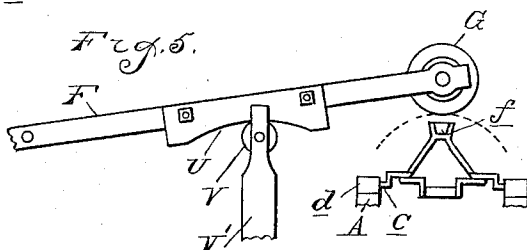


Fig. 6.

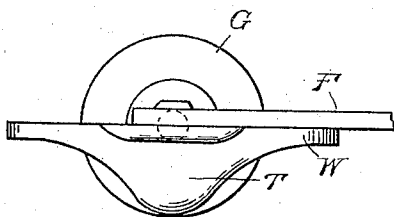
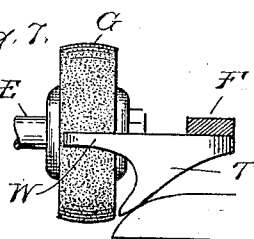


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM V. ROBINSON, OF DETROIT, MICHIGAN.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 725,142, dated April 14, 1903.

Application filed March 5, 1902. Serial No. 96,834. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM V. ROBINSON, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention relates to improvements in grinding-machines; and it consists in the peculiar arrangement and combination of parts, as more fully hereinafter described.

15 In the drawings, Figure 1 is a perspective view of the machine. Fig. 2 is a cross-section thereof. Fig. 3 is a plan of a portion of the machine. Fig. 4 is a perspective view of one of the work-holders. Fig. 5 is a side elevation. Figs. 6 and 7 are side and front elevations of the grinder and guide.

20 Generally described the machine comprises a work-carrier provided with a series of holders for securing the work and a grinder which is adapted to be reciprocated across the path of the carrier, so as to grind the surface of the casting while traveling by.

25 The invention has more particular reference to the peculiar construction of the work-carrier and the holders thereof by means of which the castings may be quickly engaged and disengaged therefrom; further, in the means employed for entering the casting beneath the grinder; further, in the means for determining the path through which the grinder travels in its reciprocation.

30 As shown in the drawings, A is a bed for supporting the work-carrier B. The latter is preferably in the form of an endless chain or belt passing around the sprocket-wheel C at opposite ends of the bed. Secured to this carrier are the work-holders D, preferably constructed as follows: *a* represents plates, which are bolted or otherwise secured to links *b* of the carrier-chain B. These plates extend 35 across the bed and are provided at opposite ends with bearing feet or flanges *c*, adapted to engage with longitudinal ways *d*, secured to the bed. Centrally of the plate *a* is the upwardly-extending post *e*, which at its upper end is provided with a slightly-tapering socket *f*. The construction is such that in the movement of the carrier-chain the holders D will be caused to travel over the bed A, the flanges *c* engaging with the ways *d* and being

held thereby from lateral movement. When 55 the end of the bed is reached, the holders will pass out of engagement with the ways and after passing around the sprocket C will be returned beneath the bed to the opposite end thereof.

60 The grinder comprises an arbor E, journaled in a frame F and having removably secured thereto the grinding-wheel G, of any desired shape or construction. The frame F is arranged in a substantially horizontal plane and is suspended free to oscillate by means of pivotal hangers H. The arbor E is driven by a belt I, connecting a pulley J thereon with a pulley K upon a shaft K'. The latter preferably forms the pivotal connection between 65 the frames F and hangers H and is connected through the medium of a belt L with a pulley on a shaft M, forming the upper pivot for the hangers H and journaled in suitable stationary bearings. The frame F is preferably partially counterbalanced in any suitably way, such as by the weight N, secured to a lever O, and having the opposite end connected through the chain P with the frame F.

75 From the construction just described it will be understood that the grinding-wheel G will be driven through the belt connections and at the same time will be free to oscillate across the path of the carrier B and is also free to move vertically. The counterweight 80 connection will hold said wheel and the supporting-frame F therefor in substantial balance; but there will be sufficient overweight on the wheel side to cause it to press downward against the surface to be ground.

90 To reciprocate the frame F, an actuating connection is provided, such as the pitman Q, connected to one of the hangers H and at its opposite end to a crank R. Thus when motion is imparted to the parts the grinder 95 G will be caused to reciprocate across the path and above the carrier C, while at the same time motion is imparted to said carrier through suitable drive connections, such as S.

100 The castings to be ground may be secured to the carrier in any suitable way; but in order to permit of quickly engaging and disengaging them I preferably provide each with a pair of securing-lugs cast integral therewith. These lugs are of a size and shape to 105 readily fit in the sockets *f* of the holders, and when thus engaged will securely hold the castings upon said carrier while operated

upon by the grinder. As the surfaces to be finished are generally curved, it is necessary to provide a grinder-wheel of particular form and also to provide means for guiding said wheel into engagement with the surface of the casting and preventing it from fouling at the ends or sides, the means employed for guiding the ends of the casting beneath the wheel preferably comprising a tapering guide T, secured to the frame F at the forward side of the wheel G. As shown, this guide is in the form of an inclined member. Thus as the castings are carried forward by the carrier B they successively come in contact with the inclined guide T, and the latter in the reciprocating movement of the frame F will mount up upon said casting carrying the grinder-wheel in contact with the surface to be finished.

In the reciprocating movement of the frame F the grinder-wheel G is caused to travel through a path substantially corresponding to the cross-section of the casting to be ground. This movement is effected by means of a cam U, which is bolted to one side of the frame F and is adapted to engage with an antifriction-roll V upon a stationary post V'. The cam U is detachably secured to the frame and may be exchanged whenever the shape of the casting varies. This cam also causes the grinder to clear the work-holders in the space between the work.

When the castings to be finished are of substantially segmental shape, the guides just described will be sufficient to hold the grinder G in proper relation thereto. With certain classes of work, however, the surface to be ground is of double curvature—as, for instance, a segment of a ring of round cross-section. With such a form the cam U would be ineffective in guiding the grinder, as the path through which it must travel at the ends of the segment is very different from that through which it must travel at the center. Thus if the wheel were only guided into contact with the ends of the castings at the center it would fall after each reciprocation so as to catch with the edge of the casting instead of mounted thereon. To overcome this difficulty, I preferably arrange the wings or guide-fingers W before described, which are secured to the frame F upon opposite sides of the periphery of the grinder-wheel G. These fingers or wings are so arranged that when the grinder-wheel passes off from the surface of the casting at each end of its movement the fingers will rest upon said casting and prevent the wheel catching on the edge thereof.

What I claim as my invention is—

1. The combination with a horizontally-engaging work-carrier, of a rotary grinder journaled in vertically-movable bearings, means for reciprocating said grinder across the path of said carrier during the feeding movement thereof, and means for first guiding said grinder into contact with the surface of the

work traveling thereby and then freeing the same to follow the contour of said surface.

2. The combination with a work-carrier of a rotary grinder, a movable frame in which said grinder is journaled, means for reciprocating said frame across the path of said carrier and simultaneously yieldingly pressing it toward the work thereon and means for guiding said grinder through a path in general conformity to the surface of the work while permitting a limited free movement of said grinder to follow the exact surface of the work.

3. The combination with a work-carrier of a rotary grinder, a movable frame in which said grinder is journaled, means for reciprocating said frame to carry said grinder across the path of the work, means for simultaneously yieldingly pressing said grinder toward the work, and a pattern-cam for guiding said frame in its reciprocation to move said grinder in general conformity to the surface to be ground while permitting limited free movement of said grinder to follow the exact surface of the work.

4. The combination with a work-carrier of a rotary grinder adapted to be reciprocated across the path of said carrier, means for yieldingly pressing said grinder toward the work on said carrier, and a guide adjacent and in fixed relation to said grinder, adapted to cause the latter to mount upon the surface of the work to be ground.

5. The combination with a work-carrier of a rotary grinder adapted to be reciprocated across the path of said carrier and yieldingly pressed toward the work thereon, and fingers carried with and projecting from opposite sides of the axis of said grinder adapted to contact with the surface of the work when the grinder passes beyond the edge thereof, and thereby guide said grinder onto said surface again in its return movement.

6. In a grinding-machine, the combination with the grinder of an endless carrier, a work-holder secured thereto comprising a flanged plate, a post projecting upward therefrom and having a work-receiving socket at its upper end, and guideways upon opposite ends of said carrier with which said flanges are adapted to slidably engage while being fed past said grinder.

7. In a grinding-machine, the combination with an endless-chain carrier and guideways upon opposite ends thereof, of the work-holder D comprising plate *a* attached to one end of said carrier, the flanges *c* upon opposite sides thereof adapted to slidably engage with said guideways, and the upwardly-extending post *e* terminating in the socket *f* substantially as and for the purpose described.

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

WILLIAM V. ROBINSON.

Witnesses:

M. B. O'DOHERTY,
H. C. SMITH.