W. VAN NOSTRAND.

GRINDING MACHINE.

APPLICATION FILED JAN. 22, 1912.

1,040,470.

Patented Oct. 8, 1912.

2 SHEETS—SHEET 1.

FIG. 1.

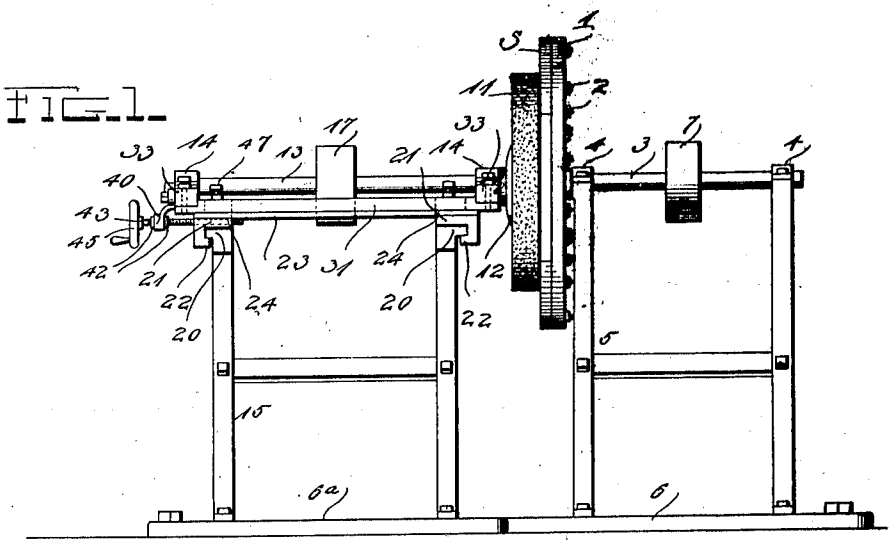
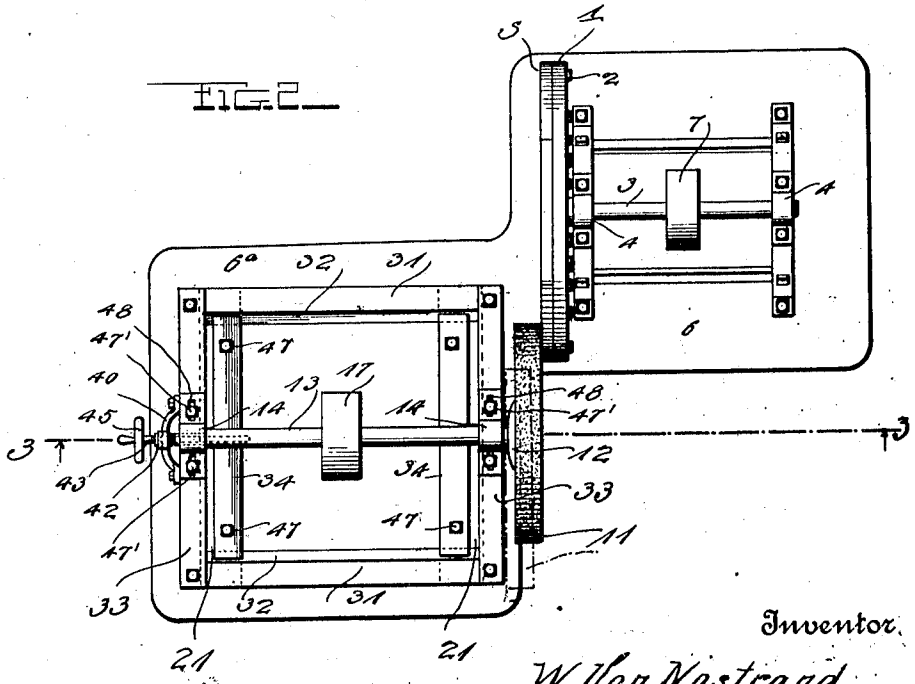


FIG. 2.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 3.

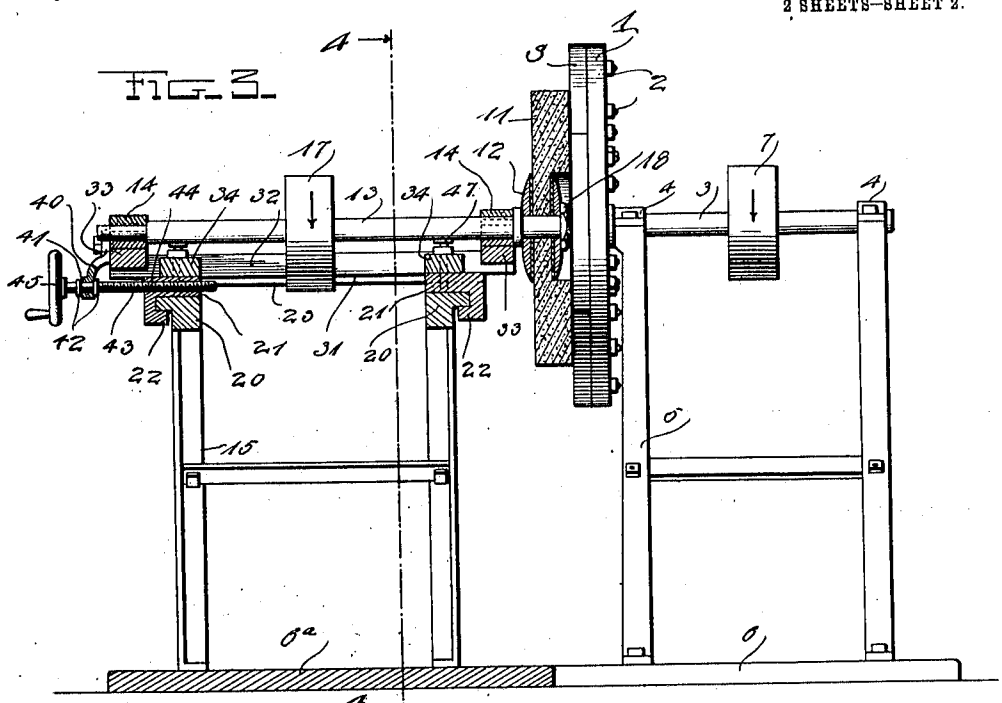
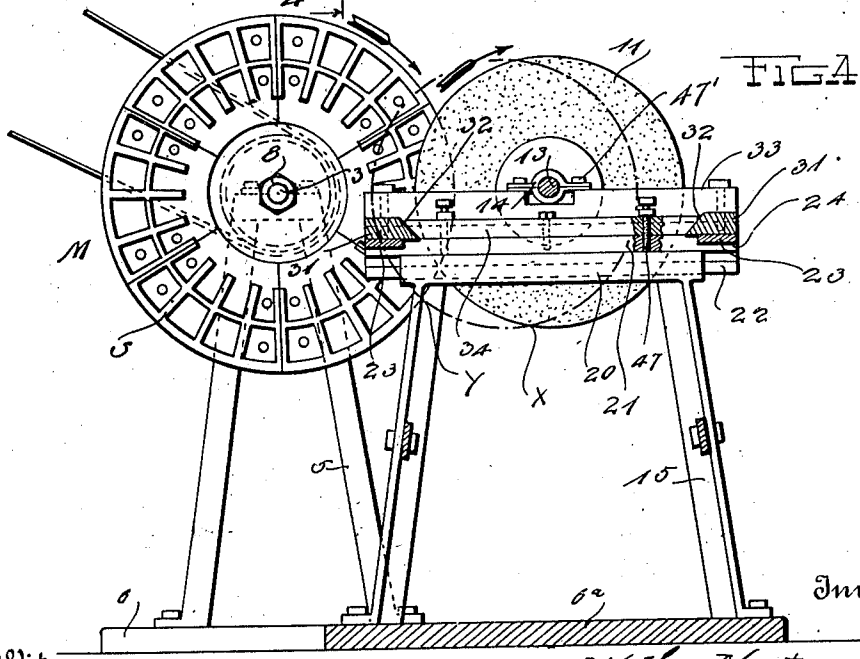


FIG. 4.



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WILLIAM VAN NOSTRAND, OF DALTON, NEW YORK.

GRINDING-MACHINE.

1,040,470. Specification of Letters Patent. Patented Oct. 8, 1912.

Application filed January 22, 1912. Serial No. 672,593.

To all whom it may concern:

Be it known that I, WILLIAM VAN NOSTRAND, a citizen of the United States, residing at Dalton, in the county of Livingston and State of New York, have invented certain new and useful Improvements in Grinding-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to grinding and polishing, and more especially to machines for grinding plane metal surfaces; and the object of the same is to produce a machine of this character more particularly adapted for dressing metal segments by means of an emery wheel.

To this end the invention consists in the machine described below and which includes a disk to which the segments may be attached when they are to be ground, although it is possible to remove the disk from its shaft and substitute the entire mill wheel, leaving the segments in place upon it.

The following specification describes my invention in detail, reference being had to the drawings wherein—

Figure 1 is a side elevation of this machine complete, and Fig. 2 is a plan view thereof. Fig. 3 is a vertical section on the line 3—3 of Fig. 2, and Fig. 4 is a cross section on the line 4—4 of Fig. 3.

In the drawings I have shown in Fig. 4 a complete mill wheel M carrying segments S on its face, as the wheels are sometimes manufactured; and I have illustrated in the other views a disk 1 against whose face said segments may be secured by bolts 2 after they have been removed from the face of the wheel M, the disk or the wheel being mounted removably upon a shaft 3 in any suitable manner as by means of a nut 8. I make this explanation because it is sometimes possible to bring the entire mill wheel to the grinding machine and thus obviate the necessity of removing its segments, but where this is not possible the segments must be removed and brought to the machine and in that case they are bolted to the face of a disk 1 to be ground. The shaft 3 is mounted in suitable bearings 4 supported by a frame 5 which is bolted to a bed 6, and any suitable means may be provided for rotating said shaft, such as a pulley 7. The bed 6 is not rectangular as usual, but is offset at one end as at 6^a, and this offset portion carries a second frame 15 which is much like the first excepting that it has an adjustable and movable carriage, the carriage in turn having bearings 14 in which is journaled a shaft 13 carrying at its front end an emery wheel 11 secured thereto in any suitable manner as by washers 12 clamped under the nut 18. This shaft 13 also may be driven by any suitable means, but I have shown it as provided with a pulley 17, and the two pulleys are indicated in Fig. 3 as rotating in the same direction.

The carriage carrying the emery wheel and its shaft is made in two parts or members respectively adjustable upon each other and upon the frame 15 in two directions at right angles to each other so as to permit the setting of the emery wheel with respect to the work to be ground in a manner to be described below. One means for carrying out this idea is to construct said frame and its carriage as follows: The frame 15 carries parallel tracks 20 across its upper end, on which slide flat shoes 21 having hook-shaped flanges 22 engaging under said tracks, and the shoes are connected at each end by cross strips 23 rabbeted into the shoes as at 24 so that a lower carriage member is built up which is formed in the shape of a square frame in whose opening stands the pulley 17 and downward through which may pass the belt leading therefrom. The upper member of this carriage consists of two shoes 31 also parallel with each other but disposed at right angles to the length of the shoes 21 so as to overlie the cross strips 23 which serve as their tracks, and the extremities of said shoes 31 are connected by cross strips 33 which serve as supports for the bearings 14 and which make up another rectangular structure constituting the upper member of the carriage but which is by preference a little longer parallel with the shaft 13 than it is wide. The inner edges of the shoes 31 are beveled as at 32 and slidably engage the beveled ends of blocks 34 which are secured upon the shoes 21, their beveled ends thereby serving as guides for the beveled edges 32 of the shoes 31, and the upper face of the cross strips 23 serving as tracks for said shoes. By this construction

the upper member of the carriage is permitted to move at right angles to the direction in which the lower member thereof moves over the frame 15, and both members being of openwork structure offer no obstruction to the presence of the pulley 17 and the means for driving it.

Depending from what might be called the outer end of the upper carriage member is a bracket 40 having an eye 41 swiveled between two collars 42 made fast on a screw 43 which is threaded through an opening 44 in one of the shoes 21, and has a hand wheel 45 at its outer extremity; and by adjusting the latter it will be clear that the upper carriage member can be moved inward and outward over the lower carriage member. As the entire carriage will be laterally adjusted to suit the size of the wheel M whose segments are being ground or the size of the disk 1 carrying said segments, no means for adjusting it by hand are necessary. However, I prefer to employ set screws 47 passing downward through the blocks 34 and the shoes 21 beneath them, and threaded through one or both, and bearing at their lower ends upon the tracks 20, so that after the entire carriage has been adjusted to the right or left as seen in Fig. 4, these screws may be set up to hold it in position. Finally, it is possible to employ set screws 47′ passing through slots 48 in the bearings 14 in which the emery-shaft is mounted, as best seen in Fig. 2, so that this shaft may be adjusted if necessary to keep the face of the emery wheel in a plane truly parallel with the face of the work to be ground. These three adjustments will be sufficient in this machine, if we except the possible use of adjustable means for securing the segments S to the disk 1 by the bolts 2.

In the operation of this machine, the segments S to be ground are bolted as at 2 to the face of the disk 1 or the entire wheel M with its segments in place is applied to the shaft 3 by means of the nut 8 or otherwise, the entire carriage being at this time moved to the right in Fig. 4 or toward the bottom of Fig. 2 so that the emery wheel 11 will occupy the position indicated in dotted lines in the last-named view. After the segments are all in place the lower carriage-member is slid over the track 20 on the frame 15 until the inner edge of the emery wheel laps the wheel M or disk 1 to an extent indicated by the dotted circle in Fig. 4; and power is then applied to rotate the two shafts 3 and 13 in the direction shown by the arrows on the pulleys, so that the emery wheel 11 and the wheel or disk carrying the segments S rotate in the same direction as the arrows indicate in Fig. 4 and their lapping portions therefore rotate in opposite directions. The upper carriage-member is then advanced over the lower by manipulating the hand wheel 45, and this brings the face of the emery wheel 11 into contact with the segments, lightly at first and later with greater force so that said segments are ground accurately and evenly. Attention is directed to the fact that any given point on the face of the emery wheel passes over the face of the segments being ground at variable speeds and in different directions. For instance, take the point X in Fig. 4. As this point passes onto the face of the segments at Y along the dotted line, it is moving in a path practically at right angles to that in which the periphery of the disk 1 or wheel M is moving, and this point X—being near the periphery of the emery wheel—is moving faster than any other point nearer its axis. As it passes farther inward toward the axis of the disk 1 it crosses a path on the latter which moves slower, and then another path moving slower, and another, and so on. Finally, at a point in line between the two axes the point X is rising vertically whereas the inner end of the segment being ground is moving vertically downward; beyond which as the point ascends it moves again radially outward over the disk 1 and finally leaves its periphery. The same course at different speeds is followed by other points on the face of the emery wheel, all of which, however, cross the face of the segments already crossed by the point X but at different speeds; and I have found from experiment that the result is that the face of the segment is ground much more rapidly than otherwise, the emery wheel may be said to be self-sharpening, and its face does not become glazed. But perhaps most important of all, there is no tendency for the wear on the face of the emery wheel to dish it, to render it convex, or to scratch it or groove it as usual. It is possible that the entire carriage may be adjusted on the tracks of the frame 15 so that the emery wheel will project beyond the inner extremities of the segments S, but it should never be set so that it does not extend at least as far as do said sections. In a mill employing many of the wheels M it is quite possible to use one of these grinding wheels almost continuously—adjusting the carriage on the frame 15 to the proper point and setting it there, and using a disk 1 corresponding in size with the wheels M so that one by one the latter may be stripped of their segments S and the same brought to and attached upon the disk and ground. Or if it be possible it may be quicker to bring the entire wheel M to the grinding machine, which dispenses with the necessity for the disk 1 and bolts 2.

The parts of this machine will of course be proportioned as the necessities of the case

may demand, and the details of construction may be modified within the spirit of this invention.

What is claimed as new is:

1. In a grinding machine, the combination with a frame, a shaft journaled therein, and means for detachably connecting to said shaft the work whose face is to be ground; of a second frame out of alinement with the first, a carriage laterally and longitudinally adjustable on this frame, a shaft journaled in the carriage, a grinding wheel carried by the end of said shaft, means for rotating both shafts in the same direction, and means for manually adjusting the carriage to set the face of the grinding wheel into contact with the face of the work or to move said faces wholly out of register with each other.

2. In a grinding machine, the combination with a frame, a shaft journaled therein, and means for detachably connecting to said shaft the work whose face is to be ground; of a second frame out of alinement with the first, a carriage made in two parts the lowermost of which is laterally adjustable on this frame and the uppermost of which is longitudinally adjustable on the first, a shaft journaled in the uppermost part, a grinding wheel carried by the end of said shaft, means for rotating both shafts in the same direction, and means for manually adjusting the upper part of the carriage to set the face of the grinding wheel into contact with the face of the work.

3. In a grinding machine, the combination with a frame, a shaft journaled therein, a disk on the shaft, and means for detachably connecting to said disk the work whose face is to be ground; of a second frame out of alinement with the first, a carriage made in two parts the lowermost of which is laterally adjustable on this frame and the uppermost of which is longitudinally adjustable on the first part, a shaft journaled in the uppermost part, a grinding wheel carried by the end of said shaft and of a size to be moved out of register with said disk when this part of the frame is adjusted, means for rotating both shafts, and means for manually adjusting the upper part of the carriage to set the face of the grinding wheel into or out of contact with the face of the work.

4. In a grinding machine, the combination with a frame, a shaft journaled therein, a disk on the shaft, and means for detachably connecting to said disk the work whose face is to be ground; of a second frame out of alinement with the first, a carriage laterally and longitudinally adjustable on this frame, a shaft journaled in the carriage, a grinding wheel carried by the end of said shaft and of a size to be moved out of register with said disk when the carriage is adjusted laterally, and means for locking the carriage on its frame after its lateral adjustment.

5. In a machine for grinding mill-wheel segments, the combination with a disk, means for rotating it in an upright plane, and means for attaching to its face the segments to be ground; of a grinding wheel, means for rotating it in an upright plane, means for adjusting the support for the wheel so that its plane shall be parallel with that of said disk, means for revolving the disk and the wheel in the same direction, and means for causing the former to lap the latter to a greater or less degree and to bear against the face of the work being ground.

6. In a grinding machine, the combination with means for rotating the work in an upright plane; of a frame spaced from the face of the work and offset laterally from its axis and having transverse tracks parallel to said plane, a carriage made in two parts whereof each has the shape of a rectangular frame, shoes on the lower part engaging said tracks, cross bars connecting the extremities of said shoes and constituting tracks for the upper part, shoes on the latter sliding on these tracks and having beveled inner edges, blocks secured upon the shoes of the lower part and having beveled ends engaging said edges, cross strips connecting the extremities of the upper shoes, journal boxes on these strips, a shaft mounted in said boxes, a driving wheel fast on the shaft within the center of said frame-shaped carriage, and a grinding wheel fast on the end of the shaft, all for the purpose set forth.

7. In a grinding machine, the combination with means for rotating the work in an upright plane; of a frame spaced from the face of the work and offset laterally from its axis and having transverse tracks parallel to said plane, a carriage made in two parts whereof each has the shape of a rectangular frame, shoes on the lower part engaging said tracks, hook-shaped flanges on said shoes engaging beneath said tracks, cross bars connecting the extremities of said shoes and constituting tracks for the upper part, shoes on the latter sliding on these tracks and having beveled inner edges, blocks secured upon the shoes of the lower part and having beveled ends engaging said edges, set screws passing through said blocks and lowermost shoes and bearing upon the lowermost tracks, cross strips connecting the upper shoes, journal boxes on these strips, a shaft mounted in said boxes, a driving wheel fast on the shaft within the center of said frame-shaped carriage, a bracket carried by the upper part of the frame and having an eye, a screw whose shank is swiveled through said eye and whose threads engage a threaded opening in the lower part of the frame, a hand wheel on the outer extremity of said

screw, and a grinding wheel fast on the end of the shaft, all for the purpose set forth.

8. In a grinding machine, the combination with a frame, a shaft journaled therein, and means for detachably connecting to said shaft the work whose face is to be ground; of a second frame, a carriage thereon, a shaft journaled in the carriage parallel to said first shaft, a grinding wheel on the second shaft with its face in a plane parallel with that of the work, means for adjusting the carriage to cause the face of the wheel to lap partly over the face of the work, means for adjusting the carriage to bring said faces into contact, and means for rotating the shafts simultaneously in the same direction.

9. In a grinding machine, the combination with a work carrier, and means for driving it to rotate the work in a given plane; of a wheel having a grinding face rotating in a plane parallel with that of the work, means for setting the wheel to lap its face partly over the face of the work so that the lapping portions shall move in opposite directions, and means for advancing the wheel along the line of its axis for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM VAN NOSTRAND.

Witnesses:
J. E. LYON,
FRED VAN NOSTRAND.