

Aug. 25, 1942.

P. STEWART ET AL

2,293,923

CENTERLESS GRINDER

Filed Sept. 7, 1939

3 Sheets-Sheet 1

FIG. 1.

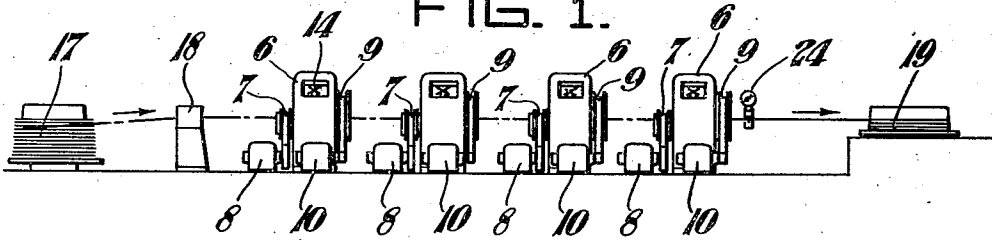
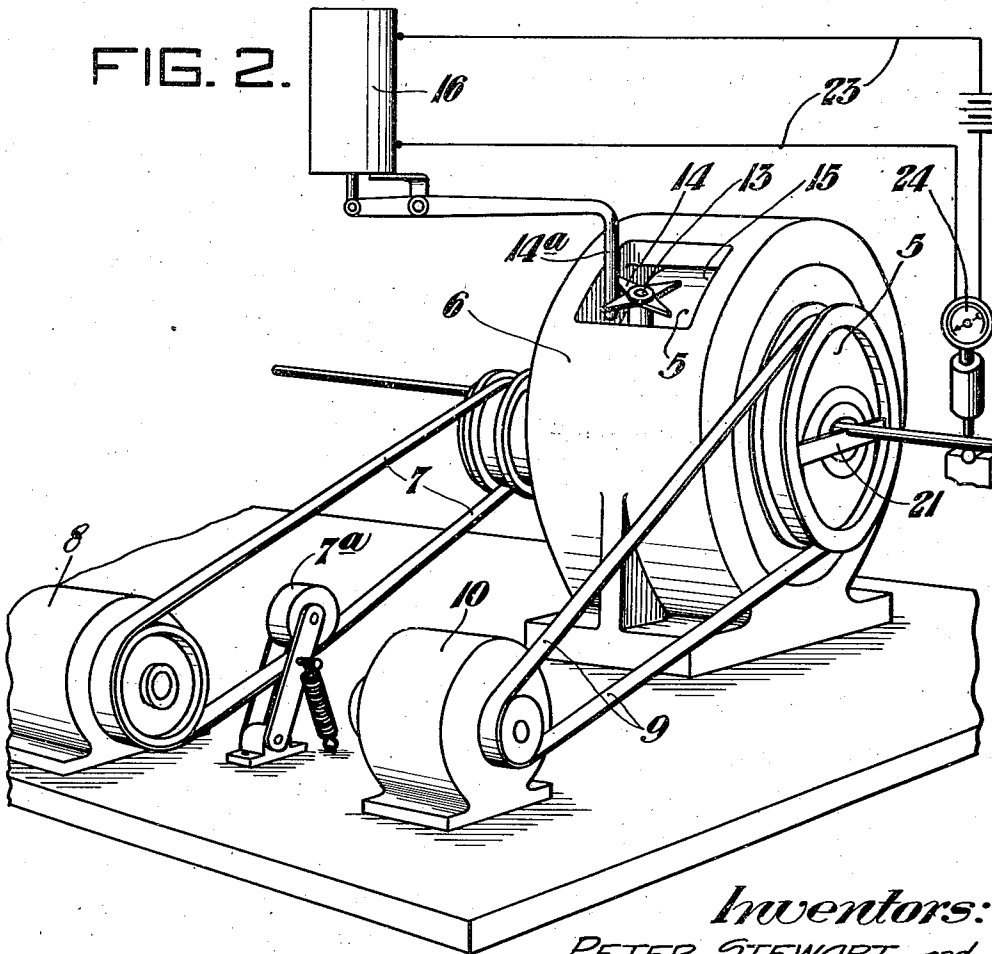


FIG. 2.



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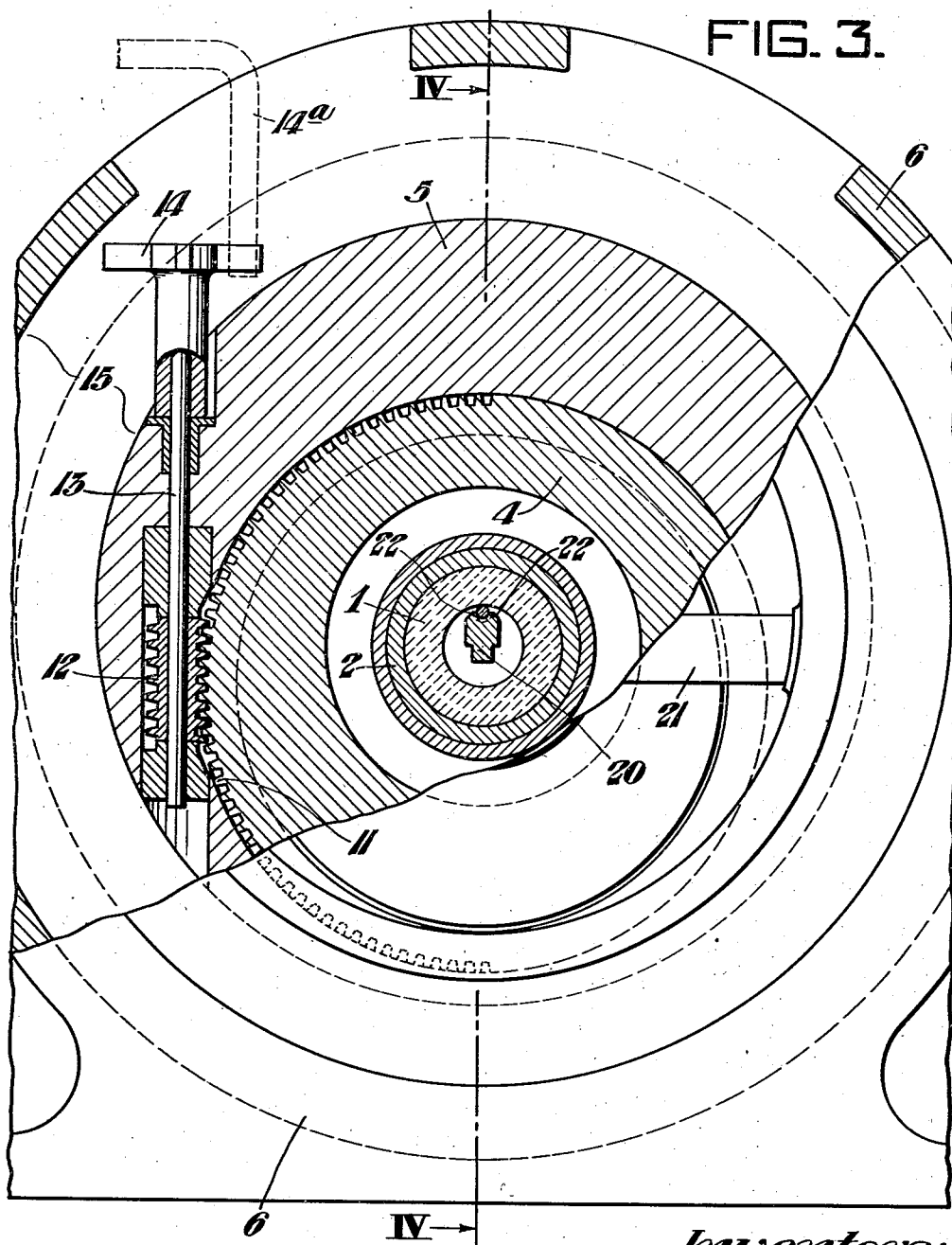
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3 Sheets-Sheet 2



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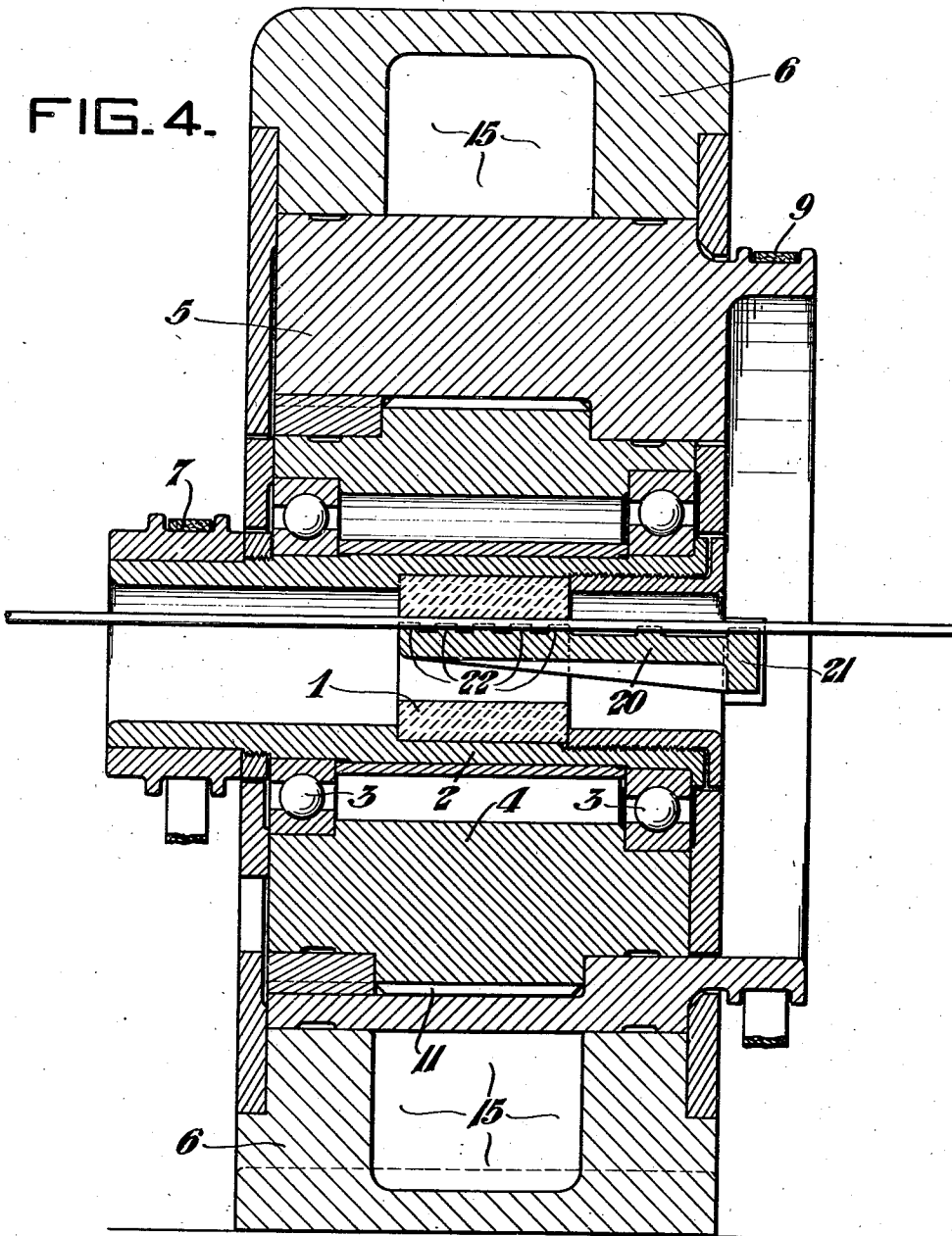
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3 Sheets-Sheet 3

FIG. 4.



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UNITED STATES PATENT OFFICE

2,293,923

CENTERLESS GRINDER

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Application September 7, 1939, Serial No. 293,834

4 Claims. (Cl. 51—73)

This invention relates to centerless grinders, the primary object being to grind the surface of long lengths of continuously moving wire, rod and the like, including assemblies such as wire strands and ropes.

A specific example of the invention is illustrated by the accompanying drawings in which:

Figure 1 shows the example in use;

Figure 2 is an isometric view of the example;

Figure 3 is a sectional elevation, and

Figure 4 is a section from the line IV—IV in Figure 3.

More specifically referring to these drawings, a rotary abrasive cylinder 1 is carried inside an annular mount 2 journaled for rotation by anti-friction bearings 3 in an annular mount 4, eccentrically of the latter. This mount 4 is eccentrically journaled in an annular mount 5 which is, in turn, journaled in a housing 6.

The mount 2 carrying the abrasive cylinder 1 is driven at a high speed through a belt drive 7 by a motor 8, and the mount 5 journaled in the housing 6 is rotatively driven at a much slower speed through a belt drive 9 by a motor 10, rotation of the mount 4 respecting the mount 5 being prevented by a worm-wheel 11 that is on the mount 4 and is engaged by a worm 12, the friction between the worm 12 and the wheel 11 being sufficient to prevent rotation between the two mounts.

This worm-wheel 11 may be turned by a shaft 13 transversely journaled by the mount 5 tangentially of the mount 4, this shaft 13 having a star-wheel 14 that revolves inside a space 15 inside the housing 6. Rotation of the star-wheel 14 can be effected by a finger 14^a pivoted to the housing 6 and provided with an electromagnetic motor 16 for moving the finger into the revolving path of the star-wheel 14, the latter being turned by engagement with the finger 14^a when it engages the same.

The drawings show a series of the grinders being used to grind the surface from wire, a coil of the wire 17 feeding through a wire drawing die 18 through the abrasive cylinders 1 of the various grinders to a wire drawing block 19. The die 18 may be used to complete the processing of the wire but it also functions to provide a taut span between it and the block 19, the grinders working on this taut span of wire.

In some instances the tautness of the wire may be sufficient to eliminate the need for supporting the wire against the grinding pressure. However, the drawings show the grinder as being provided with a support 20 that guides the wire concen-

trically respecting the rotative axis of the mount 5, this support 20 being mounted by a cross bar 21 fixed to the mount 5 and which is free from the other mounts. This support 20 has guide fingers 22 which continuously embrace a substantial portion of the circumference of the wire opposite that receiving the grinding pressure.

Energization of the electromagnetic motor 16 is effected through energized lines 23 controlled by a wire gage 24 fixed so as to continuously engage the wire leaving the grinder. When the diameter of the wire becomes too large, due to wearing of the abrasive cylinder 1, the finger 14^a is moved so as to engage the star-wheel 14 eccentrically carried by the mount 5, so as to adjust the abrasive cylinder 1 to a new position.

In operation, assuming the grinder is used as illustrated by Figure 2, the motor 10 through the belt drive 9 rotates the mount 5 at a relatively slow speed. This causes the mount 4 to revolve about the rotating axis of the mount 5, the mount 4, in turn, causing the mount 2 to revolve about this axis in a fixed orbit calculated to cause the inside of the abrasive cylinder 1 to grind the surface of the wire. The support 20 revolves with the cylinder 1 due to its being carried by the mount 5, this support 20 having, as previously mentioned, guide fingers 22 which positively hold the wire concentric the rotating axis of the mount 5. As it revolves, the abrasive cylinder 1 is rotated at a relatively high speed by the motor 8 through the belt drive 7, it being necessary to provide a spring-actuated idle pulley 7^a to maintain the belt of this drive in a taut condition since the driven wheel associated with the mount 2 must revolve with this mount as it rotates.

Grinding progresses in this manner until the abrasive cylinder 1 begins to wear and therefore to fail to remove as much of the surface from the wire as it should. At this time the gage 24 closes the circuit to the electromagnetic motor 16 through the lines 23, this motor then throwing the finger 14^a into the path of the star-wheel 14. When the star-wheel is revolved into engagement with the finger, it is rotated the distance of one of its points, this turning the worm 12 and effecting a very slight movement of the worm-wheel 11, whereby to very slightly rotate the revolving mount 4. Since this mount is eccentrically mounted by the rotating mount 5, the orbit of the abrasive cylinder 1 is changed so as to cause the inner periphery of this cylinder to approach the surface of the wire. In this manner the abrasive cylinder 1 is permanently maintained in exact grinding adjustment. It

will be noted that the position of the support 20 does not change when this just described action occurs, so that its guide fingers 22 maintain the wire concentric the rotating axis of the mount 8.

It will be appreciated from the foregoing that the use of a very few parts of rugged character enable proper adjustment of the abrasive cylinder at all times. It might also be mentioned it has been found that, due to grinding the wire by the inside of the abrasive cylinder which is always kept in exact adjustment, a self-dressing action respecting the working surface of the abrasive cylinder is secured. Therefore, the abrasive cylinder may be worked until it is totally worn away without its being removed from the grinder.

We claim:

1. A centerless grinder including the combination of a rotary abrasive wheel, a revolving mount carrying said wheel so that its working periphery revolves around the revolving axis of said mount, means for adjusting the distance between said periphery and said axis, means for guiding continuously moving work concentric with said axis, whereby said work is engaged by said periphery of said wheel, a gage measuring said work leaving said wheel, and automatic means for rendering the first named means responsive to the operation of said gage.

2. A centerless grinder including the combination of a rotary abrasive cylinder, a first rotary mount eccentrically carrying said cylinder, a second rotary mount eccentrically carrying said first mount, the axes of all of said rotary elements being parallel, means for rotating both said wheel and said second mount, wire or the like being adapted to be continuously moved through said cylinder concentric with the rotating axis of said second mount so as to be engaged by the inner periphery of said wheel, means for controlling the rotation of said first mount to thereby control the adjustment of said wheel respecting said wire or the like, a cross bar fixed to said second mount free from said first mount, and a support mounted by said bar and guiding the wire concentrically respecting the rotative axis of said second mount, said support having guide fingers that continuously embrace a substantial

portion of the circumference of the wire opposite that engaged by the inner periphery of said wheel.

3. A grinder including the combination of a rotary abrasive cylinder, a first rotary mount eccentrically carrying said cylinder, a second mount eccentrically carrying said first mount, the axes of all of said rotary elements being parallel, means for rotating both said wheel and said second mount, work being adapted to be continuously moved through said cylinder concentric with the rotating axis of said second mount so as to be engaged by the inner periphery of said wheel, means carried by said second mount for controlling the rotation of said first mount and including an operating element, and stationary means movable into a position for operating engagement by said element as it revolves due to being carried by said second mount.

4. A grinder including the combination of a rotary abrasive cylinder, a first rotary mount eccentrically carrying said cylinder, a second rotary mount eccentrically carrying said first mount, the axes of all of said rotary elements being parallel, means for rotating both said wheel and said second mount, work being adapted to be continuously moved through said cylinder concentric with the rotating axis of said second mount so as to be engaged by the inner periphery of said wheel, means carried by said second mount for controlling the rotation of said first mount and including an operating element, stationary means movable into a position for operating engagement by said element as it revolves due to being carried by said second mount, a gage continuously measuring the work after it leaves said wheel and adapted to control an electric circuit, electrically operated means for moving said stationary means to said position, and means for establishing an electric circuit controlled by said gage and operating said electrically operated means, whereby the latter is operated in accordance with the measure of the work after it leaves said wheel.

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