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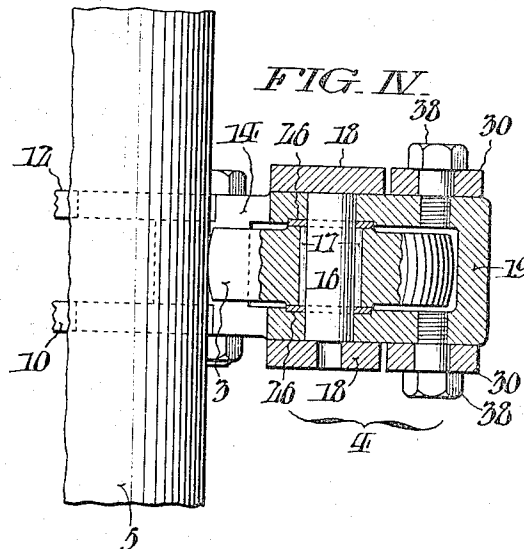
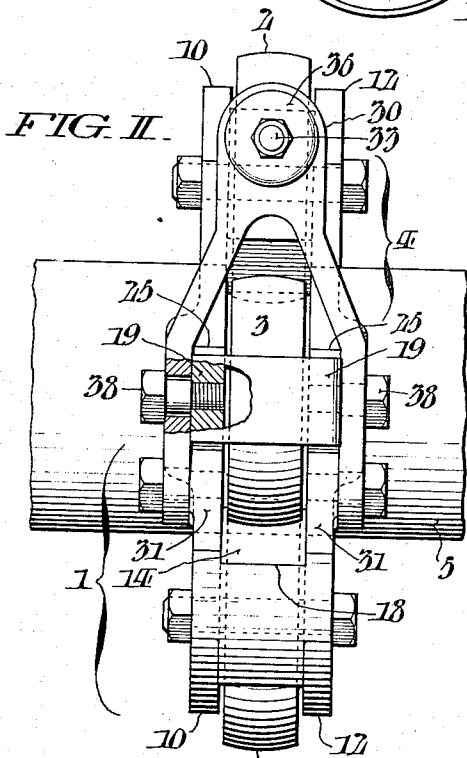
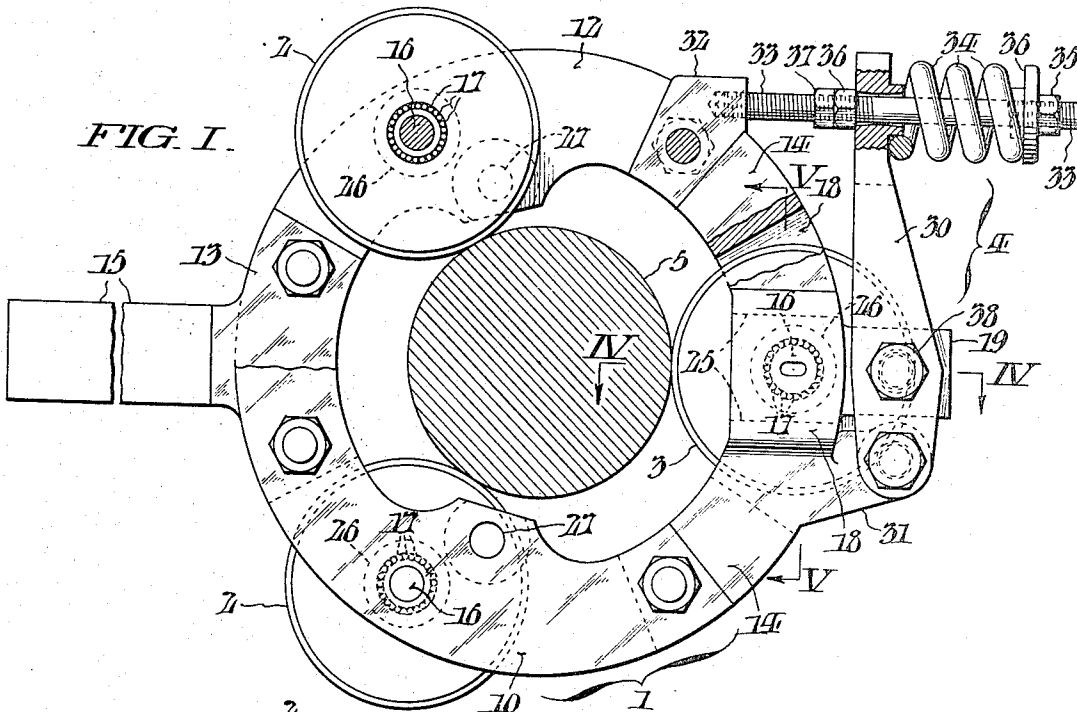
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2,053,009

AXLE BURNISHING MACHINE

Filed Feb. 14, 1936

2 Sheets-Sheet 1



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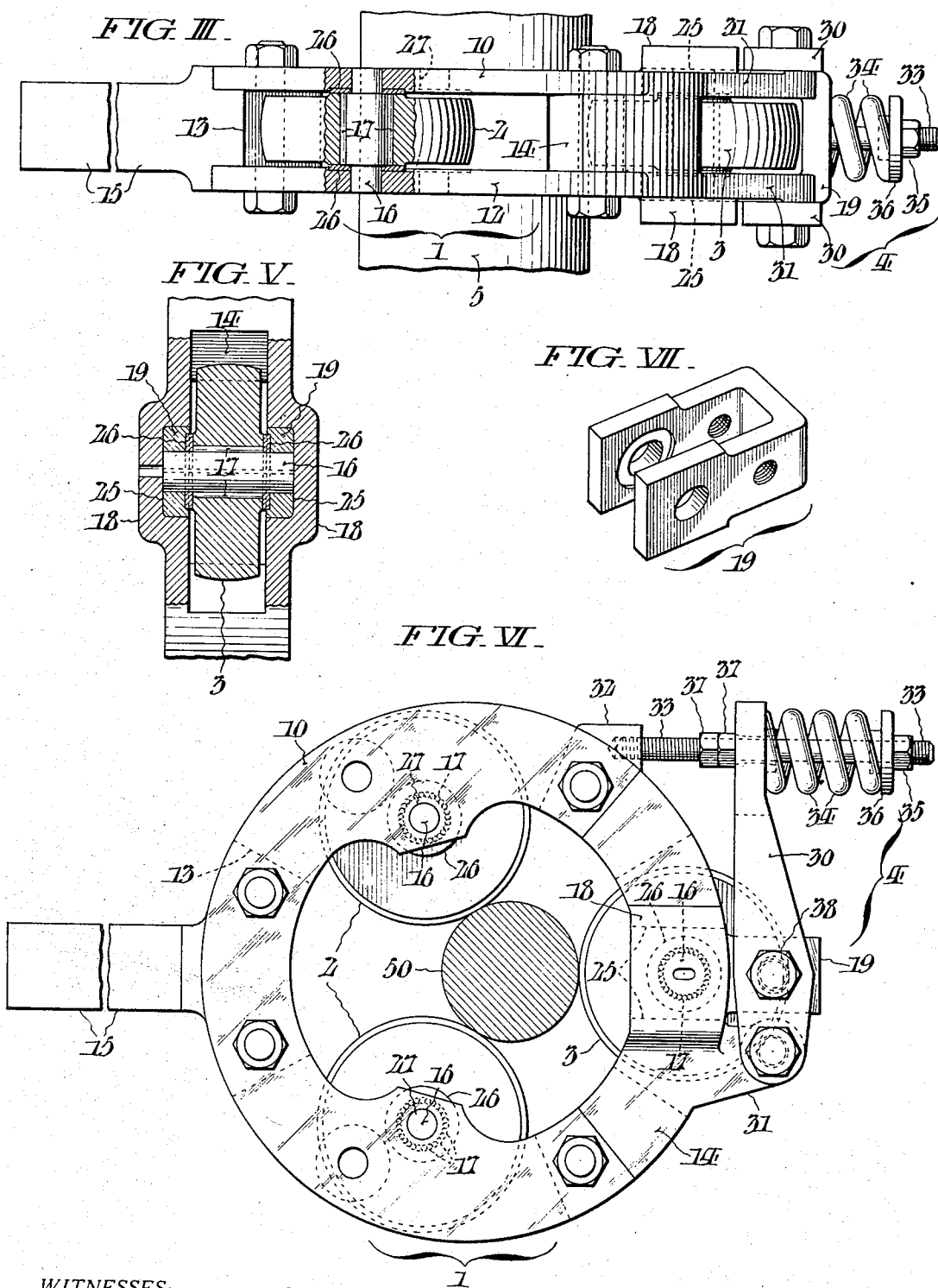
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AXLE BURNISHING MACHINE

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UNITED STATES PATENT OFFICE

2,053,009

AXLE BURNISHING MACHINE

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Application February 14, 1936, Serial No. 63,855

4 Claims. (Cl. 29—90)

My invention relates generally to pressure roll smoothing apparatus for circular work pieces mounted centrally of the rolls; more specifically, my invention relates to machines for burnishing locomotive driving axles and the like.

Among the objects of my invention is the provision of an efficient axle burnishing machine whose burnishing rolls apply equal and controlled pressure to the workpiece. Other objects of my invention include the following: the provision of an axle burnishing machine capable of predetermined and higher pressures than are now generally used in burnishing operations; the provision of a burnishing machine which positively and sharply limits the application of the extreme pressure as a protection against channeling at soft spots in the metal of the workpiece; and the provision of a burnishing machine of this type which will accommodate workpieces of different sizes without disturbing the pressure balance among the burnishing rolls. Still other objects and advantages of my invention will be apparent to those skilled in the art from the following detailed description of a preferred embodiment of my invention, reference being had to the accompanying drawings.

Of the drawings:

Fig. I is a side view of an axle burnishing machine embodying my invention.

Fig. II is an end view of the same.

Fig. III is a bottom plan view of the same.

Fig. IV is a sectional view, taken along the lines IV—IV of Fig. I.

Fig. V is a sectional view, taken along the lines V—V of Fig. I.

Fig. VI is a side view of the axle burnishing machine shown in Fig. I, with the positions of the burnishing rolls changed to accommodate a smaller workpiece without disturbing the pressure distribution among the rolls.

Fig. VII is a perspective view of the carrier on which the pressure transmitting roll is mounted.

For the purposes of a detailed description, the apparatus of my invention may be separated into the following principal elements: a frame 1, movable burnishing rolls 2, a pressure burnishing roll 3, and a pressure means 4, shown in conjunction with a workpiece 5 of predetermined diameter.

The frame 1 is made up of curved plates 10 and 12 which are bolted to curved spacing elements 13 and 14, making a circular framework. Spacing element 13 is formed with a shank 15 for supporting the device in a tool carrier of the type found on a lathe. In the operation of my device,

the workpiece can be conveniently mounted on a lathe and my device mounted on the tool carrier, the slow longitudinal movement of the tool carrier carrying my device the length of the rotating workpiece in the manner customary in usual lathe operation.

The burnishing rolls 2 are mounted between plates 10 and 12, with roller bearings 17 on pins 16; and the burnishing roll 3 is mounted in a similar manner in a housing 18 formed in spacing element 14, by means of a U shaped carrier 19 which moves in guides 25 formed in the sides of the housing 18. The roll 3 is mounted in the carrier 19 on the pin 16 with the roller bearing 17 and with spacing washers 26 separating the roller 3 from the carrier 19. The three rolls 2 and 3 are accurately positioned at equal angles of 120° about the center of the workpiece 5, the diameter of which is of a predetermined size. This equal angle positioning is of the utmost importance because the pressure on the workpiece 5 is applied solely to burnishing roll 3, and without such equal angle positioning there will not be an equal distribution of working pressure among the rolls 2 and 3. Additional holes 27 are provided in order that the movable rolls 2 may be positioned properly in the equal angle position for a workpiece 50, whose predetermined diameter is less than that of workpiece 5. It is important to note that in each case the equal angle positioning of the rolls 2 and 3 is about the center of the workpiece and not the center of the frame 1 which only incidentally occurs in the case of workpiece 5. The change is quickly accomplished by unbolting and removing plate 10 or 12, and simply shifting pins 16 with the rolls 2 to the desired position, replacing the plate 10 or 12 and bolting it on. Of course, a series of holes could be provided to accommodate a number of sizes of workpieces. The rolls 2 and 3 are curved to present convex burnishing surfaces as is usual with burnishing rolls.

The pressure means 4 comprises a bifurcated pressure arm 30 which is pivotally attached to a lug 31 formed on spacing element 14, a bolt 33 attached to lug 32 on spacing element 14 and extending through an opening in the other end of arm 30, and a spring 34 positioned around bolt 33 and held down against arm 30 by a nut 35 and washer 36. At the opposite side of the arm 30 from that on which the spring 34 bears, there is a pressure limiting nut 36 and a lock nut 37 on bolt 33. The bifurcations of the pressure arm 30 are pivotally attached to the carrier 55

19 by bolts 38. The openings in the pressure arm 30 through which the bolts 38 pass are elongated as shown in the broken away portion of Fig. II. The pressure exerted on arm 30 by spring 34 is varied by moving the nut 35; the pressure is limited by the position of nut 36 which effectually prevents any further movement of arm 30 beyond a definitely fixed point. Consequently the rolls 2 and 3 will not carry the pressure down into soft spots in the workpiece 5. The spring 34 is calibrated as to pressure and a tram is used to measure the compression or height of the spring in order to provide a controlled operation pressure.

15 In operation, the rolls 2 are positioned according to the size of the workpiece which will be considered here as mounted on a lathe, the burnishing machine being mounted on the tool holder of the lathe. The pressure of spring 34 is set by manipulation of the adjusting nut 35, and a limitation for the operation of that pressure is set by manipulation of the adjusting nut 36 and lock nut 37. As the workpiece 5 revolves, the burnishing machine slowly moves the length of the workpiece 5, rolling out imperfections without accentuating the worn soft spots of the metal. The manner of changing the burnishing machine for a different size of workpiece has been indicated above.

30 While the preferred embodiment of my invention has necessarily been described in detail, many changes and modifications apparent to those skilled in the art may be made without departing from the spirit of my invention as hereinafter claimed.

35 Having thus described my invention, I claim:

1. A burnishing machine having a frame with a central work opening, burnishing rolls positioned on said frame at equal angles about the center of a workpiece of predetermined size, two of said rolls having capacity for movement to other positions to accommodate workpieces of other predetermined sizes without disturbing the

equal angle position of the rolls about the workpiece center, the third roll being attached to a carrier which is attached to the frame with capacity for guided radial movement, a pressure arm pivotally attached to said frame at one end, a spring pressure means attached to the other end of said arm and anchored to the frame, said pressure arm being attached to said carrier at a point intermediate the ends of the arm.

2. A burnishing machine according to claim 1, characterized further by the fact that said spring pressure means is calibrated to a predetermined pressure and anchored to the frame by a bolt, extending through said spring and secured to the top of said spring with a pressure varying nut, the bottom of the spring resting on top of the pressure arm, said bolt being threaded to accommodate a pressure limiting nut with a lock nut under said pressure arm, and the pressure varying nut at the top of said bolt.

3. A burnishing machine according to claim 1, characterized further by the fact that the frame is made up of spacing elements joined by removable plates, said plates mounting two of said rolls therebetween, the third wheel being mounted in a housing formed in one of said spacing elements.

4. A burnishing machine having a frame with a central work opening, two fixed burnishing rolls, a pressure roll having capacity for limited radial movement, said three rolls being positioned on said frame at equal angles about the center of a workpiece of predetermined size, a series of additional bearing holes in said frame on the lines passing through the center of each fixed roll and the center of the pressure roll, said fixed rolls having capacity for movement to said additional bearing holes to accommodate workpieces of other predetermined sizes preserving at the same time the equal angle position of the rolls about the workpiece, and a pressure means urging said pressure roll inwardly.

VICTOR P. SCHMIDT.