Oct. 31, 1933. R. A. HERCKELBOUT 1,932,893

MACHINE FOR GRINDING SPRINGS

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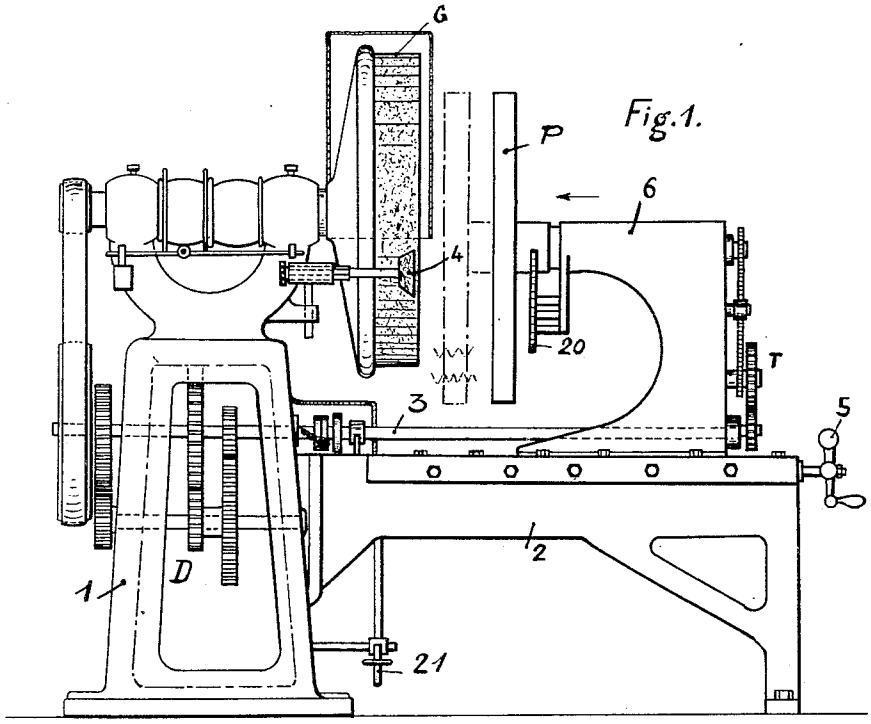


Fig. 1.

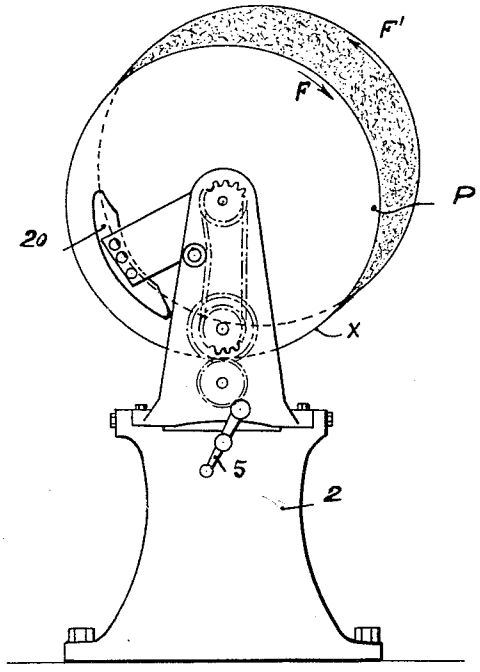


Fig. 2.

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Fig.3.

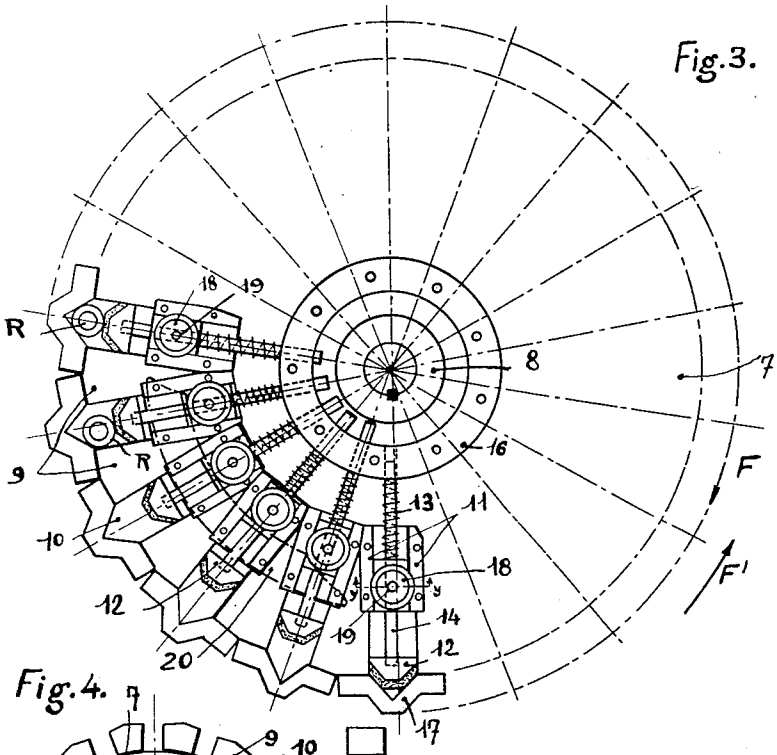


Fig.4.

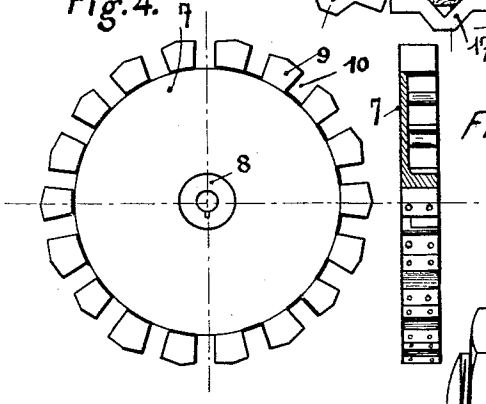


Fig.5.

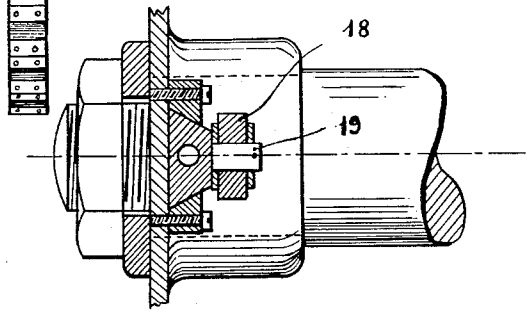


Fig.6.

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UNITED STATES PATENT OFFICE

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MACHINE FOR GRINDING SPRINGS

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Application June 3, 1931, Serial No. 541,895, and in France January 14, 1931

4 Claims. (Cl. 51—134)

This invention relates to improvements in grinding machines especially adapted for use for grinding the ends of spiral springs and other similar work, the object of the invention being to provide an improved machine of this kind which is simple in construction, is strong and durable, and which operates automatically.

With the above and other objects in view the invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the drawings:

Fig. 1 is a side view of a grinding machine the frame of which is extended for bearing the spring holder plate.

Fig. 2 is an end elevation of the same.

Fig. 3 is an enlarged detail elevation of the spring holder plate together with its clamping members.

Fig. 4 is a detail front elevation of the plate after removal of the said clamping members.

Fig. 5 is a detail side elevation partly in section of the plate.

Fig. 6 is a cross section on the line Y—Y of Fig. 3.

Fig. 1 shows a grinding machine the frame 1 of which is arranged to receive another integral frame 2, and also to contain the reduction gear D for driving a transmission shaft 3 at reduced speed, which is again reduced by a wheel gear T securing the drive of a plate P in the opposite direction to that of the grinding wheel. The plate P is out of center with the axis of the grinding wheel and rotates at the rate of one revolution against the normal speed regulation of the grinding wheel, that is one per one thousand revolutions for instance.

The plate P, which rotates slowly, is parallel with the grinding wheel G and presents the ends of the springs or other work pieces or objects to the face of the grinding wheel opposite the plate, as will be understood.

A stop 4 is provided and is adapted to be adjusted by means of a micrometric screw so as to get exactly the rate of grinding to be performed on the spring ends; 5 is a drive for the forward and back motion of the plate holder carriage 6 in which runs freely the spindle 3, the said carriage being provided with a slide. The plate P consists of a disc 7 provided with a nave 8 in its center and radial and equidistant bosses 9 on its periphery. The space 10 between two consecutive bosses makes up with the connected blades 11 a slide with a movable jaw 12 under the action of a spring 13 situated on the rod 14 between a ram 15 and a central guide crown 16 on which rests the end of the said spring. In front of each jaw 12 and closing the space 10, is a bent member 17 fixed on each side of the bosses and making a steady V-shaped jaw for retaining the spring R.

It will be understood that each spring is placed into a fixed jaw where it is kept up by the movable jaw 12 during the whole rotation of the plate opposite the grinding wheel by which all the springs are ground.

As shown by Figs. 3 and 6, the plate is provided with a radial device of similar systems, namely 18 in this instance, also giving a series of 18 springs being ground at each full revolution of the plate.

The automatic closing and opening means of the jaws in the successive range of the few jaws shown in Fig. 1 are the following:

On each ram 15 of the movable jaw is provided a roll 18 loosely rotated on its axis 19. On the other hand is fixed on the carriage 6 bearing the plate P a cam 20 which opens and closes alternately the jaws during the rotation of the plate. In reference to Fig. 3, the first jaw is shown closed being out of the cam. The plate having revolved in the direction of the arrow F, in relation to the arrow F' of the grinding wheel, this first jaw is opened owing to the fact that the roll 18 is raised on the cam, and as it traverses the same the jaw is quite opened. At this instant the operator engages one after the other the springs to be ground. However the springs are still not in contact with the wheel. The plate continues to revolve the roll rotates on the slope and then escapes same. The return spring 13 becomes free and presses again the movable jaw 12 against the spring R which being confined into the V-shaped member 17 and by three points is held up for the grinding. Before the spring is steadily clamped, the sinking of the said spring has been duly limited by the adjustment of the stop 4 in order to settle at its right value the grinding of the extreme spire to be ground. Furthermore the said stop is provided with a screw together with a slight movement for the purpose of the said adjustment.

As shown in Fig. 2, the translation of each spring is made on the whole working surface of the grinding wheel owing to the fact that same is out of centre, instead of being concentric with the plate. On the point X, the springs escape successively from the wheel, come near the cam which then lifts up one after the other the rolls

18 so as to successively open the jaws allowing thus the removal of the ground springs.

The machine is completed with a pedal by means of which the drive of the plate P may be instantaneously disengaged when a spring is not correctly disposed into the machine.

The same machine is adapted for grinding the ends of springs of various sizes, for instance the springs to be ground having from a maximal diameter from 1⅜ inch up to a ⅜ inch minimal diameter.

The dotted lines on the grinding wheel, the frame opening and disengaging device show the protecting covers against sparks, dust, &c.

Having now described the object of this invention and in which manner same is to be performed, what I claim is:

1. A grinding machine of the class described, comprising a grinding wheel mounted for rotation, a work carrier plate mounted for rotation and arranged parallel with and eccentrically with relation to the grinding wheel, means to rotate the grinding wheel and the plate, a fixed cam, a relatively fixed V-shaped jaw on the plate, radially arranged guides on the plate, a follower movable radially in said guides, a movable jaw connected to said follower, a rod extending inwardly from the follower, a spring active to momentarily move the follower outwardly and hence close the movable jaw against the fixed jaw, and a tappet element on the follower, the path of which is intercepted by the fixed cam so that as the movable jaw passes the cam the latter, by engagement with the tappet withdraws the movable jaw to open position to release the work and against the tension of the said spring.

2. A grinding machine as claimed in claim 1, in which the plate is provided with a plurality of fixed jaws, movable jaws, followers, guides for the followers, springs to project the movable jaws, and tappets on the followers for operation successively by the fixed cam.

3. A grinding machine as claimed in claim 1, in which the tappet element of the follower is a roller mounted for rotation and for engagement with the cam.

4. A grinding machine as claimed in claim 1, including an adjustable gage to predetermine the extend of grinding to be performed on the ends of the work.

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