

Sept. 29, 1931.

C. L. HAWES

1,825,455

POLISHING AND GRINDING MACHINE

Filed April 10, 1926

2 Sheets-Sheet 1

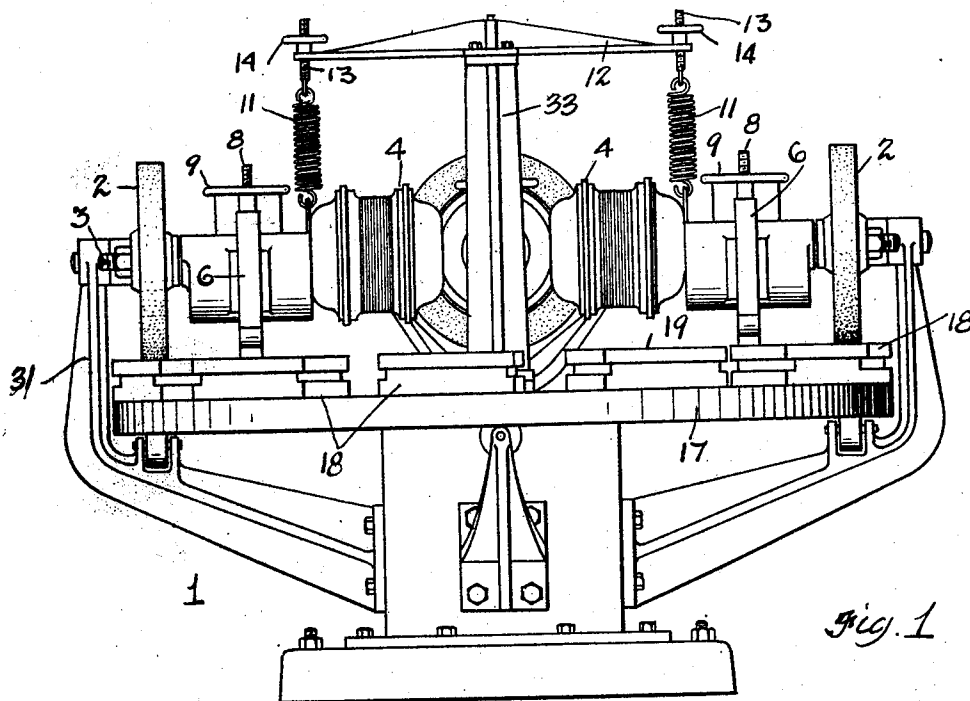


Fig. 1

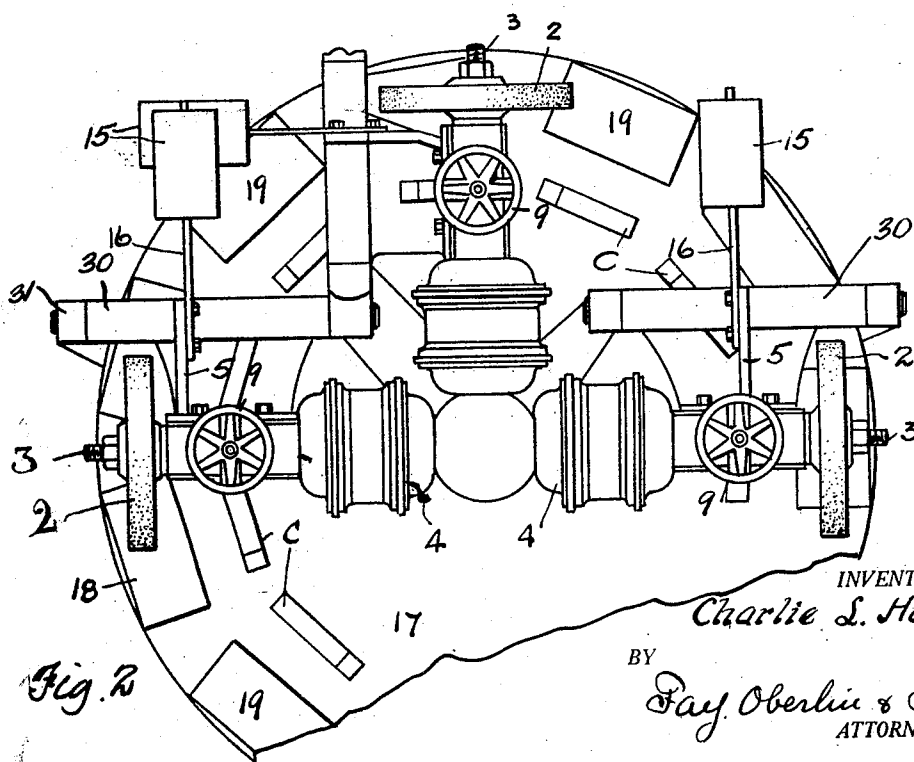


Fig. 2

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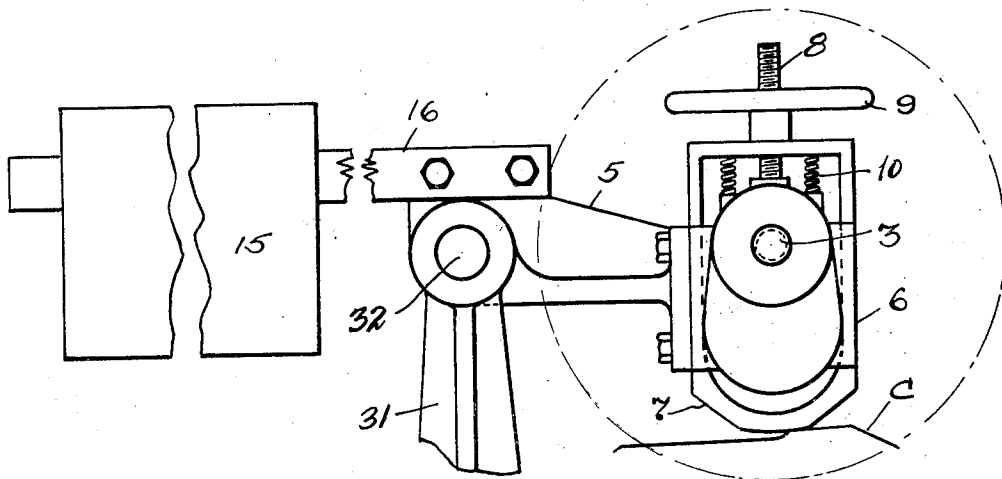


Fig. 3

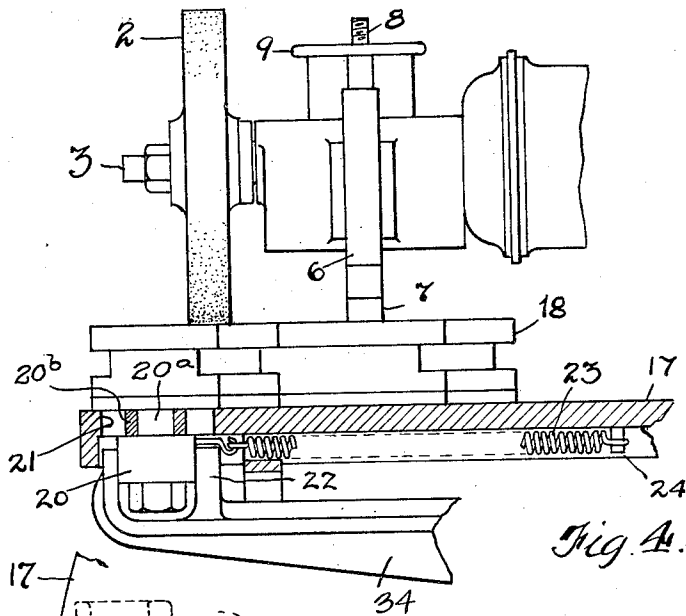


Fig. 4.

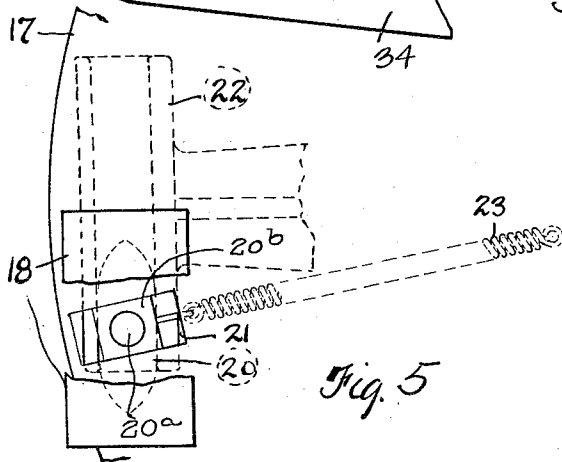


Fig. 5

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POLISHING AND GRINDING MACHINE

Application filed April 10, 1926. Serial No. 101,098.

This invention relates to grinding and polishing machinery, and more particularly to machines for grinding and shaping to desired contour. Among the objects of the invention are the provision of a mounting for the grinding wheel which allows of adjustment of depth of grinding, and automatic control of the contour followed. A further object is the provision of driving means which readily allows of all movements necessary with the grinding element. A still further object is the provision of work-holding means capable of accommodating objects of various size and shape. A further object also is the provision of guiding means for controlling the direction of movement of the work-holders. Other objects will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawings and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but several of the various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a front elevation of a machine embodying my invention; Fig. 2 is a plan view showing a counter-balancing arrangement without springs; Fig. 3 is an elevational detail on larger scale, of the mounting shown in Fig. 2; Fig. 4 is an elevational detail showing further features of the work-holding means; and Fig. 5 is a detail in plan showing the relation of the guides therein, the central portion of the work holder being broken away to show the subjacent structure.

In its general aspects, the machine comprises grinding or polishing elements and work-holding means, these being supported on a base 1 of convenient or desired form. The grinding or polishing wheels 2 are carried by spindles 3 which are also equipped with drive motors 4, the spindles being mounted on levers 5, or rather frames 6 on the levers. Each lever 5 is mounted on a shaft

30 carried in the upper ends of supports 31 as at 32. Each grinding wheel assembly with its spindle and motor is thus rockable and in a manner to prevent lateral tipping. The frames 6 have shoes 7 for a purpose to be referred to hereinafter, and the spindles are adjustable in the frames by virtue of the screw 8 with hand control wheel 9, springs 10 being interposed for the reverse take-up. Counter-balancing means are provided for the grinding wheel assembly, such means including springs 11 extending from a convenient lug on the motor and grinding wheel assembly to brackets 12 attached to standards 33, an adjustment screw 13 and hand wheel 14 being interposed for the regulation of tension as may be required. Along with the resilient or spring elements as counter-balancing means, or instead of such elements where desired, I may also provide counter-balancing weights 15, these being carried by arms 16 from the levers 5. Desirably the grinding wheel assemblies are arranged about and above a traveling carrier, such carrier being preferably in the form of a rotary table 17 which may be driven in any convenient manner, for instance, by an electric motor in the base of the machine. Placed upon the traveling carrier in suitably spaced relation are work-holders 18 which in their preferred form are magnetically controlled and have plain upper faces 19 for the reception of objects to be operated upon by the grinding or polishing wheels. These work-holders may be mounted in fixed relation on the traveling carrier if desired, but in some instances I prefer to arrange the holders in a manner to control their direction of movement while passing under the grinding or polishing wheels so as to maintain them in parallelism with such wheels. For the accomplishment of this, I mount the work-holders or magnetic chucks slidably and oscillably upon the traveling carrier, a projection being provided therebelow in the form of a shoe 20, the connection between the shoe and the chuck 18 being had by a neck 20a through a slide 20b mounted such as to allow of limited motion in the radial slots 21 arranged about the rotary table. Coacting with such projections

or shoes are guides 22 which are supported in relation to the table on arms 34 rigidly connected to the base. Take-up tension springs 23 extend from a convenient point of attachment on the table, for instance, the lug 24, to the projection or shoe and serve to maintain the shoe in position subject to the controlling action of the guide 22.

Upon the travelling carrier 17, I also provide a control or cam means C for governing the path of the grinding elements as respects their up and down movement in contour; such cam means being shaped with the contour of the finished article it is desired to produce, and as will be seen, the shoe 7 in encountering such cam control, will correspondingly take a path of motion in a vertical plane and control correspondingly the action of the grinding wheel upon the work carried by the work-holder.

As will thus be seen, articles to be operated upon may be placed by an attendant upon the work-holders or magnetic chucks 18 as they pass along in succession and such objects are carried in turn to the grinding or polishing wheels, where in response to the control of the cam for governing contour, the objects are subjected to a grinding action of depth and form as thereby determined, the counter-balanced mounting of the grinding wheel assembly allowing readily of such movements as necessary; and finally in the further travel of the carrier, the articles are brought to a point of discharge where the operator may remove them and refill the work-holders.

It will be understood that grinding wheels or polishing wheels can be used interchangeably in the assemblies here provided and in the claims hereinafter, such interchangeability and equivalency is contemplated in the expression "grinding wheel".

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a machine of the character described, an electric motor and a grinding wheel, a floating frame therefor, means for compensating the weight of said frame and contents, means for adjusting the grinding wheel relative to said frame, and travelling work carrying means cooperating with said grinding wheel.

2. In a machine of the character described, an electric motor and a grinding wheel on the motor shaft, a floating frame therefor, means for compensating the weight of said frame and contents, means for adjusting the grinding wheel relative to said frame, a control

shoe carried with said grinding wheel, a travelling-work carrying means, and means on said work-carrying means for actuating said control shoe.

3. In a machine of the character described, an electric motor and a grinding wheel on the motor shaft, a pivotally mounted frame therefor, means for adjusting said grinding wheel in said frame, a counterbalance, a control shoe carried with said grinding wheel, a travelling-work-carrying means, and means on said work-carrying means for actuating said control shoe.

4. In a machine of the character described, a grinding wheel, a pivotally mounted frame for said grinding wheel, a rotary table, a control shoe carried by said frame to the centerward side of said grinding wheel, work-carrying chucks on said table in the path of said grinding wheel, and means also on said table for actuating said control shoe.

5. In a machine of the character described, an electric motor and a grinding wheel on the motor shaft, a counterbalance, a pivotal mounting for said motor and grinding wheel, a control shoe carried with said grinding wheel, a rotary table, work-holding chucks on said table in the path of said grinding wheel, and means also on said table for actuating said control shoe.

6. In a machine of the character described, a plurality of grinding wheels, a pivotally mounted frame for each said wheel, a control shoe carried with each said grinding wheel, a rotary table, work-holders on said table in the path of said grinding wheels, and means also on said table in the path of said control shoes for actuating the same.

7. In a machine of the character described, a plurality of electric motors with a grinding wheel on each motor shaft, a counterbalance for each said motor and wheel, a pivotal mounting therefor, a control shoe carried with each said grinding wheel, a rotary table, work-holders on said table, and projections also on said table for actuating said control shoes.

8. In a machine of the character described, a plurality of electric motors each with a grinding wheel on the motor shaft, a pivotally mounted frame for each said grinding wheel, means for adjusting each grinding wheel in its frame, a control shoe carried with each said grinding wheel, a rotary table, work-holders on said table in the path of said grinding wheels, and a series of projections on said table adjacent said work-holders and in the path of said control shoes.

9. In a machine of the character described, a plurality of electric motors each with a grinding wheel on the motor shaft, a pivotally mounted frame for each said grinding wheel, a counterbalance therefor, screw-threaded means for adjusting each grinding wheel in its frame, a control shoe carried

with each said grinding wheel, a rotary table,
work-holders on said table in the path of said
grinding wheels, and a series of projections
on said table in the path of said control shoes
5 for actuating the same.

Signed by me this 9th day of April, 1926.

CHARLIE L. HAWES.

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