A. L. PRICE.

GRINDING MACHINE.

APPLICATION FILED FEB. 11, 1914.

1,118,798.

Patented Nov. 24, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

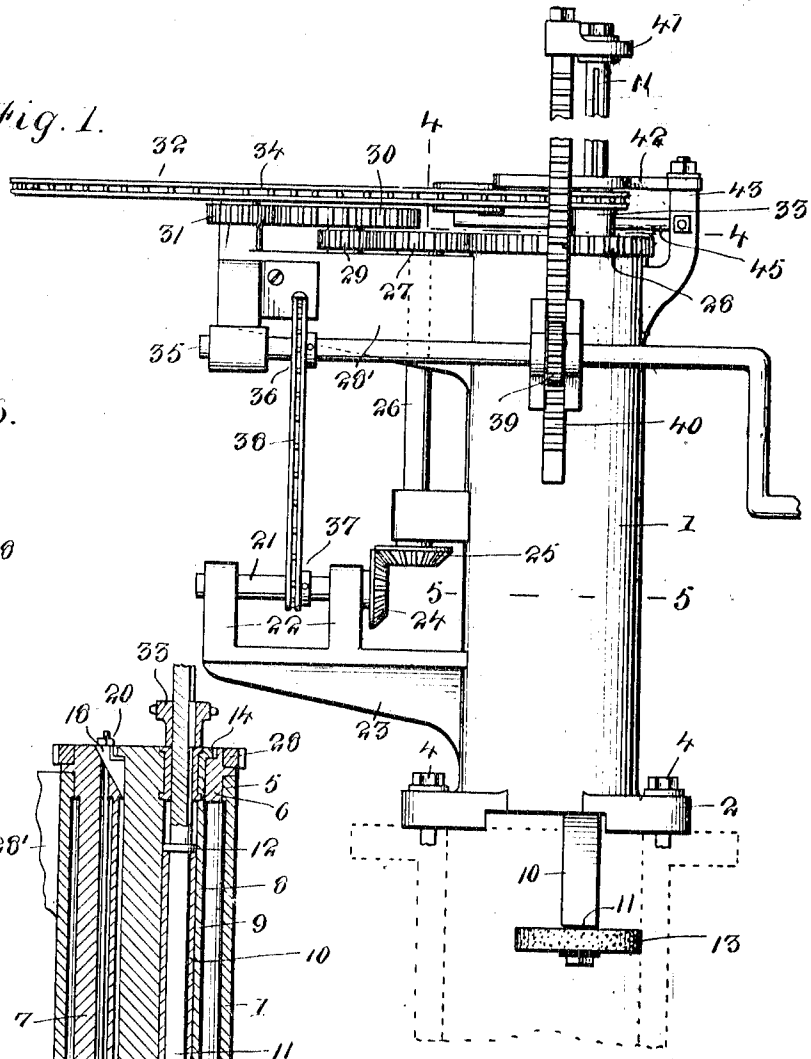


Fig. 6.

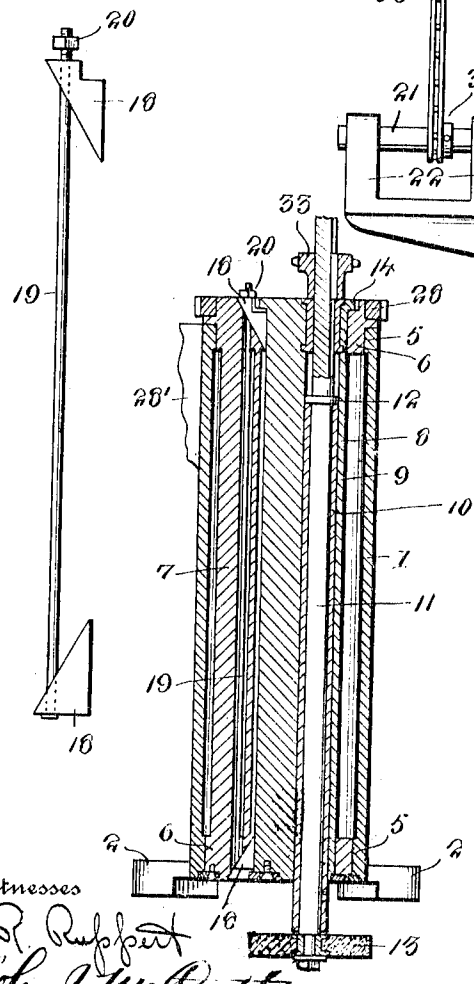


Fig. 3.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

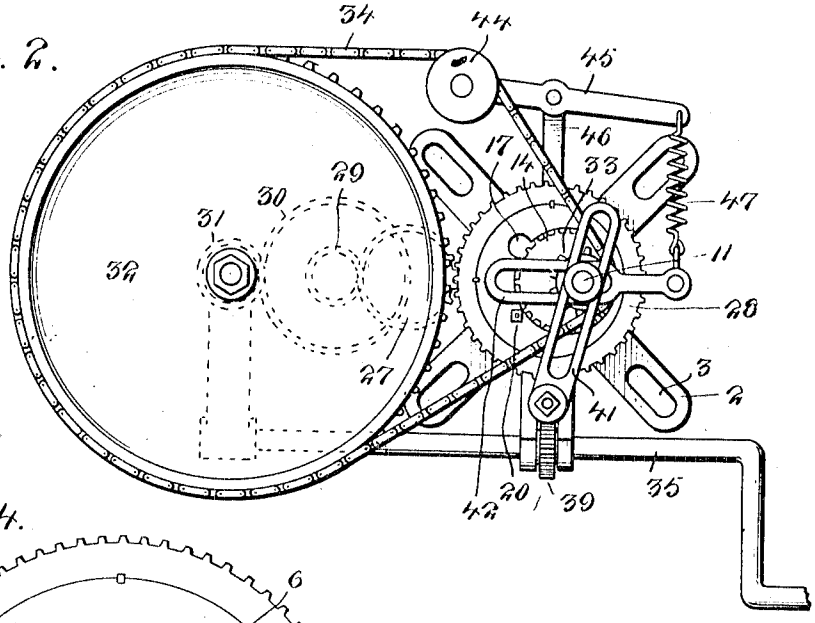


Fig. 4.

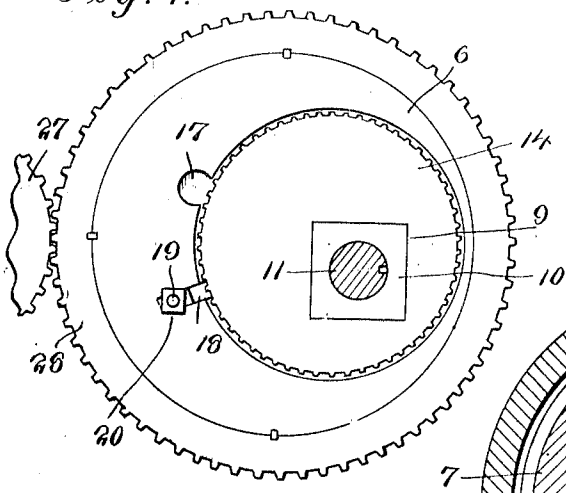


Fig. 5.

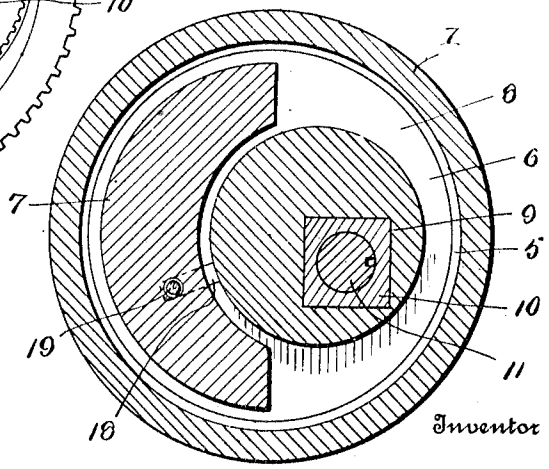
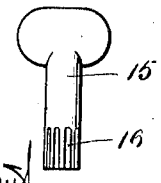


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

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GRINDING-MACHINE.

1,118,798. Specification of Letters Patent. Patented Nov. 24, 1914.

Application filed February 11, 1914. Serial No. 818,101.

To all whom it may concern:

Be it known that I, ALFRED L. PRICE, a citizen of the United States, residing at Macon, in the county of Bibb and State of Georgia, have invented new and useful Improvements in Grinding-Machines, of which the following is a specification.

This invention relates to improvements in grinding machines and has particular application to a machine of the class described for grinding engine cylinders so as to remove any imperfections therefrom.

In carrying out the present invention, it is my purpose to provide a grinding machine wherein the abrading tool will travel bodily in a circular path so as to effectively grind a circular object and wherein the tool will be moved longitudinally so that the entire surface of the object being ground will be acted upon. It is also my purpose to provide a machine of the class described wherein the frictional contact between the abrading tool and the surface to be cleaned may be varied so that any wear on the abrading element incident to the driving operation may be compensated for. Furthermore, I aim to provide a machine of the type set forth which will be capable of manual operation and which may be connected up with a source of power when such is desired and wherein the abrading tool will revolve "planet fashion" so as to travel around the surface of a cylindrical object to effect the grinding thereof, and move longitudinally of such object so as to insure the complete grinding thereof.

A further object of the invention is the provision of a grinding tool which may be readily and conveniently connected with the cylinder to be ground; which will be entirely automatic in operation and which may be operated and maintained at a minimum expense.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter set forth in and falling within the scope of the claims.

In the accompanying drawings; Figure 1 is a view in side elevation of a grinding machine constructed in accordance with the present invention, the same being shown as applied to a cylinder. Fig. 2 is a top plan view of the machine. Fig. 3 is a vertical sectional view therethrough. Fig. 4 is a horizontal sectional view on the line 4—4 of Fig. 1. Fig. 5 is a similar view on the line 5—5 of Fig. 1. Fig. 6 is a view in elevation of the wedges and connecting rod. Fig. 7 is a view in elevation of the adjusting key.

Referring now to the drawings in detail, 1 designates a cylindrical housing constructed of any suitable material and provided at one end with radially extending feet 2 formed with elongated slots 3 adapted to receive securing bolts 4 whereby the housing may be secured to the open end of the cylinder to be ground. Formed on the inner wall of the housing 1 at the opposite ends thereof are annular flanges 5, 5, while fitted within the flanges 5, 5, and capable of rotation therein are cylindrical collars 6, 6, connected to each other for simultaneous movement through the medium of a web 7 partially circular in cross section and disposed within the housing 1. Mounted eccentrically within the collars 6, 6 and arranged longitudinally of the housing 1 is a circular sleeve 8 formed eccentrically with a longitudinal passage 9 non-circular in cross section and slidably mounted within the passage 9 is a tube 10 having the outer wall thereof corresponding to the cross sectional contour of the passage and the inner wall circular in cross section. One end of this tube 10 is disposed within the passage 9, while the opposite extremity thereof normally projects out of the passage. Disposed within the tube 10 and adapted for rotation therein is a shaft 11 capable of sliding movement within the passage 9 and equipped, adjacent to the inner end of the tube 10 with a collar 12 adapted to bear upon the said end of the tube so that the latter will move outwardly of the passage in the longitudinal movement of the shaft, thereby reinforcing the shaft. Suitably fastened upon the end of the shaft 11 adjacent to the outer extremity of the sleeve is an abrading tool in the form of a wheel 13 adapted to revolve in the rotation of the shaft and travel longitudinally of its axis in the longitudinal movement of the shaft.

In practice, the housing 1 is fastened to the open end of the cylinder as illustrated in Fig. 1, and the periphery of the abrading wheel 13 frictionally engages the inner wall of the cylinder so that in the rotation of the abrading wheel under the action of the shaft the inner wall of the cylinder will be ground. In order to vary the frictional engagement

between the inner wall of the cylinder and the periphery of the abrading wheel the sleeve 8 is rotated within the collars 6, 6 and, owing to the shaft 11 being eccentrically mounted within the sleeve, the periphery of the grinding wheel is moved toward or away from the wall of the cylinder according to the direction of movement of the sleeve. For the purpose of so rotating the sleeve I employ, in the present instance, a gear wheel 14 fixed to the outer end of the sleeve, that is the end of the sleeve remote from that adjacent to the cylinder being ground, and seated within a recess formed in the adjacent collar 6, and a key 15 having the stem thereof formed with teeth 16 and adapted to seat within a recess 17 formed in the collar 6 contiguous the periphery of the gear wheel 14, the teeth 16 meshing with the teeth of the gear 14. By means of this construction, it will be seen that when the stem of the key is inserted within the recess 17 and the teeth 16 in mesh with the teeth of the gear 14 and the key rotated, the gear 14 and the sleeve 8 will be revolved with the effect to increase or decrease the frictional contact between the periphery of the abrading wheel and the wall of the cylinder, according to the direction of rotation of the key. To maintain the sleeve 8 stationary within the collars 6, 6 subsequent to the rotation of the sleeve under the action of the key any suitable means may be employed. In the present instance, wedge blocks 18, 18 are interposed between the inner walls of the rings or collars 6, 6 and the adjacent extremities of the sleeve 8 and these blocks are interconnected through the medium of a rod 19 screw threaded at one end and equipped with a nut 20. Thus, when the nut 20 is tightened the wedge blocks 8 are drawn into the collars 6, 6 with the effect to bind against the sleeve thereby effecting a rigid connection between the sleeve and the collars.

In the embodiment of my invention selected for illustrative purposes, the driving mechanism for the shaft 11 carrying the abrading wheel comprises a shaft 21 journaled in alining bearings 22 carried by an arm 23 projecting outwardly from the housing 1 and suitably connected thereto, or formed integral therewith. This shaft 21 is arranged at right angles to the housing and is adapted to be connected up with a source of power, while upon one end of such shaft is a bevel gear 24 meshing with a similar gear 25 fast upon one end of a shaft 26 journaled in bearings carried by the housing 1, the shaft 26 being arranged in parallelism with the housing and at right angles to the shaft 21. The end of the shaft 26 opposite that equipped with the bevel gear 25 is disposed in proximity to the collar 6 formed with the aperture 17 and such end of the shaft is equipped with a gear 27 meshing with the teeth of a gear ring 28 surrounding the outer end of the adjacent collar and fixed thereto. Projecting outwardly from the bearing of the shaft 26 adjacent to the gear 27 is an arm 28′ and projecting upwardly from such arm adjacent to the periphery of the gear 27 is a stub shaft upon which is rotatably mounted a pinion 29 meshing with the gear 27 and a gear 30 fixed to the pinion 29. A second stub shaft extends upwardly from the arm 28′ at the outer end thereof and mounted upon the last-mentioned shaft is a pinion 31 meshing with the gear 30, and a sprocket wheel 32 fixed to the pinion 31, while splined upon the shaft 11 is a sprocket wheel 33 and trained over the sprocket wheels 32 and 33 is an endless chain 34 adapted to revolve the shaft 11 in the rotation of the sprocket wheel 32. By means of this construction, it will be seen that when power is applied to the shaft 21, such power will be imparted to the shaft 11 and the latter revolve with the effect to actuate the abrading wheel within the cylinder.

In order to slide the shaft 11 longitudinally so that the abrading wheel will traverse the wall of the cylinder lengthwise thereof any suitable mechanism may be employed. In this instance, a shaft 35 is journaled in alining bearings carried by the housing 1 and the outer end of the arm 28′ respectively. Fixed upon the shaft 35 is a sprocket wheel 36 while fixed upon the shaft 21 is a sprocket wheel 37 and trained over the sprocket wheels 36 and 37 is an endless chain 38 by means of which power is imparted to the shaft 35 in the operation of the shaft 21. Fixed upon this shaft 35 is a pinion 39 meshing with a rack bar 40 and one end of the rack bar 40 is fixed to the outer end of the shaft 11 through the medium of an arm 41, while the rack bar is held in engagement with the pinion 39 through the medium of a suitable guide within which the rack bar is capable of sliding movement. Thus, as the shaft 21 rotates to revolve the shaft 11 and actuate the abrading wheel within the cylinder, motion is transmitted to the shaft 35 to actuate the rack bar 40 and so slide the shaft 11 whereby the wheel 13 moves longitudinally of the cylinder as well as circumferentially thereof.

It is to be understood, of course, that the driving mechanism for rotating the shaft and the mechanism for sliding the shaft are so timed relatively to each other that the abrading wheel moves longitudinally of its axis at proper intervals with respect to the planetary motion thereof. In the present instance, the shaft 11 works within an arm 42 fastened to the upper end of a bracket 43 carried by the housing 1 and bearing against the sprocket wheel 33, such arm acting to hold the sprocket wheel in proper position. One run of the chain 34 is preferably

trained over a pulley 44 carried by one end of a lever 45 pivoted between its ends for swinging movement upon an arm 46 extending outwardly from the housing 1, a coiled contractile spring 47 having one end secured to the free end of the lever 45 and the opposite end connected with the bracket 43, such spring acting upon the lever 45 to maintain the chain 44 taut.

From the foregoing description taken in connection with the accompanying drawings, the construction, mode of operation and manner of employing my improved grinding machine will be readily apparent. It will be seen that I have provided a grinding machine whereby engine cylinders and other circular objects may be ground to remove any imperfections therefrom and wherein the friction between the abrading tool and the surface to be ground may be varied and wherein the abrading tool will be moved over the entire surface to be cleaned automatically.

While I have herein shown and described one preferred form of my invention by way of illustration, I wish it to be understood that I do not limit or confine myself to the precise details of construction herein described and delineated, as modification and variation may be made within the scope of the claims without departing from the spirit of the invention.

I claim:

1. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, and means for actuating said shaft.

2. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, and means for sliding said shaft longitudinally within said sleeve.

3. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, means for sliding said shaft longitudinally within said sleeve, and means for actuating both of said first means simultaneously.

4. In a grinding machine for cylinders, a cylindrical housing, collars journaled within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings and capable of rotation therein, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, and means for rotating said sleeve within said collars whereby the eccentricity of said shaft may be varied.

5. In a grinding machine for cylinders, a cylindrical housing, collars journaled within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings and capable of rotation therein, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, means for rotating said sleeve within said collars whereby the eccentricity of said shaft may be varied, and means for sliding said shaft within said sleeve.

6. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings and capable of rotation therein, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, means for revolving said sleeve within said collars, and means for holding said sleeve against rotation.

7. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings and capable of rotation therein, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, means for revolving said sleeve within said collars, and wedge blocks interposed between said sleeve and collars and acting to hold the sleeve normally against turning movement within the collars.

8. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings and capable of rotation therein, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said collars, means for actuating said shaft, means for revolving said sleeve within said collars, wedge blocks interposed between said sleeve and collars and acting to hold the sleeve normally against turning movement within the collars, and a rod connecting said wedge blocks and controlling the action of said blocks.

9. In a grinding machine for cylinders, a cylindrical housing, collars within said housing and formed with eccentric openings, a sleeve within said openings, a shaft

journaled within said sleeve, an abrading tool connected to one end of said shaft, means for revolving said shaft, a rack bar parallel with said shaft, a connection between one end of said rack bar and shaft, a pinion meshing with said bar, means for rotating said pinion to slide said shaft within the sleeve, means for rotating said collars, and driving means for operating said last means and said last shaft simultaneously.

10. In a grinding machine for cylinders, a cylindrical housing, means for connecting said housing to the open end of the cylinder, collars within said housing and spaced apart and formed with eccentric openings, a sleeve within said openings, a shaft journaled within said sleeve, an abrading tool connected to one end of said shaft, means for rotating said shaft, means for sliding said shaft longitudinally within said sleeve, and means for rotating said collars.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED L. PRICE.

Witnesses:
CHAS. T. MILLER,
WILEY HADGER.