May 3, 1932. G. ENOCHSON 1,857,047

GRINDING MACHINE

Filed Sept. 30, 1929 2 Sheets-Sheet 1

Fig. 1.

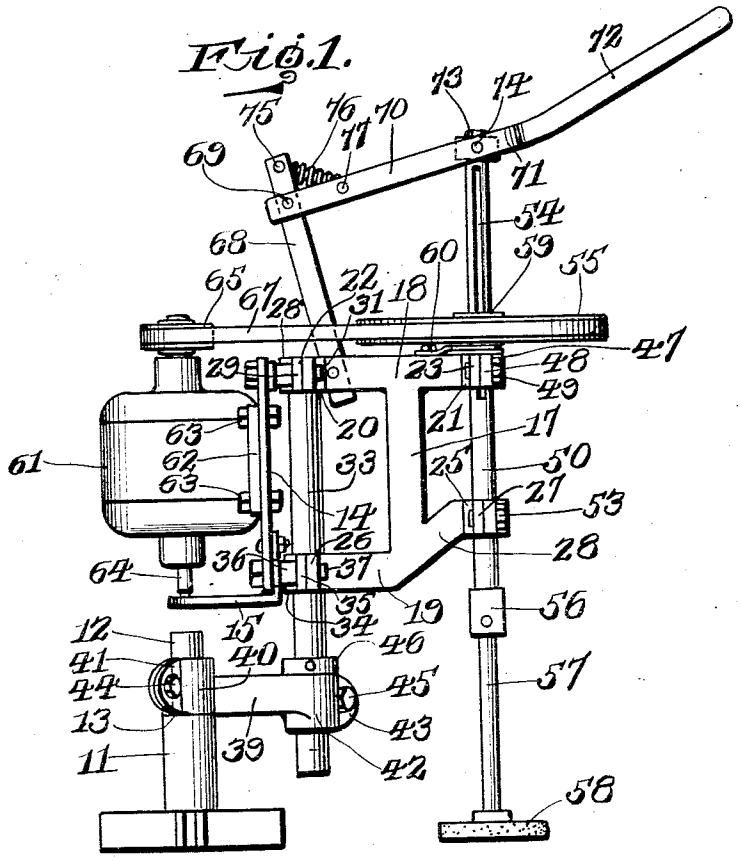

Fig. 2.

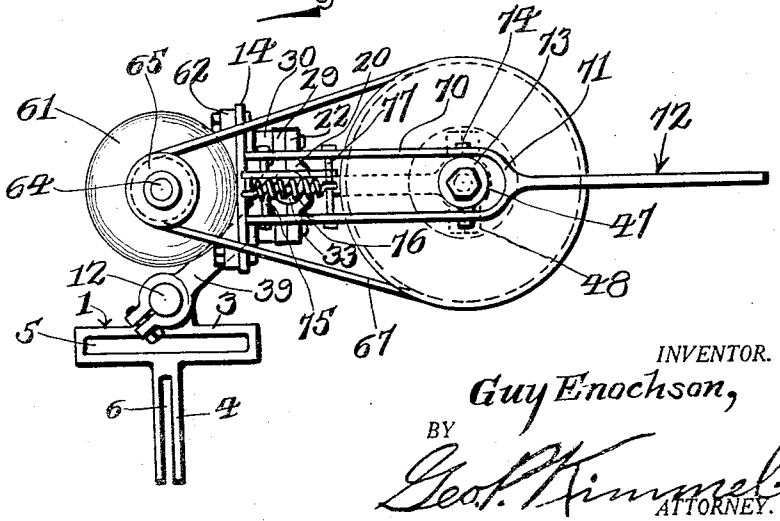

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Fig. 3.

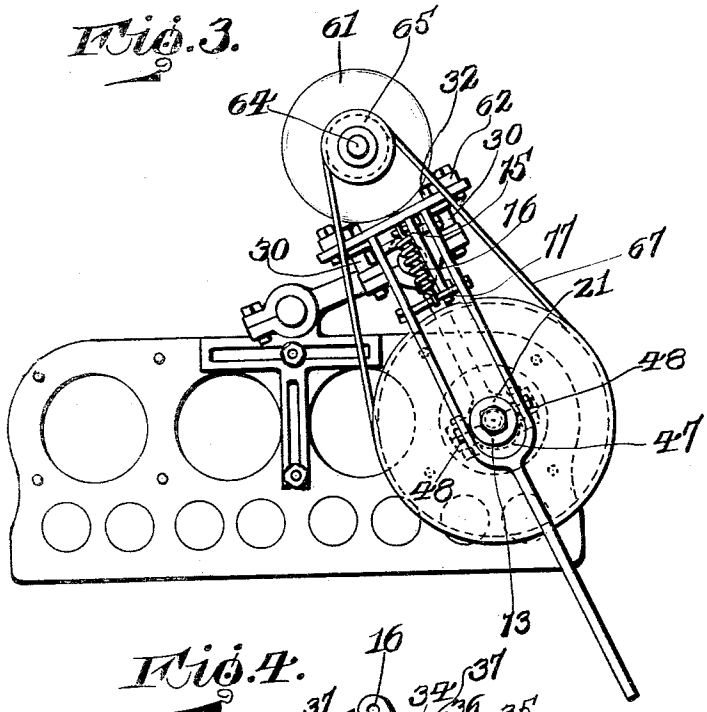
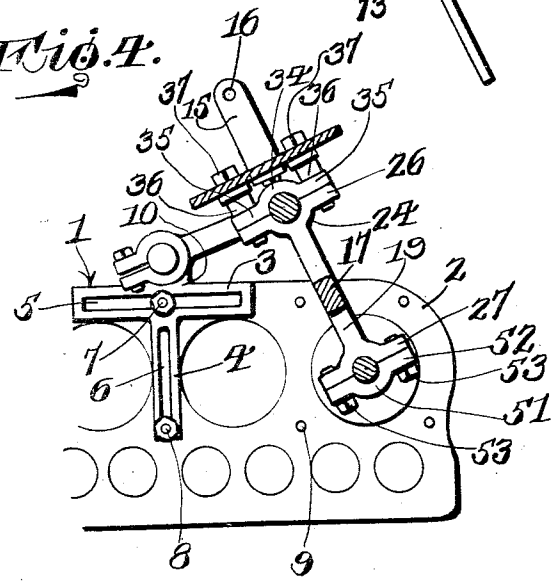


Fig. 4.



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1,857,047

UNITED STATES PATENT OFFICE

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GRINDING MACHINE

Application filed September 30, 1929. Serial No. 396,293.

This invention relates to a grinding machine designed primarily for grinding the walls of cylinders of internal combustion engines, but it is to be understood that a machine, in accordance with this invention may be employed for grinding valve seats or for any other purposes for which it is found applicable, and the invention has for its object to provide, in a manner as hereinafter set forth, a machine of the class referred to including means for anchoring it to an engine block and further including means for adjustably positioning the abrading or grinding element thereof for action upon the wall of any one of the cylinders of the block without disconnecting the machine from the latter.

A further object of the invention is to provide, in a manner as hereinafter referred to, a machine of the class referred to including a supporting frame and means to enable the vertical and angular adjustment of the frame when occasion requires to position the driving spindle thereof at the desired point with respect to the object which is to be ground.

A further object of the invention is to provide, in a manner as hereinafter set forth, a machine of the class referred to including means for anchoring it to an engine block and further including means to permit of the abrading or grinding element of the machine acting upon all of the cylinder walls of the block without disconnecting the machine from the latter.

A further object of the invention is to provide, in a manner as hereinafter set forth, a machine of the class referred to including a verticaly adjustable, spring controlled driving spindle for the abrading or grinding element of the machine whereby the lowering of the latter is had against the action of the controlling spring for the spindle and further whereby the abrading element can be quickly removed when not active with respect to the cylinder wall.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a grinding machine for the purpose referred to which is simple in its construction, strong, durable, portable, thoroughly efficient in its use, conveniently adjusted, quickly anchored in stationary position when desired to be used, readily assembled, and comparatively inexpensive to set up and designed to be used for driving any type of cylinder hone for grinding purposes.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described, and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which fall within the scope of the claims hereunto appended.

In the drawings wherein like reference characters denote corresponding parts throughout the several views:—

Figure 1 is a side elevation of a grinding machine in accordance with this invention.

Figure 2 is a top plan view thereof.

Figure 3 is a top plan view of the machine anchored to an engine block.

Figure 4 is a sectional plan of the machine anchored to an engine block, the latter being shown fragmentary in plan.

The machine includes a foot piece referred to generally at 1 and which is adapted to be adjustably connected to the engine block 2. The foot piece 1 includes T-shaped body formed of a longitudinally extending slotted part 3 and a horizontally disposed slotted part 4 which is integral with the inner side of the part 3 centrally thereof. The slot in the part 3 is indicated at 5 and that in the part 4 at 6. The slots 5, 6 do not communicate with each other. The foot piece 1 is adapted to be positioned upon the top of the engine block 2 and is adjustably secured therewith by holdfast devices 7, 8, the former extending through the slot 5 and the latter through the slot 6. The holdfast devices engage in a pair of sockets provided in the engine block for the reception of holdfast devices, not shown, for fixedly securing the engine head, not shown in position. The sockets or openings which receive the holdfast devices for securing the engine head to the block 2 are indicated at 9. As shown in

Figure 4 the foot piece 1 is detachably and adjustably secured to the engine block 2 by the engagement of the holdfast devices 7, 8 in a pair of aligning sockets or openings 9. The holdfast devices 7, 8 may be of any suitable form, but preferably consist of bolts carrying nuts on their upper ends, the bolts being of the threaded, non-head type.

The foot piece 1 further includes an outwardly directed offset part 10 which is integral with the outer side of part 3 centrally thereof, and integral with the part 10 is a vertically disposed post 11 having a reduced upper portion 12, which provides a shoulder 13.

The machine further includes a supporting frame consisting of a vertically disposed plate 14 provided centrally of its bottom with an outwardly directed, right angularly disposed adjustable arm 15, a bracket member extending at right angles to the plate 14, disposed centrally with respect thereto and consisting of a vertical arm 17 which merges into top and bottom arms 18, 19 respectively.

The plate 14 and arm 15 provides a motor carrier.

The top arm 18 at its ends is formed with concaved parts 20, 21 which are oppositely disposed. The part 20 is formed with oppositely extending flanges 22. The part 21 is provided with oppositely extending flanges 23. The lower arm 19 has its ends formed of concaved parts 24, 25 which are oppositely disposed. Projecting from the part 24 are oppositely extending flanges 26, and projecting from the part 25 are oppositely extending flanges 27. The outer portion of the arm 19, which is indicated at 28 is arranged above the inner portion of such arm. See Figure 1.

Positioned against the part 20 is a semi-circular bearing cap 28′ laterally flanged as at 29 to abut the flanges 22. Extending outwardly from the flanges 29 are tubular extensions 30 which abut against the inner face of plate 14. The flanges 22 and 29 are connected together, and the extension 30 secured to the plate 14, by holdfast devices 31 which extend through plate 14, extensions 30 and flanges 29 and 22. The bearing cap 28′ coacts with the part 20 to receive a vertically disposed post 33.

Positioned against the part 24 is a semi-circular bearing cap 34, laterally flanged as at 35. The flanges 35 oppose the flanges 26. Projecting from the flanges 35 are tubular extensions 36 which abut against the inner face of the plate 14 near the bottom of the latter. Extending through plate 14, extensions 36 and flanges 35 and 26 are holdfast devices 37. The cap 34 coacts with the part 24 for the passage of the post 33 and the latter is tightly clamped to the top and bottom bars 18, 19 respectively of the bracket member. Holdfast devices 31 secure flanges 22, 28 together, as well as the bracket member to plate 14. The holdfast devices 31, 37 act to clamp the bracket member to the post 33. The post 33 is vertically adjustable to position the supporting frame of the machine at the desired height with respect to the work to be operated upon.

The post 33 is adjustably supported from the post 11 by an arm 39 provided at one end with a split collar 40 formed with a pair of flanges 41 and at its other end with a split collar 42 provided with a pair of flanges 43. Extending through the flanges 41 is a holdfast device 44 and extending through the flanges 43 is a holdfast device 45. The collar 40 is mounted on the reduced portion 12 of the post 11 and seats upon the shoulder 13. The collar 42 embraces the lower portion of the post 33. The holdfast device 44 in connection with the flanges 41 tightly clamps the collar 40 to the reduced portion 12 of post 11. The holdfast devices 45 in connection with the flanges 43 tightly clamp the collar 42 to the lower portion of the post 33.

Carried by the post 33 is an adjustable stop collar 46 which seats upon the top of collar 42. The adjustment of collar 46 relative to post 33 provides for the positioning of the supporting frame of the machine at the desired point. Further when the collar 40 is released from binding engagement with the reduced portion 12 of the post 11 the arm 39 can be swung at any desirable inclination with respect to post 11 to position the supporting frame at an angle with respect to the latter.

Positioned against the part 21 is a semi-circular bearing cap 47 provided with flanges 48 which abut flanges 23. The flanges 48 are secured to the flanges 23 by the holdfast devices 49. The cap 47 in connection with the part 21 provides an upper bearing for a driving spindle 50. Positioned against the part 25 is a semi-circular bearing cap 51 provided with flanges 52 which abut flanges 27 and are fixedly secured therewith by the holdfast devices 53. The cap 51 in connection with the part 25 provides a lower bearing for the driving spindle 50.

The upper portion of the spindle 50 is formed with a lengthwise extending groove 54 for the reception of a key carried by a driving pulley 55 for spindle 50. The lower end of the spindle 50 is formed with a socket member 56 to receive the shank 57 of an abrading or grinding element or tool 58. The shank 57 is detachably connected to the member 56 and by this arrangement provision is had whereby tools of different diameters can be detachably secured to the spindle 50 to be driven thereby.

The driving pulley 55 is arranged over the top bar 18 of the bracket member and the hub of the pulley is indicated at 59. Carried by the top bar 18 of the bracket member and

engaging in the hub 59 is a holder device 60 to prevent the pulley 55 moving upwardly with respect to the spindle 50. The hub 59 of the pulley 55 is peripherally grooved to receive the holder member 60.

Opposing the plate 14, is a motor 61 preferably of the electric type, and which has its housing formed with oppositely extending, laterally disposed webs 62 or which may be a plate and said webs 62 are fixedly secured to the plate 14 by the holdfast devices 63. The shaft of the motor is indicated at 64 and has its lower end extend to the outer end of the arm 15. The shaft 64 has its upper end provided with a pulley 65 and leading therefrom is a driving belt 67 for the purpose of operating the pulley 65.

Secured to the top bar 18 of the bracket member is an upstanding movable support 68 which inclines in a direction away from the spindle 50. Carried by the support 68 in proximity to its upper end is a pivot 69 upon which is pivotally mounted the arms 70 of the yoke-shaped portion 71 of an operating handle 72. The upper end of the driving spindle 50 is provided with a head piece 73 formed with a pair of oppositely extending lugs 74 which provide pivots for the arms 70 of the yoke-shaped portion 71 of the operating handle 72.

The upper end of the support 68 carries a pin or stud 75 to which is connected the upper end of a controlling spring 76 for the operating handle 72. The lower end of the spring 76 is fixedly secured to a short rod 77 carried by the arm 70 of the yoke-shaped portion 71.

It is thought the many advantages of a grinding machine, in accordance with this invention can be readily understood, and although the preferred embodiment of the invention is as illustrated and described, yet it is to be understood that changes in the details of construction can be had which fall within the scope of the invention as claimed.

What I claim is:

1. A grinding machine comprising a vertically adjustable element, a bracket provided at its outer end with superposed bearings, a motor carrier, means for clamping the carrier and the inner end of the bracket to the upper portion of said element, a foot piece, an angularly adjustable arm connected to said foot piece and supporting said element, a rotatable and vertically adjustable spindle, spindle driving means mounted on the upper of said bearings, said spindle extending through said driving means and bearings, said spindle and driving means having coacting means for rotatably and slidably connecting the spindle to said driving means, a support carried by the bracket, and spring controlled means connected with said support and with the spindle for vertically adjusting the latter.

2. A grinding machine comprising a bracket having superposed bearings at its outer end, a carrier, a motor secured to the latter and having one end of its shaft provided with a pulley, a vertically adjustable element, means for clamping the carrier and the inner end of said bracket to said element, an angularly adjustable supporting arm for said element, supporting means for said arm, a spindle driving pulley mounted on the upper of said bearings, a belt connection between said pulleys, a rotatable and vertically adjustable tool carrying spindle extending through said driving pulley and bearings, and a spring controlled means pivotally connected with said bracket and with said spindle for vertically adjusting the latter.

3. In a grinding machine, a vertically adjustable post provided on its lower portion with a vertically adjustable collar, a horizontally disposed angularly adjustable arm having means at its outer end for securing the lower end of said post therein, said collar abutting the top of the outer end of said arm, supporting means for said arm, said arm having means at its inner end for clamping it to said supporting means, a supporting structure clamped intermediate its ends to the upper portion of said post, and a spindle and spindle driving mechanism carried by said supporting structure.

4. In a grinding machine, a vertically adjustable post provided on its lower portion with a vertically adjustable collar, a horizontally disposed angularly adjustable arm having means at its outer end for securing the lower end of said post therein, said collar abutting the top of the outer end of said arm, supporting means for said arm, said arm having means at its inner end for clamping it to said supporting means, a supporting structure clamped intermediate its ends to the upper portion of said post, and a spindle and spindle driving mechanism carried by said supporting structure, said supporting structure including superposed bearings for the spindle and a motor carrier.

5. In a grinding machine, a vertically adjustable post provided on its lower portion with a vertically adjustable collar, a horizontally disposed angularly adjustable arm having means at its outer end for securing the lower end of said post therein, said collar abutting the top of the outer end of said arm, supporting means for said arm, said arm having means at its inner end for clamping it to said supporting means, a supporting structure clamped intermediate its ends at the upper portion of said post, a spindle and spindle driving mechanism carried by said supporting structure, said spindle being vertically adjustable, and a spring controlled means pivotally connected with said supporting structure and with said spindle for vertically adjusting the latter.

6. In a grinding machine, a vertically adjustable post provided on its lower portion with a vertically adjustable collar, a horizontally disposed angularly adjustable arm having means at its outer end for securing the lower end of said post therein, said collar abutting the top of the outer end of said arm, supporting means for said arm, said arm having means at its inner end for clamping it to said supporting means, a supporting structure clamped intermediate its ends to the upper portion of said post, a spindle and spindle driving mechanism carried by said supporting structure, said supporting structure including superposed bearings for the spindle and a motor carrier, said spindle being vertically adjustable, and spring controlled means pivotally connected with said supporting structure and with said spindle for vertically adjusting the latter.

7. In a grinding machine, a vertically adjustable post provided on its lower portion with a vertically adjustable collar, a horizontally disposed angularly adjustable arm having means at its outer end for clamping the lower end of said post thereto, said collar for abutting the top of the outer end of said arm where the post is clamped to the latter, a support for said arm, said arm having means at its other end for clamping it to said support, a tool spindle, a bracket having superposed bearings for said spindle, a motor carrier, means for clamping the bracket and carrier to the upper portion of said post, and driving mechanism for said spindle arranged above said bracket and carrier.

8. In a grinding machine, a vertically adjustable post provided on its lower portion with a vertically adjustable collar, a horizontally disposed angularly adjustable arm having means at its outer end for clamping the lower end of said post thereto, said collar for abutting the top of the outer end of said arm where the post is clamped to the latter, a support for said arm, said arm having means at its other end for clamping it to said support, a tool spindle, a bracket having superposed bearings for said spindle, a motor carrier, means for clamping the bracket and carrier to the upper portion of said post, driving mechanism for said spindle arranged above said bracket and carrier, said spindle being vertically adjustable, and means pivotally connected with said bracket and with said spindle for vertically adjusting the latter.

In testimony whereof, I affix my signature hereto.

GUY ENOCHSON.