April 12, 1932. G. F. KRIESEL 1,853,907

GRINDING MACHINE

Filed April 14, 1928 2 Sheets-Sheet 1

Fig. 1.

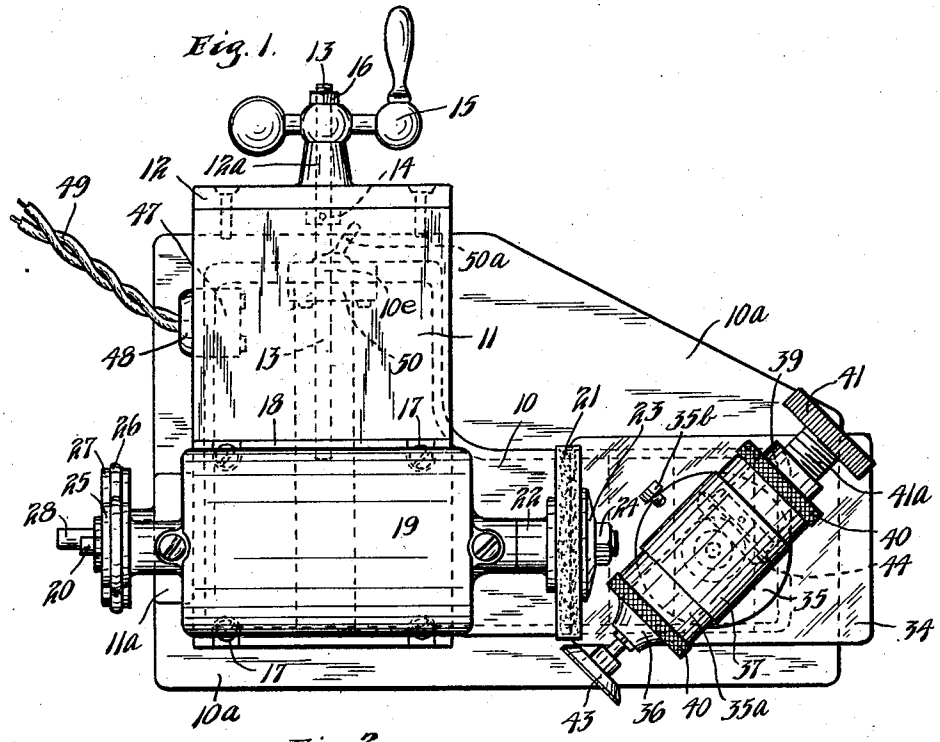

Fig. 2.

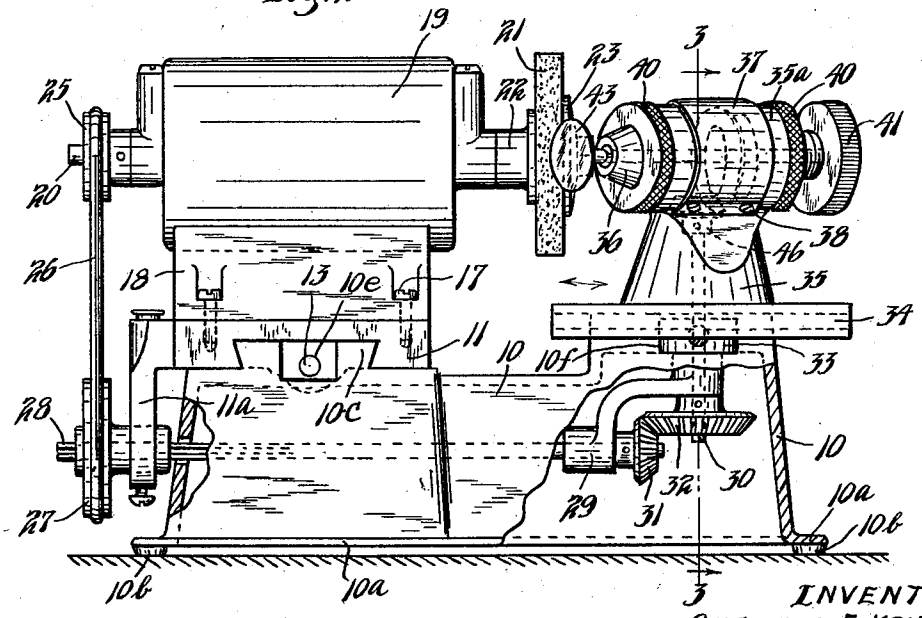

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Fig. 3.

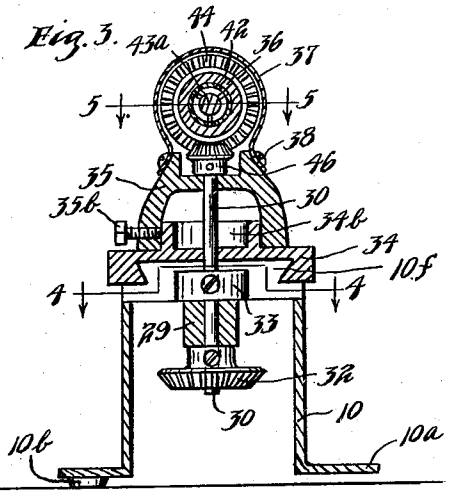


Fig. 4.

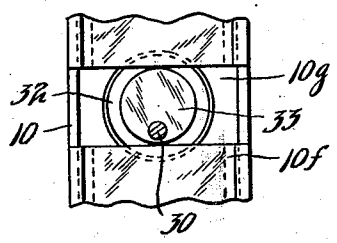
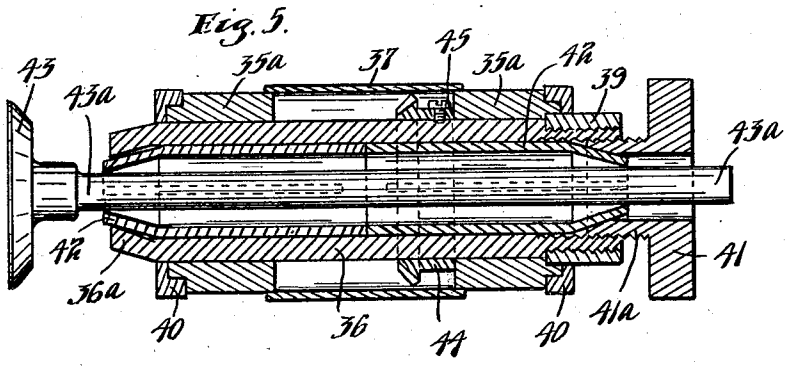


Fig. 5.



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UNITED STATES PATENT OFFICE

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GRINDING MACHINE

Application filed April 14, 1928. Serial No. 269,919.

This invention relates to a grinding machine and particularly to a grinding machine such as used to grind valves of internal combustion engines and similar small articles or tools.

It is an object of this invention to provide a simple small and compact machine for grinding valves which can be readily adjusted for operation, and which is preferably moter driven.

It is a further object of the invention to provide a small valve grinding machine having a slide carrying a motor driven grinding wheel and a reciprocating means for holding the valve movable toward and from said wheel, said means being rotatable about a vertical axis.

It is more specifically an object of the invention to provide a comparatively small, simple and compact machine comprising a slide carrying a motor driven grinding wheel, a second slide reciprocable at right angles to said first mentioned slide and toward and from said wheel, a head carried in said latter slide revoluble about a vertical axis, in which head a hollow shaft is journaled adapted to have the valve clamped therein, and means for reciprocating said second mentioned slide from said motor.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views and in which:—

Fig. 1 is a plan view of the machine;

Fig. 2 is a view in front elevation, certain parts being broken away and other parts being shown in vertical section;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2;

Fig. 4 is a horizontal section on line 4—4 of Fig. 3; and

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 3 shown on an enlarged scale, said sections being taken as indicated by the arrows.

Referring to the drawings, a machine is shown comprising the frame 10 of hollow boxlike form having a surrounding bottom flange 10*a* provided with spaced supporting lugs 10*b*. The frame 10 is provided at one side with the dove-tailed ribs 10*c* forming the guideway for a slide 11 fitting on said guideway and extending transversely of the machine. The slide 11 has secured thereto a plate 12 having a projecting boss 12*a* in which is journaled a screw 13, said screw being held from movement by the collar 14 pinned to said screw at one end of said bearing and by the operating hand wheel 15 disposed at the other end of said bearing and held in place by the nuts 16 threaded on the end of screw 13. The screw 13 passes through a threaded portion of frame 10*e* whereby when hand wheel 15 is turned, slide 11 will be moved forwardly and rearwardly. The slide 11 has secured thereto by bolts 17 a saddle member 18 in which is mounted a motor 19. The motor 19 has secured to one end of its armature or driving shaft 20 a grinding wheel 21, the same being held in place on an arbor 22 secured to said shaft by the plate 23 and clamping nuts 24. The said driving shaft 20 has secured to its end a grooved driving pulley 25 over which runs a belt 26 also running over and driving a pulley 27 keyed to one end of a splined shaft 28, the hub of said pulley being journaled in a depending portion 11*a* of the slide 11. The shaft 28 extends through an aperture in the end of frame 10 and is journaled at its other end in one hub of a bearing 29 carried on and forming a bearing for a vertical shaft 30 extending upward adjacent one end of the frame 10. Gears 31 and 32 are respectively secured to shafts 28 and 30, said gears meshing with each other and forming the driving means for shaft 30. The shaft 30 has secured thereto immediately above bearing 29 an eccentric 33 disposed in a slot 10*g* in frame 10 and extending transversely of the slide 34. The slide 34 is movable lengthwise of the frame on the dove-tailed guide 10*f* formed on said frame. The slide 34 has an upstanding cylindrical portion 34*b* substantially centrally thereon, on which is mounted for swinging movement about the vertical axis of shaft 30 a head 35. The head

35 may be held in the desired position by a set screw 35*b*. The head 35 has spaced bearing portions 35*a* in which is journaled a hollow shaft 36. A cover 37 extends over and between the portions 37*a* being secured at its sides to the head 35 by the screws 38. The shaft 36 is tapered interiorly and exteriorly at its end 36*a* and is threaded at its other end to receive a sleeve 39. Knurled ornamental cap members are secured at the ends of bearing portions 35*a*. The shaft 36 is interiorly threaded at the end opposite end 36*a* to receive the threaded hub 41*a* of a knurled wheel 41 having a bore therethrough with a flared inner end. A clamping sleeve 42 is carried in shaft 36 having split tapered ends, said sleeve 42 forming a holding means for the article to be ground, such as the stem 43*a* of a valve 43. The flared end of the bore in hub 41*a* engages the tapered end of member 42 and as member 41 is turned to move hub 41*a* inwardly, member 42 will be pushed against the tapered end 36*a* and contracted, and will also have its other end contracted by the flared surface on member 41. The stem 43*a* is thus firmly clamped at separated points and thus held accurately in axial position in shaft 36. The shaft 36 has secured thereto a gear 44 in any suitable manner as by the set screw 45, which gear meshes with a pinion 46 secured to the top of the shaft 30. The slide 11 is provided with a socket 47 adapted to receive the detachable plug 48 to which are connected the conductors 49 for supplying current to motor 19. Conductors 49 will be provided at their other ends with a plug which can be inserted in any convenient electric socket. The socket 47 will be connected by suitable conductors to a switch 50 carried in the frame and having a projecting operating handle 50*a* which will be disposed in convenient position for operation.

In operation, current will be supplied to the motor 19 and the grinding wheel 21 will be rotated at high speed. The shaft 28 is driven through belt 26. Shaft 30 is driven through gears 30 and 31 by shaft 28 and shaft 30 in turn rotates the shaft 36 through the gear 44. The valve to be ground, such as shown at 43, will be clamped and centered in the member 42 by turning the wheel 41. The head 35 will then be turned on member 34*b* so that the valve occupies the proper position in relation to the edge of the wheel 21 and will then be tightened and held in position by screw 35*b*. As the machine is now driven, shaft 30 will revolve eccentric 33 and thus will reciprocate slide 34 through a certain amplitude so that the valve 43 will be moved back and forth across the wheel 21. The valve will also be rotated by shaft 36 being rotated by the gear 46. The valve is thus turned and simultaneously reciprocated and the same will be properly and accurately ground. It is apparent that other articles may be clamped in the position and ground in a similar manner. The wheel 21 can be brought into the proper position by moving slide 11 by the hand wheel 15. The machine is of sufficient weight to rest upon a work bench or table and be operated, and the same can readily be connected for use by connection, as above stated, to any convenient electric socket.

From the above description it is seen that applicant has provided a very simple and compact valve grinding machine. The machine is quite small and is thus very convenient for small establishments such as garages, for valve grinding purposes. In the commercial embodiment of the machine the base is approximately one foot long. The machine has sufficient weight so that it may simply rest on any suitable support and be operated without being secured thereto. The machine can be connected for operation to any convenient lamp socket and no belts are thus necessary. The parts are comparatively few, compactly arranged, and so disposed that there are no moving parts in the way of the operator or in which the operator may be caught. The device has been amply demonstrated in actual practice and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. A grinding machine having in combination, a frame, a slide movable transversely thereof, a motor mounted on said slide, a grinding wheel secured to the driving shaft of said motor and rotated thereby, a splined shaft extending longitudinally of said frame below said slide, a slide on said frame reciprocable toward and from said grinding wheel parallel to the axis thereof, a head rotatable on said slide, a member journaled in said head adapted to hold an article to be ground, a gear secured to said member, a gear meshing with said gear, a shaft secured to said last mentioned gear and extending vertically through said head and slide, means on said shaft for reciprocating said last mentioned slide, a gear secured to said last mentioned shaft, a gear meshing with said last mentioned gear and secured to said splined shaft, a pulley carried on said first mentioned slide through which said splined shaft projects, said pulley being keyed to said splined shaft, a pulley carried by said motor and a belt connecting said pulleys.

2. A valve grinding machine having in

combination, a frame, a slide movable transversely of said frame, a motor carried on said slide, a grinding wheel carried on the shaft of said motor, a second slide on said frame reciprocable parallel to the axis of said shaft and wheel, a head revoluble on said second slide about a vertical axis, a member journaled in said head about a horizontal axis adapted to carry a valve to be ground, beveled gears for rotating said member, a vertical shaft carrying one of said gears and extending downwardly through said head into said frame, a beveled gear at the lower end of said shaft, means on said shaft for reciprocating said second slide, a beveled gear meshing with said beveled gear, a shaft secured to said last mentioned beveled gear and extending lengthwise of said frame at the bottom thereof, a pulley journaled in said frame at one end thereof and held from movement longitudinally of its axis, said last mentioned shaft being splined to said pulley and reciprocable therein and a pulley on said motor, and a belt running over both of said pulleys.

3. A valve grinding machine having in combination, a frame, a slide adjustable transversely of said frame, a motor carried on said slide, a grinding wheel attached to the shaft of said motor, a work-carrying slide, slidable longitudinally of said frame in a line parallel to the axis of said motor shaft, a work-carrying head rotatably adjustable on said work-carrying slide, a rotary chuck in said head journaled on a horizontal axis, a vertical driving shaft extending through said head connected with said chuck for driving the same, driving connections between the lower end of said shaft and said motor and an eccentric disposed medially of said shaft for slidably reciprocating said work-carrying slide.

In testimony whereof I affix my signature.

GUSTAVE F. KRIESEL.