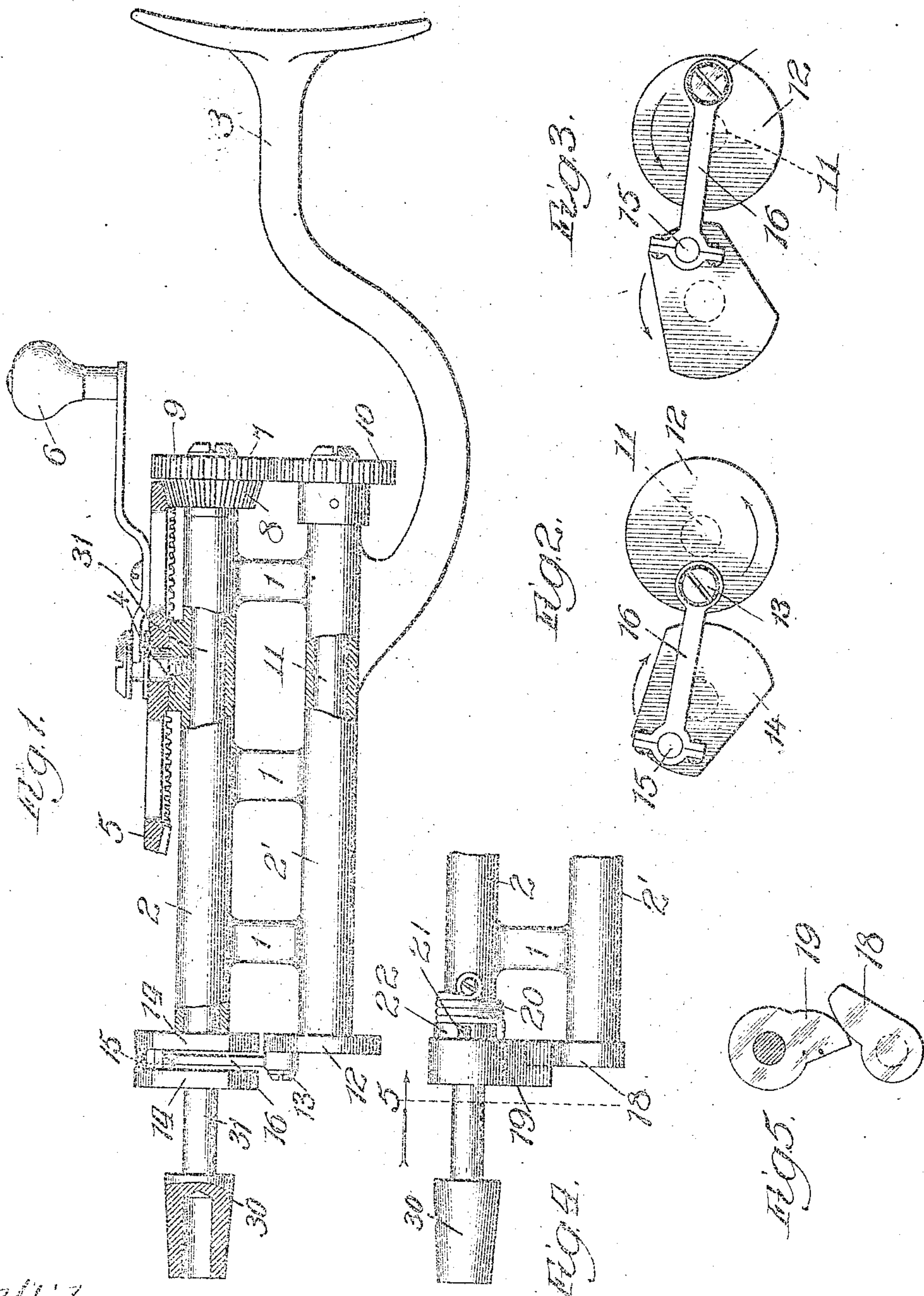


No. 876,449.

PATENTED JAN. 14, 1908.

J. E. FRY.
GRINDING MACHINE.
APPLICATION FILED FEB. 27, 1907.



Witnesses:
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UNITED STATES PATENT OFFICE.

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GRINDING-MACHINE.

No. 876,449.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN E. FRY, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Grinding-Machines, of which the following is a specification.

The object of my invention is to provide a portable valve grinding apparatus adapted particularly for the use of automobilists, but also useful in other connections.

In the drawings—Figure 1 is an elevation partly in section of my improved valve grinding apparatus. Figs. 2 and 3 are details of the mechanism for oscillating the grinding head. Figs. 4 and 5 are detail views of a modified form of mechanism for oscillating the grinding head.

As shown in the drawing, the frame of my grinding apparatus consists of two cylindrical bearing parts 2, 2' connected by webs 1.

The frame may, if desired be provided with a body rest 3 as indicated in Fig. 1. Mounted upon a stud 4 projecting from the side of the bearing 2 is a bevel gear 5, provided with a hand crank 6 for actuating the apparatus.

An idler gear, designated generally by the reference numeral 7, is rotatably mounted in any suitable manner upon the end of the bearing 2. The idler 7 consists of a bevel gear 8 integral with or otherwise rigidly secured to a spur gear 9, the bevel gear 8 meshing with the bevel gear 5 before mentioned. The spur gear 9 meshes with a second spur gear 10 rigidly mounted upon a shaft 11 which extends throughout the length of the bearing 2'. The shaft 11 carries at its lower end a disk 12 on which is mounted a wrist pin 13.

By means of the mechanism so far described it will be apparent that the rotation of the bevel gear 5 will impart a rotary movement to the disk 12 and to the wrist pin carried thereby.

At the lower end of the bearing 2 a grinding head 30 is rotatably mounted in any suitable manner. In the present instance I have shown the grinding head as being secured to a shaft 31 extending throughout the length of the part 2, and at its upper end affording a bearing for the idler gear 7 above mentioned.

The upper end of the grinding head 30 is provided with a crank 14 and crank pin 15.

A pitman 16 connects the wrist pin 13 with the crank pin 15. The eccentricity of the

wrist pin 13 is slightly less than that of the crank 15. As a result of the relation of the eccentricity of these parts the rotary movement imparted to the disk 12 and its wrist pin 13 causes an oscillating movement of the crank 14 and the connected grinding head 30, such oscillating movement being especially desirable in the class of work for which my improved grinding apparatus is designed.

In the modification shown in Figs. 4 and 5, I have substituted cam mechanism for the crank movement above described. The numeral 18 designates a cam rigidly secured to the lower end of the shaft 11 and rotating therewith. Mounted upon the grinding head 30 is a projection 19 designed to be engaged by the cam 18 during its rotary movement. A spring 20 secured at one end to the frame of the machine and at the other end to the part 19 is designed to return the grinding head to its initial position after the point of the cam 18 has slipped over the projection 19. A stop 21 upon the part 19 and a stop 22 upon the frame of the machine are provided for the purpose of limiting the movement communicated to the grinding head by the spring 20.

I claim:

1. In a grinding machine, a rotary member having a wrist pin eccentrically mounted thereon, a grinding head provided with a crank and crank pin, and a pitman connecting said wrist pin and crank pin.

2. In a grinding machine, a rotary member having a wrist pin eccentrically mounted thereon, an oscillatory grinding head provided with a crank and crank pin, the eccentricity of said wrist pin being less than that of said crank pin, and a pitman, whereby an oscillatory movement is imparted to the grinding head by the rotary movement of said rotary member.

3. In a grinding machine, a rotary member having a wrist pin eccentrically mounted thereon, an oscillatory grinding head provided with a crank and crank pin, a pitman connecting said wrist pin and said crank pin, and means for rotating said rotary member.

4. In a grinding machine, a rotary member having a wrist pin eccentrically mounted thereon, an oscillatory grinding head provided with a crank and crank pin, the eccentricity of said wrist pin being less than that of said crank pin, a pitman whereby an oscillatory movement is imparted to the grinding

head by the rotary movement of said rotary member, and means for rotating said rotary member.

5 5. In a grinding machine, a rotary member having a wrist pin eccentrically mounted thereon, an oscillatory grinding head provided with a crank and crank pin, a pitman connecting said wrist pin and said crank pin, a shaft connected to said rotary member, and
10 gearing for rotating said shaft.

6. In a grinding machine, a rotary member having a wrist pin eccentrically mounted thereon, an oscillatory grinding head provided with a crank and crank pin the eccentricity of said wrist pin being less than that
15 of said crank pin, a pitman whereby an oscillatory movement is imparted to the grinding head by the rotary movement of said rotary member, a shaft connected to said rotary
20 member, and gearing for rotating said shaft.

7. In a grinding machine, a rotating member having a wrist pin eccentrically mounted thereon, a grinding head provided with a crank and crank pin, a pitman connecting
25 said wrist pin and said crank pin, a spur gear secured to said rotary member, a bevel gear operatively connected to said spur gear, and a hand crank secured to said bevel gear.

8. In a grinding machine, a rotating member having a wrist pin eccentrically mounted
30 thereon, a grinding head provided with a

crank and crank pin, a pitman connecting said wrist pin and said crank pin, a spur gear secured to said rotary member, an intermediate spur gear meshing with said first spur
35 gear, a bevel gear rigidly secured to said intermediate gear, and a second bevel gear meshing with said first bevel gear, the second bevel gear being provided with a hand crank.

9. In a grinding machine, a frame provided with a body rest, a rotary member mounted thereon, an eccentric wrist pin upon
40 said rotary member, a grinding head provided with a crank and crank pin, and a pitman connecting said wrist pin with said crank pin.

10. In a grinding machine, a frame provided with a body rest, an oscillatory grinding head, gearing for oscillating the same,
45 and a hand crank for actuating said gearing.

11. In a grinding machine, a frame, a grinding head rotatably mounted thereon and means for imparting an oscillatory movement to said grinding head.

12. In a grinding machine, a frame, a
55 grinding head rotatable therein, and means for imparting partial revolutions in opposite directions to said grinding head.

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Witnesses:

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