April 7, 1942. A. RICCARDI 2,278,799

GUN

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Fig. 1

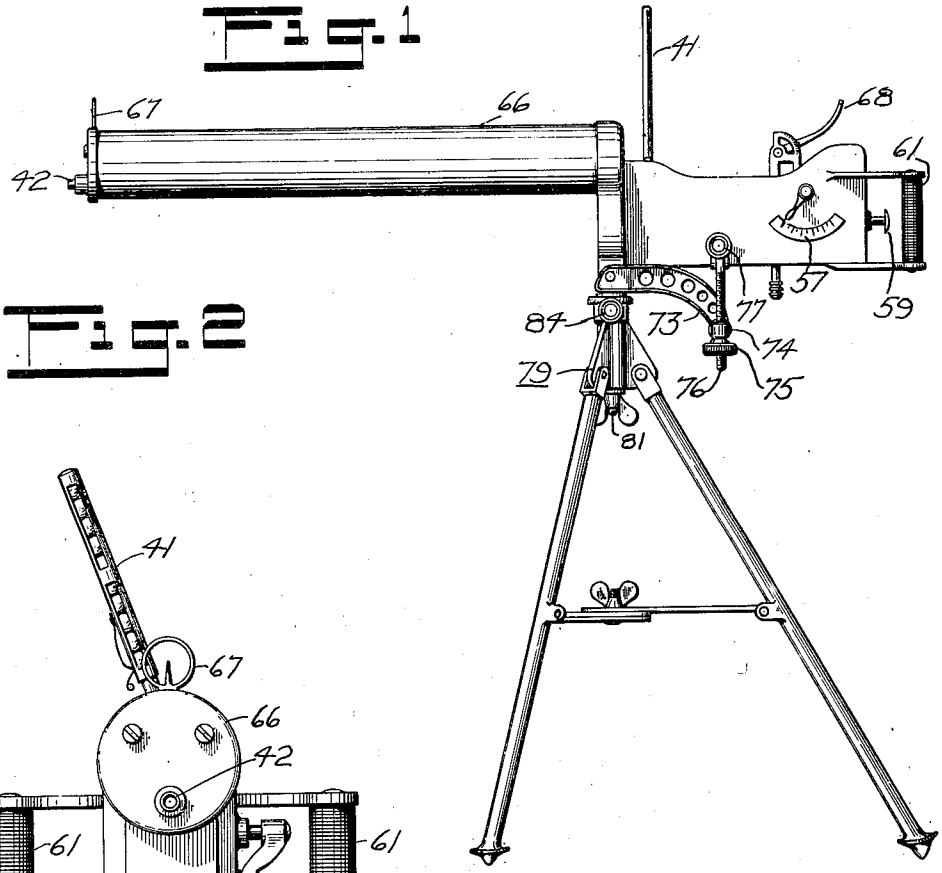


Fig. 2

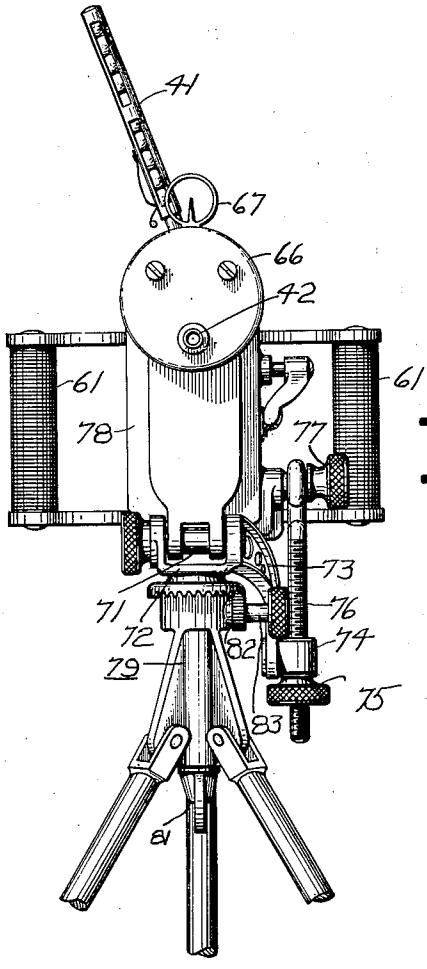
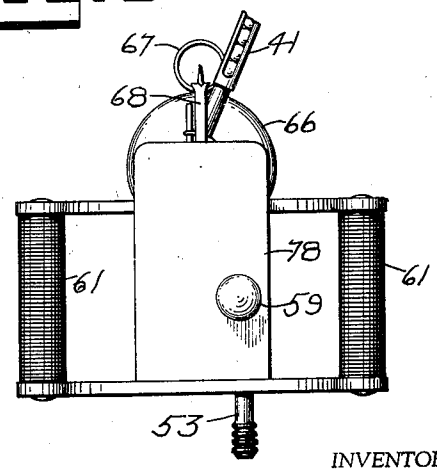


Fig. 3



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Fig. 4

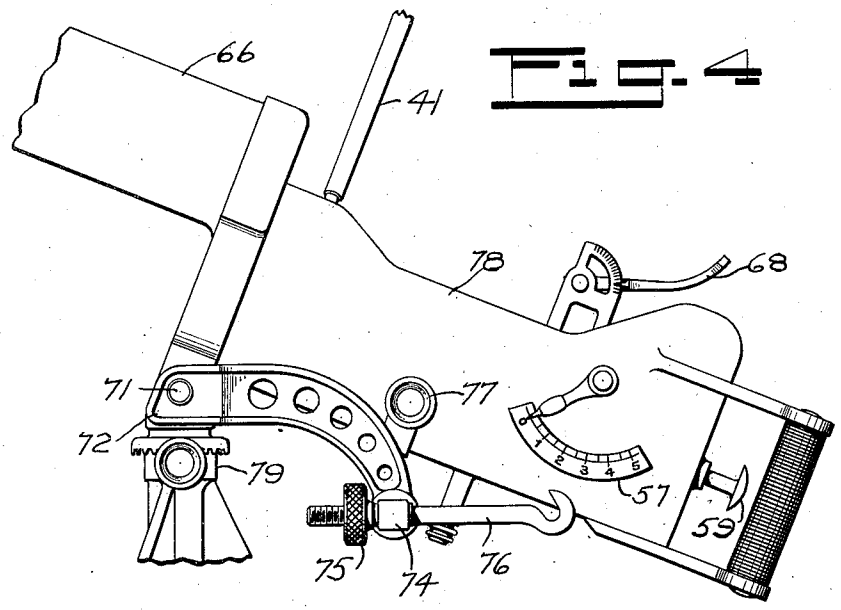
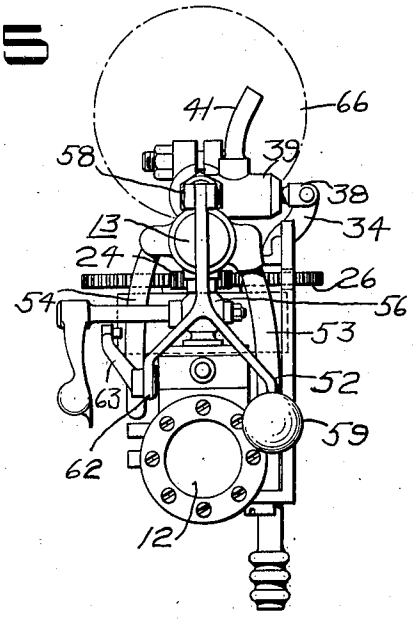


Fig. 5



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Fig. 6

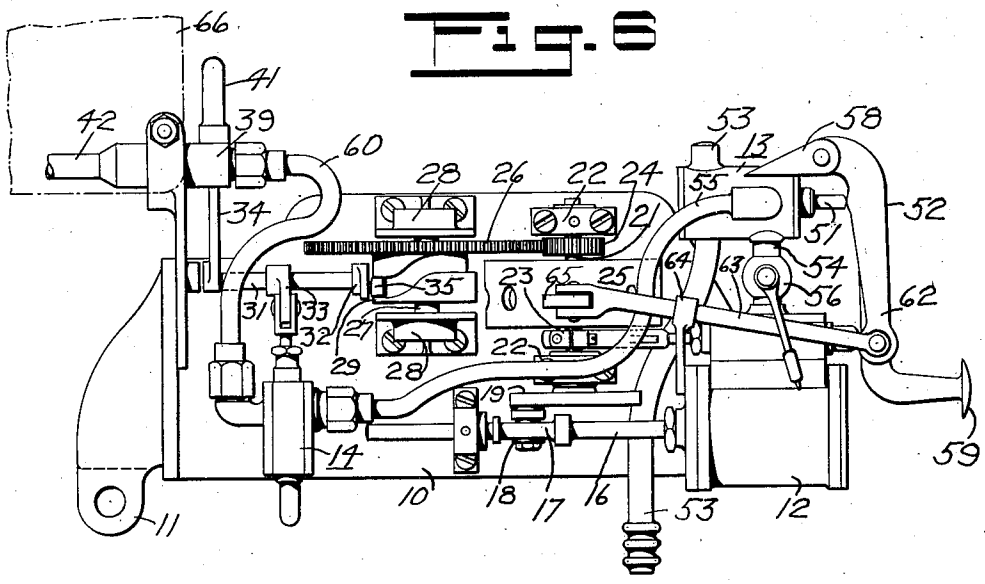
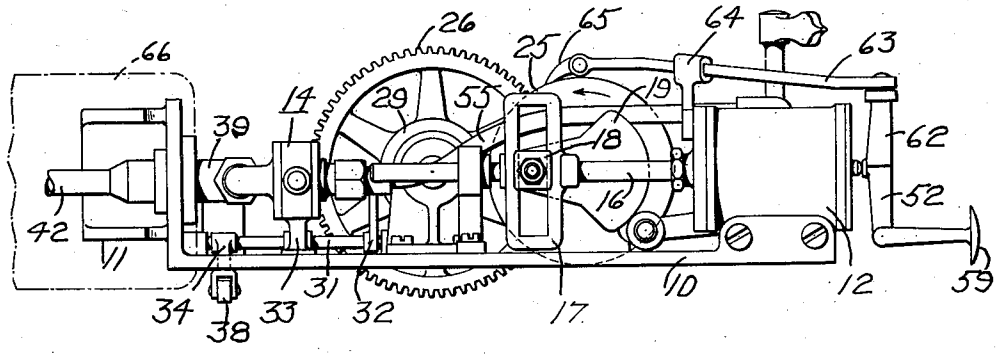


Fig. 7



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Fig. 8

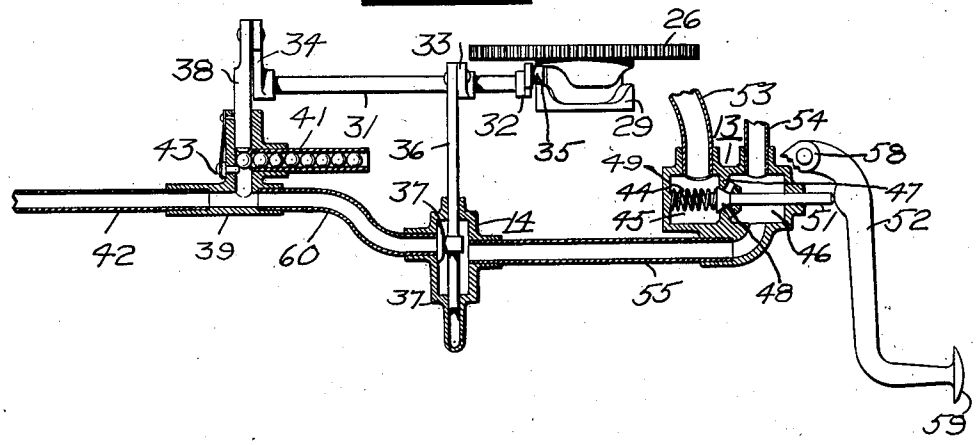
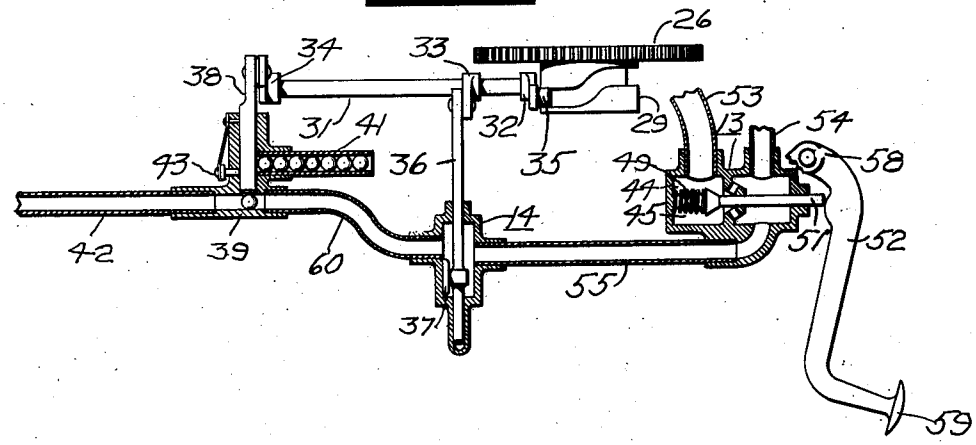


Fig. 9



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Patented Apr. 7, 1942

2,278,799

UNITED STATES PATENT OFFICE

2,278,799

GUN

Aristide Riccardi, Rome, Italy, assignor to Dorothy Mackenzie Seaman, New York, N. Y.

Application October 29, 1938, Serial No. 237,668

3 Claims. (Cl. 124—11)

The present invention relates to guns, and especially to guns utilizing air pressure as the operating force. More particularly the invention relates to air operated guns, such as are commonly known as machine guns, that is, guns in which a large number of shots may be fired successively and automatically. In this gun either spherical or cylindrical pellets of any common material may be utilized as projectiles. Among the materials which are commonly used may be mentioned steel, lead, fiber, or ebony.

The machine gun of the present invention is adapted to be used in position on a tripod or separated therefrom as an automatic rifle. The gun is adapted to successively and automatically fire a number of projectiles contained in a magazine under control of a single lever which starts and stops the operation. This gun is also provided with means to regulate the time intervals between successive shots.

It is an object of this invention to provide an air operated machine gun which is suitable for use as a toy, but which is sufficiently accurate so that it may be substituted for machine guns of the ordinary type for use in target practice.

Another object of the invention is to provide an air operated machine gun in which the projectiles are automatically fed from a magazine to the firing chamber in such manner that but one projectile can be in the chamber at any given time and such that there can be no leak of pressure from the chamber through the feeding mechanism.

It is a further object of the invention to provide such a gun which is operated by means of an air motor, the speed of which may be easily and simply regulated.

Further objects and features of the invention will appear when the following specification is considered with the annexed drawings, in which—

Figure 1 is a side view of the complete gun mounted on a tripod;

Figure 2 is a front view of the gun of Figure 1 on a somewhat larger scale than that figure;

Figure 3 is a fragmentary rear view of the gun of Figure 1;

Figure 4 is a side view of the gun showing particularly the manner of mounting the gun on a tripod and of providing means for removing the gun from that tripod;

Figure 5 is a rear view of the gun with the casing removed;

Figure 6 is a side view of the gun, excepting the barrel, with the casing removed, showing the arrangement of the operating mechanism;

Figure 7 is a bottom plan view of the mechanism shown in Figure 6;

Figure 8 is a fragmentary, schematic, cross-sectional view of the control valves and the mechanism for feeding projectiles to the gun barrel; and

Figure 9 is a view similar to Figure 8 but showing the parts in operated position.

The various parts of the gun are mounted upon a base 10, Figures 6 and 7, which base is provided with the lugs 11 adapted to be pivoted upon a suitable support, as will appear later. Mounted upon the base 10 are the various operating parts of the mechanism, including a motor 12, control valve 13, pulsator valve 14, and feed shaft 31 and associated levers.

The motor 12 is the ordinary slide valve motor, the piston rod 16 of which projects to the left and terminates in a crosshead 17. Mounted in the crosshead is block 18 which is slidable within the crosshead. Pivoted in the block 18 is the crank pin which is fixed in the crank disc 19. Crank disc 19 is mounted on a crankshaft 21, which shaft extends vertically and is adapted to rotate in the bearings 22 which are fixed to the plate 10. The valve of the motor 12 is controlled by means of an eccentric and strap 23 in the usual manner.

Also mounted on the crankshaft intermediate the bushings 22 is a gear 24 and a ratchet wheel 25. The ratchet wheel 25 is for the purpose of moving the crankshaft from its dead center position in a manner which will appear later. The gear 24 meshes with the gear 26 mounted on shaft 27, which shaft is rotatably mounted in bearings 28 fixed to the base plate 10 forward of the bearings 22. Likewise mounted on the shaft 27 is a cam drum 29, which cam drum is adapted to control the operation of the feeding mechanism as well as of the pulsator valve 14. Mounted in bearings on the base plate 10 forward of the cam drum 29 is the horizontally disposed shaft 31. This shaft has mounted thereon three arms 32, 33 and 34. Arm 32 carries cam roller 35 which lies in the slot of cam drum 29. Arm 33 is pivoted to a reciprocating member 36 which near its lower end carries the valve element 37 of the pulsator valve 14.

Arm 34 has in its extremity a slot which cooperates with the pin on the feed plunger 38, which plunger extends into a bore in the casing 39, as is best seen in Figures 5, 8 and 9. Extending upwardly (to the right in schematic dia-

grams Figures 8 and 9) from casing 39 is the magazine 41 in which the projectiles are placed. It will be seen that as the crank shaft revolves the cam drum likewise revolves, causing oscillatory movement of the shaft 31 which causes alternate closing and opening of the pulsator valve 14 and likewise causes reciprocation of the plunger 38 to feed projectiles into the barrel 42 of the gun. A spring pressed pin 43 in chamber 39 prevents the projectiles from falling into the barrel at any time other than when fed by the plunger 38.

The operation of the motor, as well as the admission of air to the pulsator valve 14, is controlled through the medium of valve 13, as may be seen by reference to Figure 8. The valve, generally designated 13, consists of a casing 44 having therein two chambers 45 and 46 between which is a valve seat 47. Valve 48 normally rests on this valve seat, being pressed against the seat by spring 49 and having its stem 51 extending toward the right in position to be operated by a lever 52. Fitted into the casing 44 and communicating with the left hand chamber 46 is an air inlet tube 53 (see Figure 6) which may connect with any source of air under pressure as with a compressor or storage tank, or with a source of any other gas under pressure. Ordinarily, of course, this tube would connect with an air cylinder or similar storage reservoir.

Fitted into the casing 44 and communicating with the right hand chamber are two tubes 54 and 55. Tube 54 (see also Figure 6) communicates with the motor 12 through a regulating valve 56, the handle of which projects outside the casing, as may be seen in Figure 1, and cooperates with a dial 57 to indicate the speed of operation. Tube 55 communicates with chamber 14 so that whenever air is admitted to the motor 12 air is likewise admitted to the chamber 14 from whence, when the motor is operating, it is, at timed intervals, permitted to pass through tube 60 and enter the barrel 42 of the gun behind a projectile.

The control lever 52 is pivoted at its upper end on a lug 58 which extends upwardly and to the right from the valve casing 44. The lower end of this lever projects outwardly through the casing and terminates in a button 59 at the rear of the gun in position to be readily operated by the thumb of one whose hands are on the handles 61 (Figure 1) which are attached to the casing of the gun. Lever 52 is forked and has a second branch 62 which at its lower end is pivotally connected to an arm 63. Arm 63 extends to the right and is guided in a slot in a supporting member 64 in such position that a pawl 65 pivotally mounted in the bifurcated end of the lever 63 may cooperate with the ratchet wheel 25.

In order to initiate operation of the gun the operator presses on button 59 which swings clockwise pressing against valve stem 51, at the same time, through the link 63, causing movement of the pawl 65 which, if the motor is on dead center, rotates the crank shaft through the medium of the ratchet wheel 25 sufficiently to remove it from this dead center position. Pressure on the valve stem 51 moves the valve to the left against the tension of spring 49 and permits air to enter through the pipe 53 and flow through pipes 54 and 55 to the motor 12 and to the pulsator valve 14. The motor will immediately start operating and the crank shaft 27 will rotate, causing rotation of cam drum 29. Rotation of the drum 29 will cause shaft 31 to oscillate and will thus cause alternate opening and closing of pulsator valve 14 and thus admission of air to the gun barrel 42.

Likewise, this oscillation of shaft 31 will cause reciprocation of plunger 38 and consequent feeding of projectiles successively into the barrel 42. In Figure 9 the parts are shown in position with the valve 48 off the valve seat 47 and consequently with air flowing to the chamber 14. Likewise in Figure 9 the parts are shown in position in which a projectile has been fed to the gun barrel 42 and the valve member 37 has been moved downwardly to permit passage of air from chamber 14 to the barrel.

By reference to Figures 8 and 9 it will be seen that the projectile is fed into place in the barrel and the valve 37 moved to its lower position substantially simultaneously so that immediately the projectile is in the barrel the air pressure behind it expels it therefrom. It will also be seen by reference to these figures that the plunger 38 occupies such a position that there can be no leakage from the gun barrel 42 through the magazine 41 and, consequently, the pressure will not be diminished undesirably.

In order to enhance the appearance of this machine gun, and particularly in order to make it resemble an ordinary machine gun, the barrel 42 is encased in a cylindrical member 66 (Figures 1, 2 and 3). Mounted at one end of this casing 66 is a sight 67 which is an ordinary ring sight. By use of this sight together with the elevator lift sight 68 pivoted on the supporting member 69, accurate aiming of the gun may be achieved.

It is frequently desirable that such a gun be solidly supported, and for this purpose a tripod is provided on which the gun is pivoted so that it may be elevated and rotated to any desired extent. In order to permit elevation the lugs 11 are provided, these lugs curving downwardly and being adapted to pivot upon a pin 71 which is inserted through holes in the lugs and through cooperating holes in a bifurcated member 72 supported upon the tripod. In order that the elevation of the gun may be readily adjusted a rearwardly extending arm 73 integral with the member 72 is provided.

Pivoted at the end of the arm 73 is a strap 74 which rotatively supports an internally threaded sleeve 75, the threads of which cooperate with a screw 76, the hooked end of which may cooperate with a screw 77 extending outwardly from the housing 78 which covers the operating mechanism of the gun. Due to this arrangement it is possible to remove the gun from its tripod for use as an automatic rifle. This may be done by loosening the screw 77, removing the hooked end of the screw 76 from beneath screw 77, and then removing the pin 71 from position in the lug 72, thus freeing the gun entirely from the tripod.

It will be seen that when the gun is assembled on the tripod the elevation may be readily adjusted by rotating the sleeve 75, thus causing elevation or depression of the muzze of the gun as the entire instrument swings about the pin 71.

In order that the gun may be readily rotated in a horizontal plane, the tripod, generally designated 79, is provided with a center bore into which a downwardly extending projection 81 of the member 72 is fitted. Member 72 also has fastened thereto near its upper extremity a toothed collar which cooperates with a spur gear 82 mounted on a stub shaft 83 rotatably fixed

in the tripod head. This shaft 83 is provided with a knurled head 84 and may thus be readily rotated by hand in such manner that the gun, due to the cooperation of gear 82 and toothed collar, is rotated to any desired position in a horizontal plane.

While the above has described a preferred form of mechanism, it will be obvious that many changes can be made within the scope of the invention and, therefore, no limitation is to be implied from the above description and the appended claims alone are to determine the scope of my invention.

What I desire to secure by United States Letters Patent is:

1. In an air operated gun of the class described, a barrel, an air motor, a source of air under pressure, means connecting said source of air to said motor, means for controlling the flow of air to said motor, means operated by said motor for intermittently supplying air under pressure to said barrel, and means for feeding projectiles to said barrel in position to be expelled therefrom by said air, said feeding means comprising a reciprocable plunger operating in a passage communicating with said barrel, said plunger serving to close said passage when air is supplied to said barrel thereby preventing escape of air through said feeding means.

2. In a device of the class described, an air motor, a source of air under pressure, means connecting said source to said motor, valve means for controlling the flow of air to said motor, means comprising a trigger for operating said valve means, and means operated by said last mentioned means for moving said air motor from its dead center position.

3. In a device of the class described, a gun barrel, means for feeding projectiles one by one to said barrel, means for supplying air under pressure to said barrel to eject said projectiles in rapid succession, and means for operating said feeding means and air supplying means, said last mentioned means comprising a cam and cam follower and lever arms connected to said follower and to said feeding and air supplying means.

ARISTIDE RICCARDI.