July 12, 1938. A. F. CRESIEN 2,123,563

POWER HAMMER

Filed Aug. 13, 1936 3 Sheets-Sheet 1

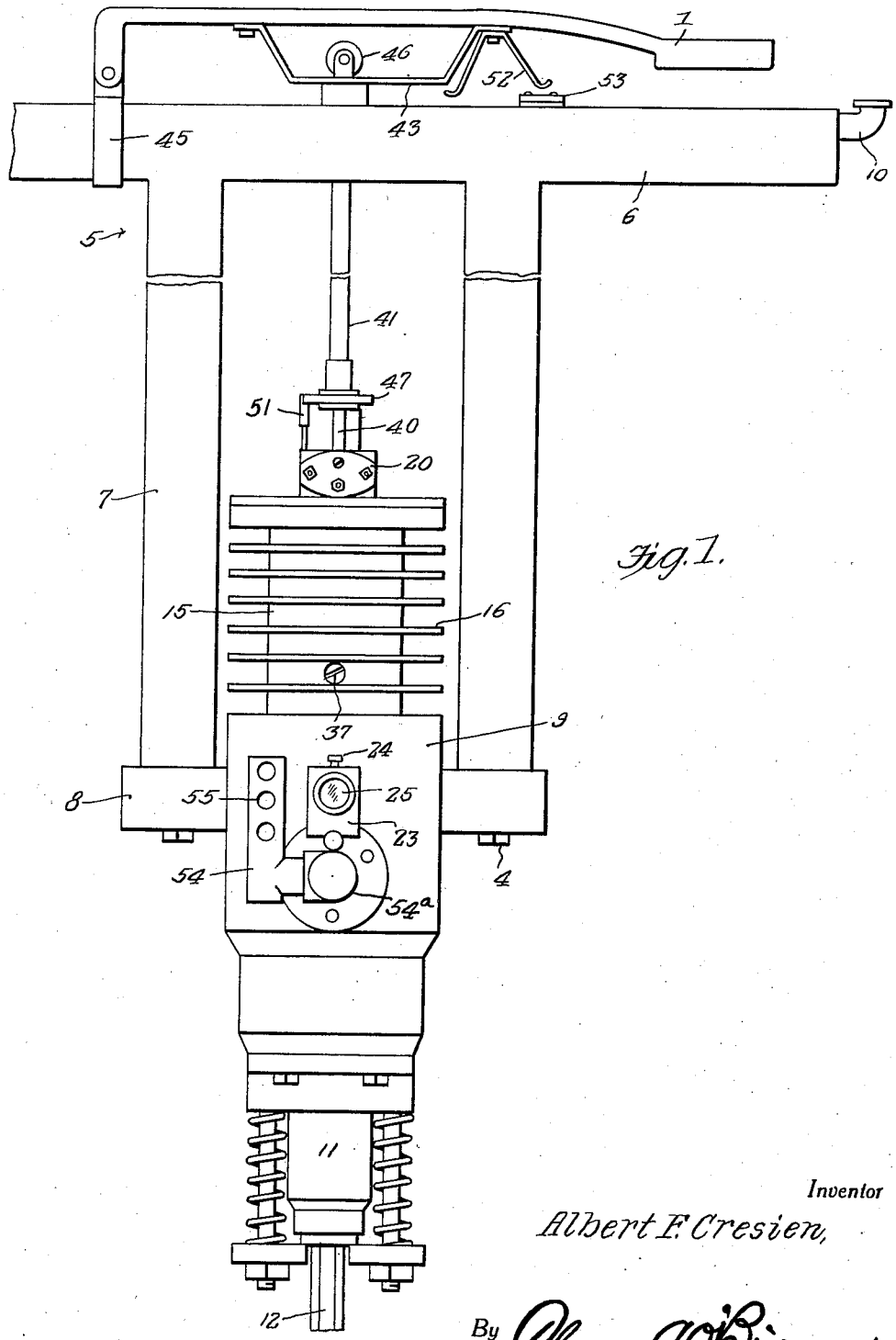


Fig. 1.

Inventor

Albert F. Cresien,

By Clarence A. O'Brien and Hyman Berman Attorneys

July 12, 1938. A. F. CRESIEN 2,123,563

POWER HAMMER

Filed Aug. 13, 1936 3 Sheets-Sheet 2

Fig. 2.

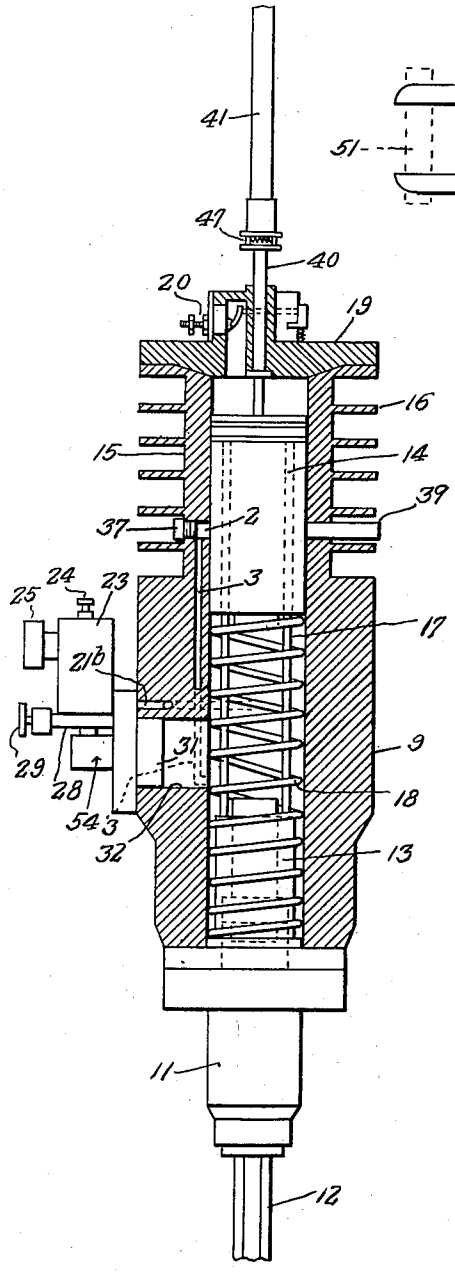


Fig. 3.

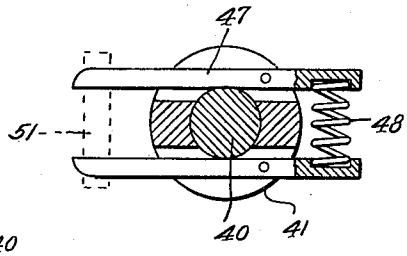
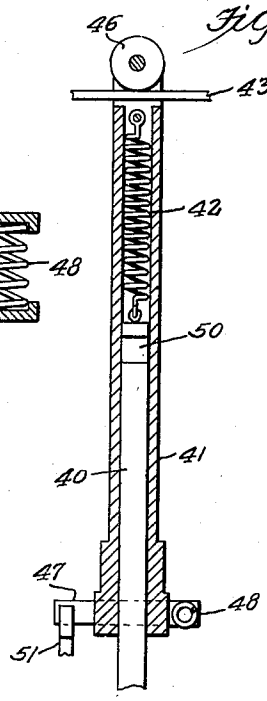


Fig. 4.



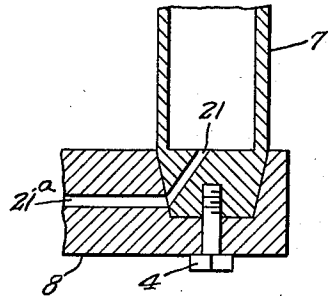


Fig. 5.

Inventor

Albert F. Cresien.

By Clarence A. O'Brien and Hyman Berman Attorneys

July 12, 1938. A. F. CRESIEN 2,123,563

POWER HAMMER

Filed Aug. 13, 1936 3 Sheets-Sheet 3

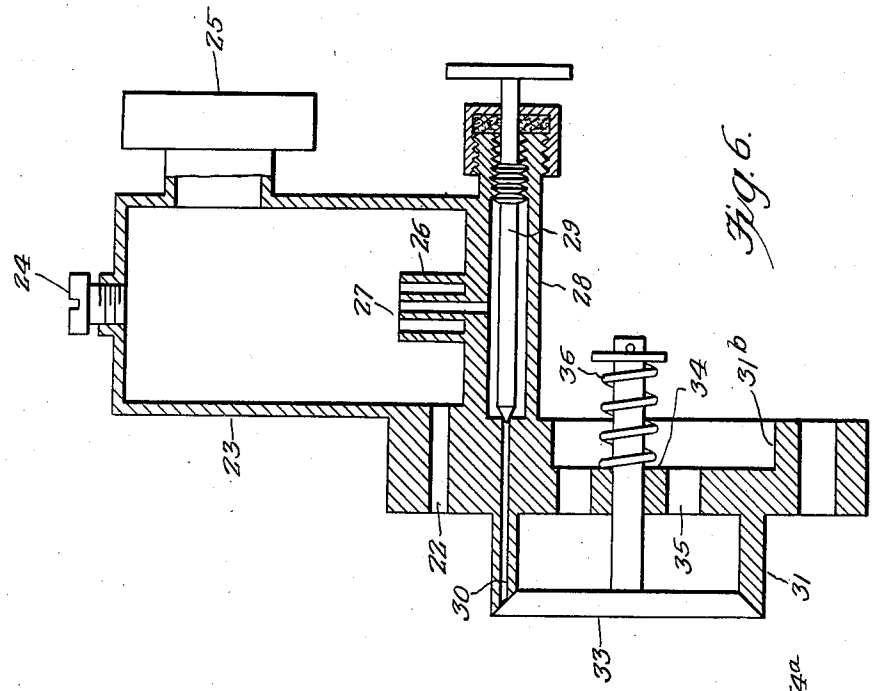


Fig. 6.

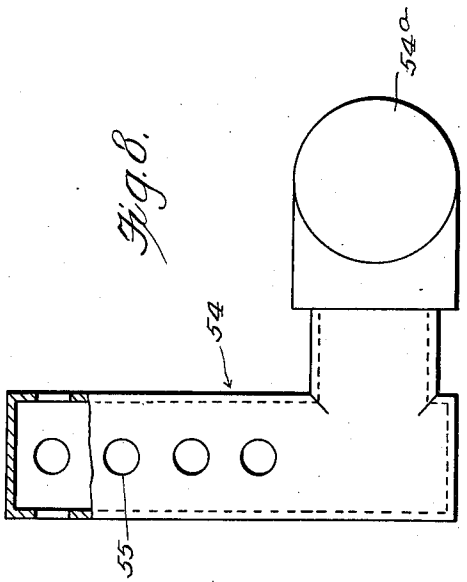


Fig. 8.

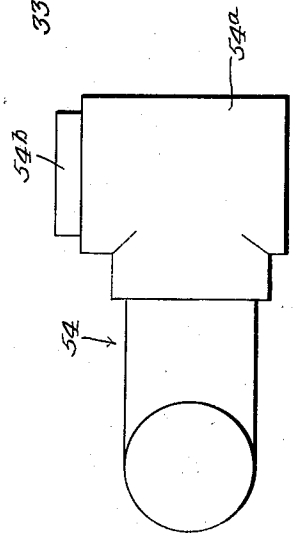


Fig. 7.

Inventor

Albert F. Cresien,

By Clarence A. O'Brien
Hyman Berman

Attorneys

Patented July 12, 1938

2,123,563

UNITED STATES PATENT OFFICE

2,123,563

POWER HAMMER

Albert F. Cresien, McComb, Miss.

Application August 13, 1936, Serial No. 95,892

3 Claims. (Cl. 123—7)

This invention relates to power hammers and the objects of the invention are to provide a gasoline driven hammer which may be used for drilling, demolition work or other purposes, to provide a hammer which is portable, and also to provide a hammer having safety features associated therewith to the end that the hammer will cease operating when pressure is released on the handle.

Briefly, the invention consists in the provision of a gasoline driven, air cooled, two cycle hammer which will be found to possess numerous and advantageous features over the types of power hammers now generally employed.

The invention together with its objects and advantages will be best understood from a study of the following description taken in connection with the accompanying drawings wherein:—

Figure 1 is an elevational view of the improved power hammer.

Figure 2 is a longitudinal sectional view through the hammer.

Figure 3 is a horizontal sectional view through a latch mechanism forming part of the invention.

Figure 4 is a fragmentary longitudinal sectional view through a rod assembly forming part of the invention.

Figure 5 is a fragmentary detail sectional view showing the manner of connecting the handle with a casting forming part of the invention.

Figure 6 is an enlarged detail sectional view through a carburetor inlet assembly forming part of the invention.

Figure 7 is a top plan view of an air breather, and

Figure 8 is a side elevational view of the air breather with certain parts broken away and shown in section.

Referring to the drawings by reference numerals it will be seen that in the preferred embodiment thereof the improved power hammer comprises a substantially hollow handle 5, which includes a hollow cross member 6 having depending therefrom parallel extensions 7. The handle 5 forms a container for fuel, in the present instance gasolene and to that end at one end of the grip 6, the handle 5 is provided with a filling neck 10.

Further the invention comprises a casting 9 that has extended from diametrically opposite sides thereof lugs 8, which as best shown in Figure 5 are provided with a socket which receives the tapered solid ends of the handle extensions 7. Screws or similar fastening elements 4 serve to positively secure said ends of the handle extensions 7 within the sockets of the lugs 8.

The block 9 has formed integrally therewith a cylinder 15 in which operates a piston 14.

The piston 14 is guided in its movements through the medium of guide rods 17 suitably anchored within a bored portion of the block 9 as shown in Figure 2. Also within the lower end of the bored portion of the block 9 is an impact assembly 13 for operating the tool 12 which is connected with the impact assembly 13 through the medium of a chuck or other suitable coupling 11.

The bored portion of the block 9 below the piston 14 constitutes a carburetor having an inlet 32.

Suitably associated with the inlet 32 of the block 9 is a casting which includes an air intake valve 31 fitted within the intake 32 and controlled by a valve disk 33 having a stem operating in a suitable guide structure 34 and with which is associated a spring 36 that normally retains the valve 33 seated at the inner end of the intake 31. The guide 34 is provided with openings 35 through which air from the atmosphere enters the neck 31 to pass from the neck 31 into the carburetor portion of the block 9 below the piston 14.

The lower ends of the handle extension 7 are provided with ports 21 that register with ports 21*a* provided in the lugs 8. Suitably cored within the blocks 9 is a passage 21*b* that connects the passages 21*a* with a passage 22 (see Figure 6) that opens into a fuel reservoir 23.

The fuel in the reservoir seeks a suitable level, and the level of fuel in the reservoir 23 may be ascertained by looking through a sight window 25 with which the reservoir 23 is suitably equipped. In the top thereof the reservoir 23 is provided with a suitable plug 24. At the bottom thereof, the reservoir 23 is provided with a collector cup 26 and a tube 27 arranged centrally of the cup 26 and extending through the bottom of the reservoir chamber 23 into an integral valve casing 28. Collector cup 26 and tube 27 are so designed as to prevent vapor lock and also the formation of bubbles that would interrupt the gasoline supply under high vibration.

Leading from one end of the valve casing 28 through the peripheral wall of the intake neck 31 is a fuel passage 30 which is also controlled by the valve 33 as shown in Figure 6.

From the above it will be seen that on each upward stroke of piston 14, fuel from the handle 5 flows through the ports 21, 21*a*, 21*b*, 22 into

the reservoir 23. From the reservoir 23, fuel passes through the tube 27 into the valve 28, and from the valve 28 through the passage 30 and from the jet 30, the fuel passes into the intake 32 of the carburetor portion of casting of block 9. At the same time, valve 33 being open air from the atmosphere is drawn into the carburetor portion of the block 9 through a breather 54 hereinafter more fully referred to and past the valve 33 to mix with the fuel admitted into the carburetor in the manner just explained.

Formed in the block 9 and wall of cylinder 15 is a passage 3 which at one end opens into the carburetor portion of the block 9 and at its other end opens as at 2 into the cylinder 15 above the piston 14 when the latter is in its lowest position. A plug for the port 2 as indicated by the reference numeral 37 is provided as shown in Figure 2.

Thus it will be seen that as the piston 14 moves downwardly the fuel mixture below the piston within the block 9 is compressed and forced through the passage 3 and port 2 into the cylinder 15 above the piston 14. On the compression stroke of the piston 14 the fuel admitted into the cylinder 15 will be compressed and at the end of this compression stroke the fuel compressed by the upward movement of the piston will be exploded through the medium of the igniting assembly 20 which may be of any suitable design. Obviously the force of the exploding gases will act on the piston 14 to move the same downward. Thus the cycle of operation is continuously repeated so that the piston 14 in its reciprocatory action acts on the impact assembly 13 in a manner to operate the tool 12.

The breather assembly 54 includes a union 54*a* that connects the pipe with a nipple 54*b* that is received within a recess 31*b* provided in the casting assembly of Figure 6 at the side of the guide 34 opposite to the valve 33. Pipe 54 is provided with airports 55 through which the air passes from the atmosphere through the breather, the passages 35, and pass the valve 33, when the latter is in open position to mix with the fuel entering the carburetor portion of the block 9 below the piston 14.

As shown in Fig. 2 the make and break ignitor 20 which may be of any suitable construction and design, and forms no part of the present invention is preferably of the compression responsive type and is therefore under the control of piston 14, and is suitably mounted on a head 19 provided for the cylinder 15.

The head 19 is suitably bored to provide a guide for actuator rod 40 that moves vertically through the head 19 and has an inner end adapted to engage the head of the piston 14 for initiating downward movement of the piston as will hereinafter be more fully explained.

Slidably associated with the rod 40 is a tubular rod 41 which at its lower end is provided with a pair of spaced collars between which are pivoted latch dogs 47 between one end of which is a spring 48 that normally urges the free ends of the dogs 47 inwardly towards one another.

Rods 40 and 41 are normally urged towards one another through the medium of a spring 42 which at one end is anchored within the rod 41, and at its opposite end is secured to the upper end of the rod 40 as clearly shown in Figure 4.

Also at its upper end the rod 40 is provided at opposite sides thereof with grooves or slots 50 with which the latch element 47 engage when the rod 41 is moved upwardly relative to the rod 40, as and for a purpose hereinafter more fully explained.

At its upper end the rod 41 is bifurcated to receive an intermediate portion of a bracket 43 the opposite ends of which are suitably secured to a handle member 1 pivoted at one end to a clamp 45 secured about an end portion of the grip 6 of handle 5.

Also and as clearly shown in Figures 1 and 4, suitably provided in the bifurcated end of the rod 41 is a roller 46 which engages the intermediate portion of the bracket 43.

From the above it will be seen that to initiate operation of the hammer, handle 1 is swung upwardly for pulling the rod 41 upwardly relative to the rod 40. As the rod 41 moves upwardly, latch members 47 are brought opposite the grooves 50 and under action of spring 48 move inwardly into engagement with the grooves 50 thus locking the rods 40 and 41 together. When this locking of these rods 40 and 41 is effected, handle 1 is then moved downwardly. As handle 1 moves downwardly rod 40 at its inner end engages the piston 14 at the head of the latter and forces said piston downwardly of the block 9 against the action of spring 18. As before mentioned as the piston 14 moves downwardly the fuel mixture below the piston is forced through the passage 3 and the port 2 into the cylinder 15 above the piston 14.

Rising from the cap 19 in the path of the levers 47 is the suitably shaped lug 51. It will thus be seen that as rods 40 and 41 move downwardly for moving the piston 14 downwardly as and for the purpose just mentioned, the latch members 47 will ultimately engage with the lug 51 spreading these latch members 47 apart and out of engagement with the rod 41, thus releasing the rod. Upon release of the rod 40, the spring 18 will act on the piston 14 to move the same, forcibly, upwardly to compress the fuel admitted into the cylinder 15 above the piston 14. As piston 14 moves upwardly on its compression stroke sufficient pressure will be developed for setting in operation the make and break device 20 to ignite the compressed fuel above the piston 14. Obviously under the force of the explosion, piston 14 will then move downwardly on its power stroke against the action of spring 18, and this cycle of operation is repeated for the continuous operation of the hammer.

It will be understood that the igniting device 20 may be arranged in a suitable battery circuit and for controlling this circuit there is provided a switch consisting of a contact 53 suitably mounted on and insulated from the grip 6 of handle 5 and a contact 52 suitably mounted on and insulated from the handle 1 and bracket 43. Thus as the handle 1 moves downwardly for moving the piston 14 downwardly in the manner above explained, the contact 52 will engage contact 53 thus completing the circuit through the ignition device 20 for firing the charge compressed by the upward movement of the piston 14.

In connection with the above it will be understood that during the desired operation of the hammer, handle 1 is depressed sufficiently to maintain contacts 52 and 53 engaged. Thus it will be seen that when it is desired to stop the operation of the hammer, pressure is released from the handle 1 and under influence of the spring contact 52 handle 1 will move slightly upwardly to separate the contacts 52 and 53.

For scavenging the cylinder 15 the latter is provided with an exhaust port 39 which opens to

the atmosphere. Thus it will be seen that as piston 14 moves downwardly in response to the explosive action of the gases, port 39 as well as port 2 will be uncovered. Thus the burnt gases will escape through the port 39 and the fuel mixture from below the piston 14 will be admitted into the cylinder 15 above the piston 14.

For controlling the supply of fuel through the jets 30 into the carburetor chamber of the block 9, there is accommodated within the valve casing 28 a needle valve 29 arranged to control the jet 30 as shown in Figure 6.

Since the operation of the invention was described as the description of the details of the invention progressed, it is thought unnecessary to repeat in detail the operation of the device, and that the same will be clear from the foregoing.

Having thus described the invention what is claimed as new is:

1. In a device of the character described, the combination with a cylinder having a floating piston reciprocable therein, an impact assembly in the lower end of said cylinder, and a spring acting upon said piston and in opposition to the movement thereof toward said impact assembly; means for initiating movement of the piston against the action of the spring and including a head for said cylinder having a bore therethrough, an actuator rod slidable through the bore in said head and having an inner end adapted to engage the piston for moving the latter downwardly, a tubular rod slidably mounted on said actuator rod, and interengaging means on the actuator rod and on said tubular rod for releasably connecting said rods together when the tubular rod is moved in one direction relative to the actuator rod whereby upon reverse movement of said tubular rod said actuator rod is caused to move inwardly of the cylinder to engage the piston for moving the latter toward said impact assembly in opposition to said spring, and means on the upper end of the cylinder for releasing the rod at the completion of the movement of the piston toward said impact assembly, whereby said actuator rod is free to telescope inwardly of the tubular rod incidental to the return movement of the piston.

2. In a device of the character described, the combination with a cylinder having a piston reciprocating therein; of means for initiating movement of said piston including an actuator rod movable through the upper end of the cylinder and inwardly of the latter to engage the piston to move the latter in one direction, a tubular rod slidable on said actuator rod, said actuator rod being provided adjacent one end thereof with grooves, spring pivoted dogs on said tubular rod engageable with said grooves to releasably secure said rods against relative movement when the tubular rod is moved outwardly of said actuator rod, whereby both of said rods are caused to move inwardly to engage the actuator rod with said piston, and a lug mounted on the upper end of the cylinder in the path of said dogs to release the rods at the completion of the movement of the piston toward said impact assembly, whereby said actuator rod is free to telescope inwardly of the tubular rod upon return movement of the piston.

3. In a device of the character described and in combination with a cylinder having a floating piston reciprocable therein, of means for initiating movement of the piston including a head for said cylinder and having a bore therethrough, an actuator rod slidable through the bore in said head and having an inner end adapted to engage the piston to move the latter in one direction, a tubular rod slidably mounted on said actuator rod, interengaging means on the actuator rod and said tubular rod for releasably connecting said rods together when the tubular rod is moved in one direction relative to the actuator rod whereby upon reverse movement of said tubular rod said actuator rod is caused to move inwardly of the cylinder to engage said piston for moving the latter in said one direction, a handle member pivotally mounted at the head equipped end of said cylinder, a bracket member secured at its respective opposite ends to said handle and having its intermediate portion spaced from said handle, and roller means on one end of said tubular rod and engaging the intermediate portion of said bracket whereby swinging movement of the handle member is transmitted to said tubular rod.

ALBERT F. CRESIEN.