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E. KUHN

2,950,705

INTERNAL COMBUSTION PERCUSSIVE TOOLS

Filed Jan. 28, 1959

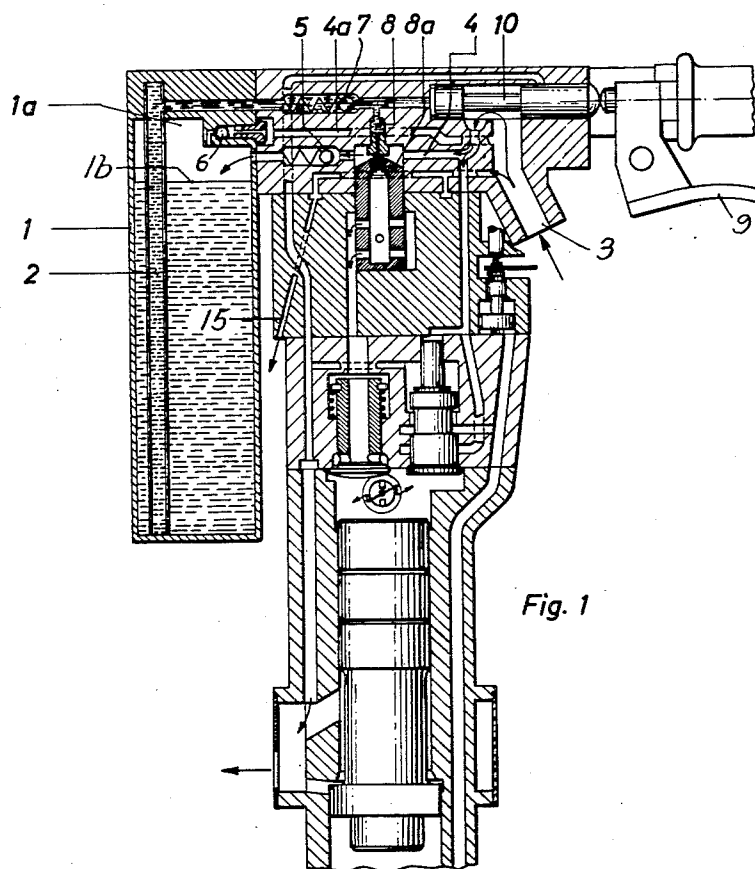


Fig. 1

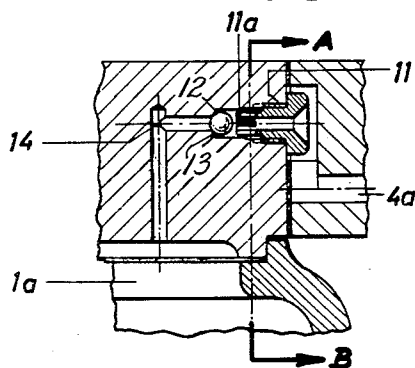


Fig. 2

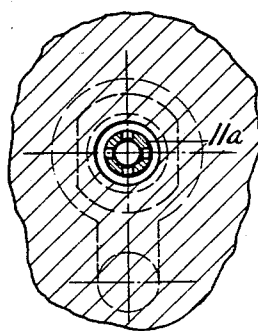


Fig. 3

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2 Claims. (Cl. 123—7)

This invention relates to internal combustion percussive tools and is particularly concerned with such tools which require compressed air for their operation. With such tools the compressed air is fed into a sealed fuel tank having a fuel outlet through which the fuel is forced by the compressed air upon the opening of a hand-operated valve through an ascending pipe, to a carburettor, whence it passes into a combustion chamber of the tool. When the tool is stopped the combustion chamber is vented. Should the compressed air supply fail and the hand-operated valve be inadvertently opened, fuel will flow into the combustion chamber which would become completely flooded, since due to the failure of the compressed air supply, the tool would not start whilst the existence of a super-atmospheric pressure in the fuel tank results in the continued delivery of fuel.

It is an object of the invention to provide an internal combustion percussive tool wherein the danger of such flooding is substantially reduced.

According to the present invention there is provided in an internal combustion percussive tool having a fuel tank arranged to communicate via a manually operated fuel valve with a carburettor of said tool, an inlet arranged to be connected to a supply of compressed air and arranged to communicate via a first non-return valve with an air space in said tank, the action of said compressed air in said air space being to force fuel from said tank to said carburettor upon opening of said fuel valve, said tank being furthermore provided with a second non-return safety valve arranged to vent said air space upon failure of said compressed air supply.

Thus in view of the fact that the fuel tank is vented no fuel can pass into the combustion chamber, even though the manually operated valve is operated.

For a better understanding of the invention and to show how the same may be carried into effect reference will now be made to the accompanying drawings, in which:

Figure 1 is a sectional elevation of part of an internal combustion tool in accordance with the present invention,

Figure 2 is an enlarged sectional elevation of a detail shown in Figure 1, and

Figure 3 is an enlarged sectional view along the line A—B of the detail shown in Figure 2.

Referring to the drawings, the tool comprises a fuel tank 1 having a pressure space 1a and a fuel level 1b. The interior of the tank communicates via an ascending pipe 2, a hand-operated fuel valve 7 with a nozzle 8 of a carburettor 8a. The valve 7 is coupled to an operating lever 9 via a push rod 10. A compressed air supply inlet 3, which is arranged for connection to a compressed air supply installation (not shown) communicating via channels 4 and 4a and respectively oppositely directed non-return valves 5 and 6 with the interior of the tank. The non-return valve 6 which acts as a safety valve can be connected directly to the inlet 3.

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In addition to the parts already mentioned, Figure 2 also shows a safety valve 6 having a through-bored screw 11 with a stop 11a and a ball 12, rectangular bores 14 being provided in the housing of the non-return safety valve 6.

In operation compressed air flows from the inlet 3 via the channels 4 and 4a respectively to the non-return valve 5 and to the non-return safety valve 6. From the non-return valve 5, the compressed air passes into the fuel tank 1, fills the space 1a and presses on the surface 1b of the fuel. At the same time, the air in the channel 4a, which due to the throttling effect of the non-return valve 5 has a higher pressure than the air in the space 1a, biases the ball 12 of the non-return safety valve 6 on to its seating 13 so as to close the valve 6. The fuel under pressure rises through the pipe 2 as far as the hand-operated fuel valve 7 and upon operation of the hand lever 9, the push-rod 10 is moved to the left and the fuel valve 7 is opened. The fuel now flows to the nozzle 8 and carburettor 8a, mixes there with the compressed air, and in its subsequent path feeds the internal combustion tool in a manner known per se.

Should the supply of compressed air fail the pressure in the channels 4 and 4a falls to zero and the tool at once stops. Simultaneously the biasing on the ball 12 is removed and the ball 12 is displaced from its seating under the effect of the super-atmospheric pressure in the fuel tank 1. With the opening of the valve 6 the air in the pressure space 1a of the tank 1 escapes via the bores 14 past the ball 12 through the screw 11 into the space 4a and into the atmosphere through the permanently open cooling air bore 15. If, through inadvertent operation of the lever 9, the fuel valve 7 is opened, no fuel can escape through the nozzle 8 into the carburettor 8a and flood the combustion chamber, because there is no longer any superatmospheric pressure prevailing in the space 1a.

I claim:

1. In an internal combustion percussive tool, a combination comprising a fuel tank, a carburettor of said tool, a manually operated fuel valve through which said tank is arranged to communicate with said carburettor, an inlet of said tank arranged to be connected to a source of compressed air, a first non-return valve of said tank communicating with said inlet by means of a first channel and through which said inlet is arranged to communicate with an air space in said tank so that upon connection of said inlet to said source of compressed air the compressed air forces fuel from said tank upon opening of said fuel valve, and a second non-return valve of said tank communicating with said inlet by means of a second channel and arranged to vent said air space upon failure of said compressed air supply, said non-return valves being oppositely directed so that, when acted on by said compressed air, said first non-return valve is displaced away from its seating whilst said second non-return valve is biased on to its seating.

2. In an internal combustion percussive tool, the combination according to claim 1, wherein said first valve is arranged to introduce a throttling effect upon the flow of compressed air past it into said air space so that the pressure of air in said air space is arranged to be less than the pressure of the compressed air acting on said second valve.

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