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THROTTLE HANDLE

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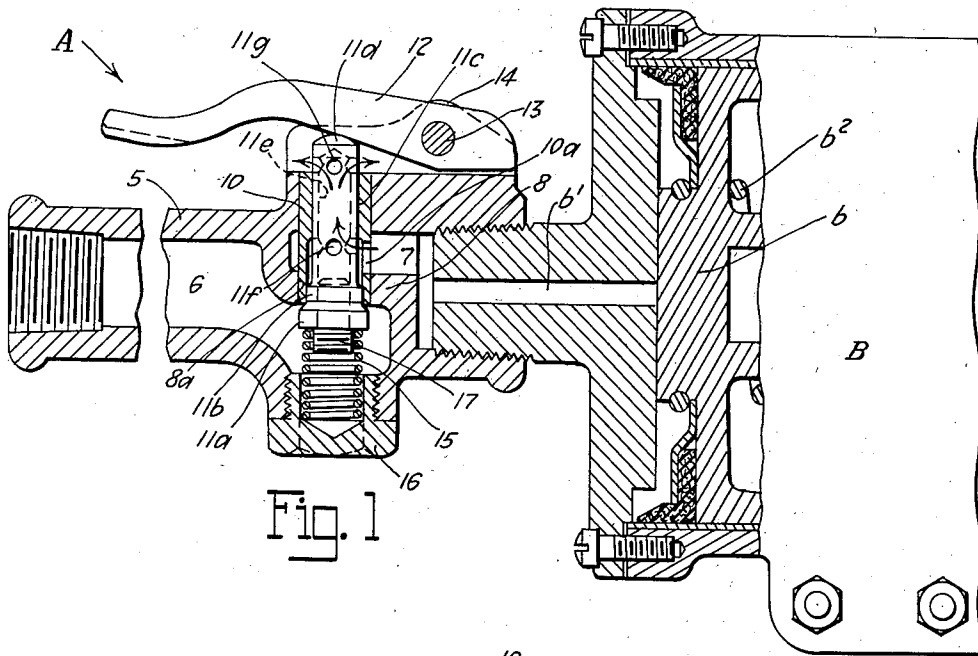


Fig. 1

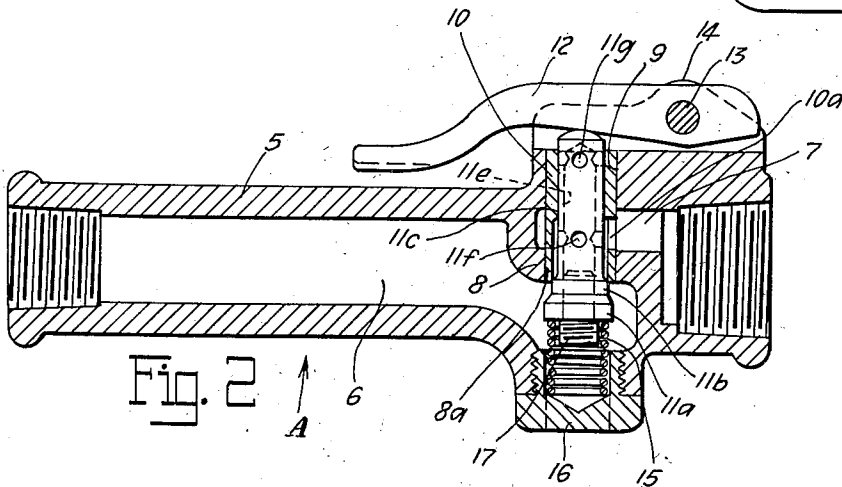


Fig. 2

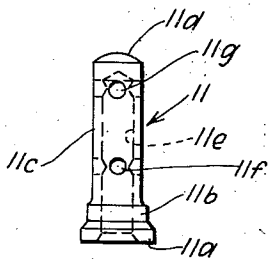


Fig. 3

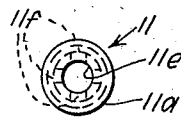


Fig. 4

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THROTTLE HANDLE

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This invention relates to apparatus for controlling the operation of fluid pressure tools and machines. More specifically it concerns throttle control valves, especially when
5 associated with handles for manually supporting or directing the tools or machines.

One object of the invention is to provide an improved throttle arrangement which will control both the fluid inlet and the exhaust
10 of a tool or machine. Another object is to effect such control by the use of but a single control member and without loss of motive fluid. Another object is to provide a simple
15 and inexpensive manual support and throttle device which will effect such objects. Other objects will be apparent from the detailed description which follows.

In order to illustrate the invention, one concrete embodiment thereof is shown in the
20 accompanying drawings in which:

Fig. 1 is a sectional view of the throttle handle as applied to a fluid pressure tool which is shown largely broken away but partly in section;

25 Fig. 2 is a view of the throttle handle alone, showing certain of the parts in a different position; and

30 Figs. 3 and 4 are respectively, a side elevational view and a bottom plan view of the valve plunger.

The embodiment of the invention, chosen for the purpose of illustration, comprises a throttle handle device indicated generally at A and shown as applied to a fluid pressure
35 tool or machine B of any suitable or desired type. In the present instance, the tool B is a squeeze riveter having a piston *b* adapted to be moved in one direction by pressure fluid admitted thereto through a passage *b'* and restored to the position shown on venting of
40 the pressure fluid through the action of a spring *b²*.

The throttle handle device A, to which the invention directly relates, has a grip portion
45 5 having a chamber 6 therewithin adapted to be connected to a source of motive fluid and a second chamber 7 for connection with the inlet passage *b'* of fluid pressure tool B, the chambers being separated by a partition 8
50 having a port 8*a* therethrough for establish-

ing communication therebetween. Device A has a bore or port 9 through the exterior thereof in line with partition port 8*a* and a bushing 10 having a differential bore is seated in ports 8*a* and 9 and traverses a portion
55 of chamber 7 with one or more openings 10*a* in communication with the latter.

A single valve member 11 is slidably mounted in bushing 10 to control the port
60 opening between chambers 6 and 7, the member being in the form of a plunger having a head 11*a* disposed in chamber 6 to engage the inner end of bushing 10, a large diameter part 11*b* adjacent the head and fitting the large
65 diameter part of the bushing bore, and a smaller diameter part 11*c* of much greater length fitting the small diameter part of the bushing bore with an operating end 11*d* extending above and beyond the bushing. Oper-
70 ating end 11*d* is arranged to be engaged by a manual operating lever 12 having a pivotal mounting on a pin 13 supported in ears 14 on throttle handle A. Valve 11 is yieldingly maintained with its head 11*a* in engagement
75 with the lower end of the bushing by a coil spring 15 backed by a plug 16 in threaded engagement with an opening in handle device A beneath the partition bore 8*a*.

Bushing 10 and valve plunger 11 cooperate to provide a vent for chamber 7, the vent
80 preferably taking the form of an axial bore 11*e* in plunger 11 which has axially spaced transverse ports 11*f* and 11*g* communicating therewith, the former being adjacent the large diameter part 11*b* of the plunger and the latter in the projecting operating end
85 11*d*. The axial bore in plunger 11 may be made from either end. In the event that it is made from the lower end, as shown in the drawings, the bore is closed by a suitable plug
90 17 (Figs. 1 and 2) preferably extending beyond head 11*a* so as to serve as a guide for spring 15.

In order to eliminate all waste of pressure fluid, the venting of chamber 7 and the admit-
95 ting of pressure fluid thereto from chamber 7 are not concurrent but sequential, the arrangement being such that the communicating port between chamber 6 and 7 controlled
100 by valve plunger 11 cannot be opened while

the vent for chamber 7 is open. Conversely the vent cannot be opened so long as pressure fluid is being admitted to chamber 7 from chamber 6. This control is effected by a critical determination of the extent of large diameter part 11b on plunger 11 and the positioning of ports 11g to insure that the large diameter part 11b continues to seal the port between chamber 6 and 7 until after the vent ports 11g are closed by the upper end of bushing 10. Fig. 1 shows the valve plunger in the closed position, the chamber 7 being vented through bushing opening 10a, ports 11f, axial bore 11e, and ports 11g which are in communication with atmosphere. Fig. 2 shows the position of the parts when lever 12 has been moved downwardly to such an extent that vent ports 11g are closed by the upper end of bushing 10 and showing the large diameter portion 11b of valve plunger 11 still sealing the port between chambers 6 and 7 but about to open the same on further movement of the operating lever 12.

While the invention has been herein disclosed in what is now considered to be its preferred form, it is to be understood that the invention is not limited to the specific details thereof but covers all changes, modifications, and adaptations within the scope of the appended claims.

I claim as my invention:

1. A throttle device for a fluid pressure machine having a chamber to be connected to said machine and another chamber to be connected to a source of fluid pressure, a partition separating said chambers and having a port therethrough, and a movable valve member controlling said port, said member extending beyond said device and providing a vent in its extended portion for said machine chamber but arranged to seal said port so long as said vent is open.

2. A throttle handle for a fluid pressure tool providing two chambers, a partition separating said chambers and having a port therethrough, said handle having a port in the exterior thereof in line with said partition port, a single valve member slidably arranged in said ports to control the connection between said chambers, said member providing a vent for one of said chambers and having means maintaining a seal at said partition port so long as said vent is open.

3. A throttle handle for a fluid pressure tool providing two chambers, a partition separating said chambers and having a port therethrough, said handle having a port in the exterior thereof in line with said partition port, a bushing seated in said ports and traversing one of said chambers, a single valve member slidably mounted in said bushing for controlling said partition port, and means providing a vent for said bushing traversed chamber under control of said valve, said parts being so arranged that said

valve member seals said partition port so long as said vent is open.

4. A throttle handle for a fluid pressure tool providing two chambers, a partition separating said chambers and having a port therethrough, said handle having a port in the exterior thereof in line with said partition port, a bushing seated in said ports and traversing one of said chambers, said bushing having a two diameter bore and an opening into said last named chamber, a valve member slidably mounted within said bushing for controlling said partition port and having an axial bore providing a vent for said last named chamber, said valve member being constructed and arranged so that said vent is open only when said partition port is sealed.

5. A throttle handle for a fluid pressure tool providing two chambers, a partition separating said chambers and having a port therethrough, said handle having a port in the exterior thereof in line with said partition port, a bushing seated in said ports and traversing one of said chambers, said bushing having a two diameter bore and an opening into said last named chamber, a two diameter valve member slidably mounted in said bushing for controlling said partition port, means providing a vent for said last named chamber including an axial bore in the small diameter portion of said valve member, and means for closing said vent when and before said valve member is moved to a position to open said partition port.

6. A throttle handle for a fluid pressure tool providing two chambers, a partition separating said chambers and having a port therethrough, said handle having a port in the exterior thereof in line with said partition port, a bushing seated in said ports and traversing one of said chambers, said bushing having a two diameter bore and an opening into said last named chamber, a two diameter valve member slidably mounted in said bushing for controlling said partition port and having an operating end extending above said bushing, said valve member having an axial bore in the small diameter portion thereof with transverse ports in the plane of said bushing opening and in its exposed end to provide a vent for said last named chamber, the large diameter portion of said valve being of sufficient length to maintain a seal at said partition port until the vent port in the exposed end of said valve member is sealed by said bushing.

7. A throttle handle for a fluid pressure tool providing two chambers, a partition separating said chambers and having a port therethrough, said handle having a port in the exterior thereof in line with said partition port, a bushing seated in said ports and traversing one of said chambers, said bushing having a two diameter bore and an opening

into said last named chamber, a two diameter valve member slidably mounted in said bushing and having a head to engage the inner end of the bushing and an operating end extending above the outer end of the bushing, means for yieldingly maintaining said head against said bushing, a lever mounted on said handle and engaging said operating end to move said valve member against said yielding means, said valve member having an axial bore in the small diameter portion thereof with transverse ports in the plane of said bushing opening and in its exposed end to provide a vent for said last named chamber, the large diameter portion of said valve being of sufficient length to maintain a seal at said partition port until the vent port in the exposed end of said valve member is sealed by said bushing.

8. A combined throttle valve and vent member comprising an elongated plunger having differential concentric portions, the large diameter portion being at one end and of relatively small length, the smaller diameter portion having an axial bore with a transverse port therefrom adjacent said large diameter portion.

9. A combined throttle valve and vent member comprising a plunger having a head and a differential extension thereon providing a large diameter part immediately adjacent said head and a smaller diameter part of greater length therebeyond, an axial bore in said smaller diameter part and a transverse port communicating with said bore adjacent said large diameter part.

10. A combined throttle valve and vent member comprising a plunger having a head and a differential extension thereon providing a large diameter part immediately adjacent said head and a smaller diameter part of greater length therebeyond, an axial bore in said smaller diameter part and axially spaced transverse ports communicating with said bore.

Signed by me at Detroit, in the county of Wayne, and State of Michigan, this 25th day of September, 1928.

EDWARD W. STEVENS.