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GOVERNOR FOR PRESSURE FLUID OPERATED TOOLS

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Fig 1

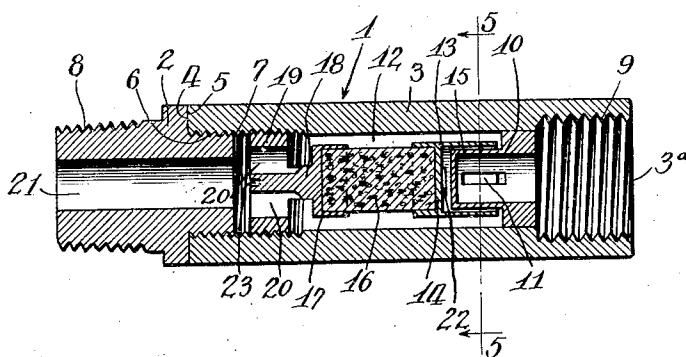


Fig 2

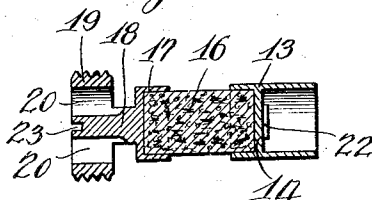


Fig 3

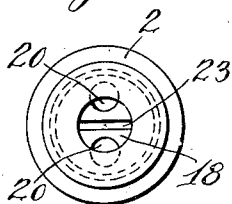


Fig 4

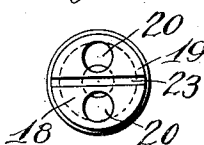
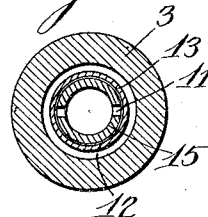


Fig 5



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UNITED STATES PATENT OFFICE.

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GOVERNOR FOR PRESSURE-FLUID-OPERATED TOOLS.

Application filed August 29, 1925. Serial No. 53,241.

The invention relates generally to automatic governors and more particularly to governors for pressure fluid operated tools, such as pneumatic grinders, drills, etc.

5 In the pressure fluid supply line of a tool of this type it is desirable to have an automatic governor which will pass a relatively small quantity of pressure fluid to the tool when the tool is "idling" or "running light," 10 thereby preventing excessive speed of the tool and waste of pressure fluid; but which, upon application of a load to the tool automatically will pass relatively larger quantities of pressure fluid as the load increases.

15 It is the general object of the invention to provide a new and improved governor of simple construction which will afford such control for a pressure fluid operated tool.

In order that a governor of this type shall 20 operate efficiently it is necessary that the internal mechanism, which is normally in contact with the pressure fluid, be composed of materials unaffected by steam, oil or other fluids ordinarily encountered in devices of 25 this kind and be of such construction as to be free to operate even though foreign matter should collect thereon. It is another object of the invention to produce a governor which incorporates an actuating element embodying these features.

30 Cork is practically unaffected by such fluids. A block of cork, if compressed longitudinally until its length is reduced to about one-tenth of the original length does 35 not increase appreciably in cross section. Upon release the cork will expand longitudinally to about three-quarters of its original length with the new characteristic that it is softer than before and resilient but 40 longitudinally only, that is, after such treatment the cork may be compressed longitudinally under fairly low pressure while it retains its original rigidity transversely. It is possible to repeatedly compress and release 45 the cork many times without losing this resiliency. If placed in a container and subjected to fluid pressure on all sides the cork will shorten without expanding noticeably in a transverse direction.

50 It is a further object of the invention to incorporate a block of cork as the actuating element of a valve in a governor for pressure fluid operated tools, the cork having first been treated as described above.

55 In pursuance of the foregoing objects, I

aim to provide an improved governor comprising a casing having a pressure fluid passage therethrough controlled by a valve which has an actuating element of cork. 60 treated in this manner, the valve being arranged normally to permit a relatively small amount of pressure fluid to pass through the casing, but, upon increase of back pressure in the valve chamber such as occurs when a load is applied to the tool, being adapted 65 automatically to permit increasing quantities of pressure fluid to flow as the load increases.

Further objects and advantages will become apparent as the description proceeds. 70

In the drawings:

Figure 1 is a central longitudinal section illustrating one form of the invention.

Fig. 2 is a central longitudinal section of the valve and mounting therefor. 75

Fig. 3 is a view looking at the left end of Fig. 1.

Fig. 4 is a view looking at the left end of Fig. 2.

Fig. 5 is a sectional view along line 5-5 of 80 Fig. 1.

While I have shown in the drawings and will herein describe in detail the preferred embodiment of my invention, it is to be understood that I do not thereby intend to 85 limit the invention to the specific form disclosed, but aim to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims. 90

In the exemplary form illustrated, the governor comprises a casing 1 adapted to be connected in a pressure fluid supply line (not shown), this casing being herein shown 95 as composed of two sections 2 and 3 having abutting shoulders 4 and 5 held in air-tight engagement by means of the screw-threaded portions 6 and 7 of the sections. The section 2 is also screw threaded at 8 and the section 3 at 9 to readily permit coupling of 100 the casing in a pressure fluid supply line.

As viewed in Fig. 1, the right hand end 3^a is the normal intake end of the governor. At this end a hollow cup-shaped plug 10 is 105 suitably mounted in the casing section 3, the plug herein shown being a press fit. This plug has openings 11 in the wall thereof to establish communication between the valve chamber 12 and the intake end 3^a of the governor. 110

Various forms of valves may be used to close these openings to regulate the flow of pressure fluid therethrough, the preferred form illustrated in the drawings comprising a cylindrical member 13 having a transverse wall 14, this member 13 fitting loosely over the inwardly extending portion 15 of the plug 10 so as to be guided thereby. For operating this valve a block of cork 16 treated as hereinbefore described is mounted as by means of a suitable cement, with one end in the valve member 13 and the other end in a cup-shaped portion 17 of a valve mounting member 18. This member 18 comprises a threaded flange portion 19, in engagement with the threaded portion 7 of the casing section 3 to permit of longitudinal adjustment therein, and the cup-shaped portion 17 hereinbefore mentioned. In the flanged portion 19 are provided passageways 20 to establish communication between the valve chamber 12 and the outlet bore 21 of the casing section 2.

In the form illustrated the valve member 13 has a vent 22 therethrough to equalize, at all times, the pressure in the chamber formed between the said valve member and the plug 15 and the pressure in the valve chamber 12. The wall 14 is adapted to limit the movement of the valve in closing the openings 11, so that with the surface of the wall contacting the plug 10 a sufficient portion of the openings 11 remains uncovered to permit the passage of pressure fluid to operate a tool when "idling". The mounting member 18 has a diametrical groove 23 therein adapted to be engaged by a screw driver to facilitate adjustment of the entire valve structure longitudinally of the casing when it is desired to adjust the normal position of the valve or to increase or decrease the pressure which the valve 13 normally exerts on the plug 10.

In operation, with the end 3^a of the governor connected to the pressure fluid supply line and the other end connected to a pressure fluid operated tool, the small amount of pressure fluid permitted to pass through the openings 11 with the valve 13 in its closed position is predetermined and is designed to operate the tool at an idling speed, i. e., a safe speed with no load on the tool. Under such conditions the pressure required to operate the tool is very small so that the pressure in the valve chamber 12 is but slightly above atmospheric. When a load is applied to the tool the speed of the tool decreases and the pressure in the valve chamber increases until it is sufficient to compress the cork 16 longitudinally to operate the valve 13 and thereby permit increased quantities

of pressure fluid to pass through the governor.

From the foregoing it will be apparent that I have provided a governor for pressure fluid operated tools of simple and improved construction wherein there are no closely fitted sliding surfaces to be affected by deposits of foreign matter, which has a valve actuating device that is unaffected by moisture, oils, etc., and which automatically will permit increasing quantities of pressure fluid to flow through the governor to a tool as the load upon the tool increases.

I claim as my invention:

1. A governor of the character described having, in combination, a casing, a cup-shaped plug mounted at one end thereof and having an aperture therein to permit flow of pressure fluid therethrough, a valve guided by said plug and normally tending to close said aperture, means to operate said valve comprising a longitudinally resilient cork carried by a member in screw-threaded engagement with said casing, said member being adjustable in the casing to vary the pressure which the valve normally exerts on said plug.

2. A governor of the character described having, in combination, a casing having a pressure fluid passage therethrough, a valve adapted to close the larger portion of said passage, means comprising a longitudinally resilient cork tending normally to hold said valve closed, said cork being yieldable to the pressure of the pressure fluid to open said valve, and means for adjusting the normal position of said valve.

3. A governor of the character described having, in combination, a casing having a passage to permit flow of pressure fluid therethrough and a valve device adapted normally to restrict said passage, said valve device comprising a block of cork previously compressed longitudinally to approximately one-tenth its original length.

4. A governor of the character described having, in combination, a casing and a longitudinally resilient cork mounted therein and carrying a valve to control the flow of fluid through the casing.

5. A governor of the character described having, in combination, a casing and means therein carrying a valve to control the flow of fluid through the casing, said means comprising a solid block of material compressible longitudinally but relatively non-compressible transversely.

In testimony whereof, I have hereunto affixed my signature.

ERNEST H. SHAFF.