Dec. 22, 1959 J. KAPITULA 2,918,337

PISTONS

Filed July 16, 1957

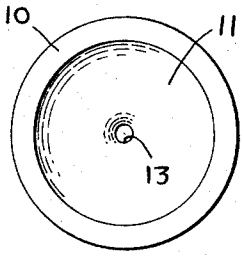


FIG. 2

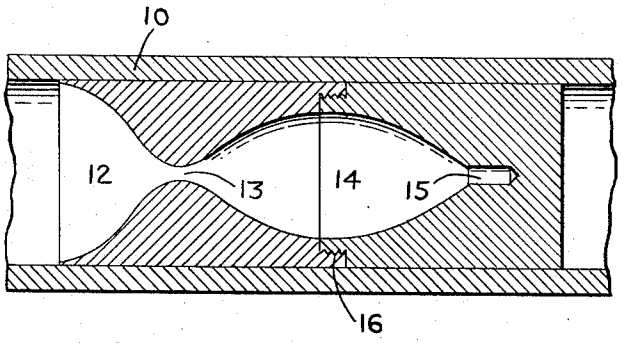
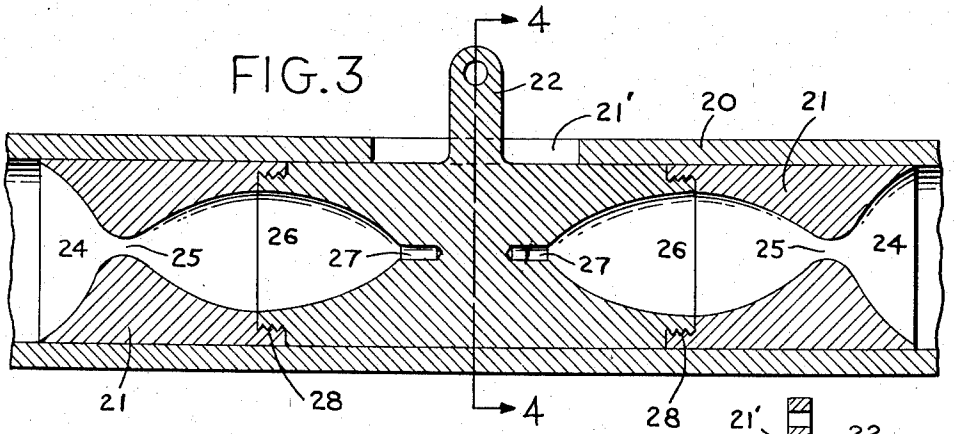


FIG. 1

FIG. 3



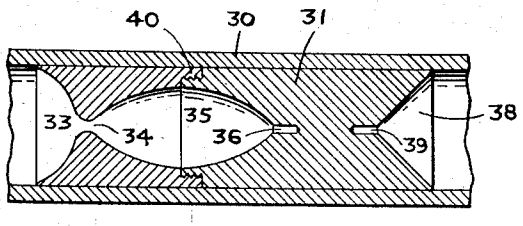


FIG. 5

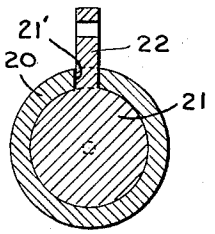


FIG. 4

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PISTONS

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4 Claims. (Cl. 309—4)

This invention relates to pistons, as for internal combustion engines, jacks, hammers, etc., operated by the power of gas, steam, compressed air, or hydraulically, and has several advantages and numerous applications, as hereinafter pointed out and appreciated by those skilled in the art.

The drawings illustrate different forms of the invention, and in these

Fig. 1 is a central longitudinal section of a piston within a cylinder;

Fig. 2 is an end view of Fig. 1;

Fig. 3 is a central longitudinal section of a modified form of piston;

Fig. 4 is a cross section taken on line 4—4 of Fig. 3;

Fig. 5 is a central longitudinal section of another modification.

Referring to the drawings for a detailed description thereof, I show in Figs. 1 and 2, a cylinder **10** containing a piston **11**. The piston contains a symmetrical, central cavity extending inwardly from one end, said cavity comprising a funnel shaped end portion **12**, which at its outer end has a diameter approximating that of the piston. This portion of the cavity serves to funnel the motive medium into a constricted portion **13**, which functions as a venturi tube. Adjacent to, and inwardly of, the venturi, there is a section **14**, substantially oval in longitudinal section, and beyond section **14** there is a constricted blind section **15**. For practicability in forming the cavity described, the piston is made in 2 sections threadedly connected as shown at **16**. The form of cavity described increases the area of pressure and therefore increases efficiency, the venturi or constricted section **13** functioning to increase the velocity of the motive medium therethrough and building up pressure therebeyond, especially in the contricted end section **15**, thus enabling a given pressure to be obtained with a smaller piston and diminishing the weight of the engine. This type of piston is useful for internal combustion engines, hydraulic pumps with either driving or driven pistons, hydraulic arbor presses, etc.

In Figs. 3 and 4, I show a cylinder **20**, having a piston **21** slidable therein. The cylinder has a longiudtnal slot **21'** to accommodate movement of an arm **22**, which extends from the middle of the piston through the cylinder. This form of piston has similar cavities extending inwardly from each end, the cavities being of the same form as that of Fig. 1. The cavities of Fig. 3 have parts

numbered **24**, **25**, **26** and **27**, corresponding respectively to the described parts **12**, **13**, **14** and **15** of the cavity in Fig. 1. As in piston **11** of Fig. 1, this piston **21** is in two sections threaded together at **28**. This type of piston is useful, for example, in aircraft servo units, wherein the movement of a piston is hydraulically controlled and is connected to ailerons, rudders and elevators for automatic control of the plane. With the form of cavity described, there is obtained a greater pressure with a given size of piston. This piston is also useful in free piston engines by eliminating the arm **22** and the slot **21**.

In Fig. 5, I show a cylinder **30**, with a piston **31** therein. This piston has cavities extending from both ends, but they are of different form and develop different pressures. The cavity at the left is of the same form as shown in Figs. 1 and 3, and consists of parts **33**, **34**, **35** and **36**, which correspond respectively to parts **12**, **13**, **14** and **15** of the cavity in Fig. 1. The cavity at the right end of the piston **31** is conical, as indicated at **38**, with a constricted cylindrical portion **39** at the inner end thereof. The piston is in two parts threaded together at **40**. This type of piston is useful in hydraulic or compressed gas systems. The two forms of cavity in this piston give a differential pressure, as desirable, for example, where two systems are to be operated from the same line but at different pressures, the pressure at the left end of the piston being greater than that at the right end.

What is claimed is:

1. A piston having a blind cavity in an end thereof, said cavity formed into a funnel-shaped portion adjacent to the end of the piston and having a constricted or venturi portion connecting with the funnel-shaped portion, and having, further, a third section adjacent to and connecting with the venturi section, said third section enlarging in diameter from the venturi section and then diminishing in diameter, and a fourth constricted section at the inner end of the third section.

2. The piston specified in claim 1, in which there is a cavity in the other end of the piston.

3. The piston specified in claim 1, in which there is a similar cavity in the other end of the piston.

4. The piston specified in claim 1, in which there is a conical cavity in the other end of the piston, with a constricted portion extending inwardly from the apex of said conical portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,759,160	Lang	May 20, 1930
1,803,263	Lang	Apr. 28, 1931
2,573,536	Bodine	Oct. 30, 1951
2,662,510	French	Dec. 15, 1953

FOREIGN PATENTS

351,633	Great Britain	July 2, 1931
313,228	Switzerland	Mar. 31, 1956

OTHER REFERENCES

Benz: German application, Ser. No. 1,006,665, printed April 18, 1957 (Kl 46a² 79/01), 2 pp. spec. 1 sht. drg.