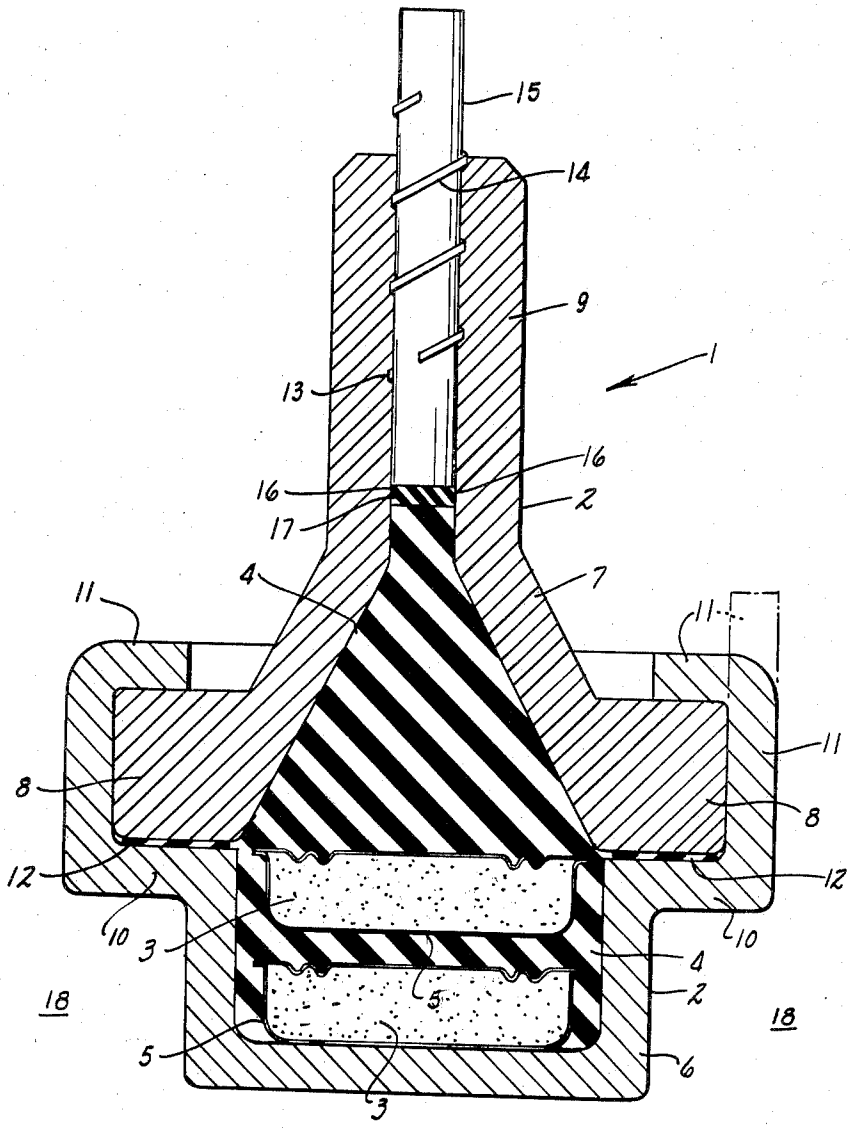
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POWER ELEMENT

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POWER ELEMENT

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This invention relates to a power element operable by pressure change in a pressure-producing material. The pressure-producing material may be a contained thermally expansible material as for example disclosed in U. S. Patent No. 2,259,846, or the pressure-producing material may be a pressure fluid introduced from a remote source as illustrated in Fig. 3 of the U. S. Patent No. 2,534,497.

Power elements of the above discussed type usually include a housing for the pressure-producing material, and a piston slidably mounted in the housing. Pressure change in the pressure-producing material causes the piston to move rectilinearly into and out of the housing.

For certain applications it is desirable that the piston have a rotary movement instead of or in addition to a rectilinear movement. A principal object of the present invention is to provide for rotary piston movement in an economically formed power element construction.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawing Fig. 1 is a sectional view through one embodiment of the invention.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is shown a power element **1** including a housing **2**, pressure-producing material **3**, and a body of force-transmitting material **4**.

Pressure-producing material **3** may be any of several thermally expansible materials, as for example the vinyl chloride polymer-diphenyl-heat conducting particle material disclosed in U. S. Patent No. 2,259,846. For certain applications the pressure within housing **2** may be developed by introducing pressure fluid into the housing from a remote source as illustrated in Fig. 3 of U. S. Patent No. 2,534,497.

In the illustrated embodiment pressure-producing material **3** is contained within expansible-contractible metal envelopes **5** of the type disclosed in copending applications, Serial No. 513,455, filed on June 6, 1955. Force transmitting material **4** is in the illustrated embodiment

the pliable material formed of discrete particles of polytetrafluoroethylene in a carrier of polyethylene. This material may be compounded in the manner disclosed in copending application, Serial No. 498,655, filed on April 1, 1955.

Housing **2** includes a cup element **5** and a cover element **7**. Element **7** includes an annular wall portion **8** and a sleeve portion **9**. Element **6** includes an annular shoulder **10** and a peripheral flange **11**. Assembly of elements **5** and **6** is effected by turning an edge portion of flange **11** down from its dotted line position to its full line position in clamping engagement with annular wall portion **8**. An annular gasket **12** is provided between wall portion **8** and shoulder **10** for sealing the joint between elements **6** and **7**.

Sleeve portion **9** is internally threaded at **13** for meshingly engaging threads **14** formed on shaft **15**. A conventional spring mechanism (not shown) may be provided for urging shaft **15** into housing **2** during pressure decrease in material **3**. In order to prevent any of material **4** from being squeezed or extruded into joint **16** (between the lower end of shaft **15** and the internal surface of sleeve portion **9**) there is provided an "anti-extrusion" disk **17** formed of polytetrafluoroethylene.

Operation of power element **1** is such that during temperature increase in ambient atmosphere **18** material **3** expands so as to expand envelopes **5** from their illustrated configurations. Expansion of envelopes **5** causes material **4** to exert an upward pressure on disk **17**. This upward pressure causes shaft **15** to move rectilinearly and rotatably upward in sleeve portion **9**. During temperature decrease the pressure within material **3** decreases so as to allow the spring mechanism to return shaft **15** to its illustrated position.

Power element **1** may be employed to operate any of several different devices, as for example a valve or a switch. Either housing **2** or shaft **15** may be fixedly secured to the operated device, depending on the particular construction and position of the device being operated.

I claim:

1. A power element comprising a housing, said housing including an internally threaded sleeve; pressure-producing material within the housing; a threaded shaft meshingly engaged with the threads in the sleeve; and force-transmitting material within the housing between the shaft and pressure-producing material.

2. A power element comprising a housing; said housing including a cup element having an annular shoulder radiating outwardly from its mouth, and a cover fixedly positioned on said shoulder and overlying the cup element mouth, said cover including an interiorly threaded tubular extension; a threaded shaft meshingly engaged with the threads in the tubular extension; pressure-producing material within the housing; and force-transmitting material within the housing between the shaft and pressure-producing material.

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