J. F. SCOTT.

POWER CHAMBER.

APPLICATION FILED JUNE 9, 1916.

1,231,302.

Patented June 26, 1917.

2 SHEETS—SHEET 1.

Fig. 2,

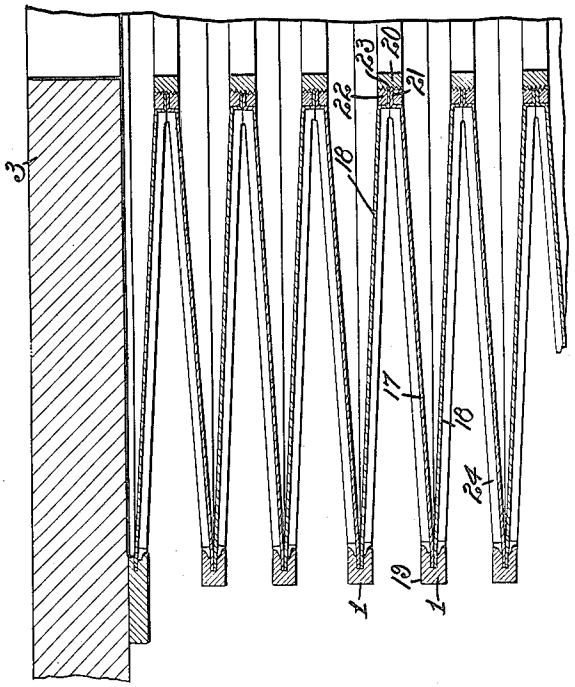
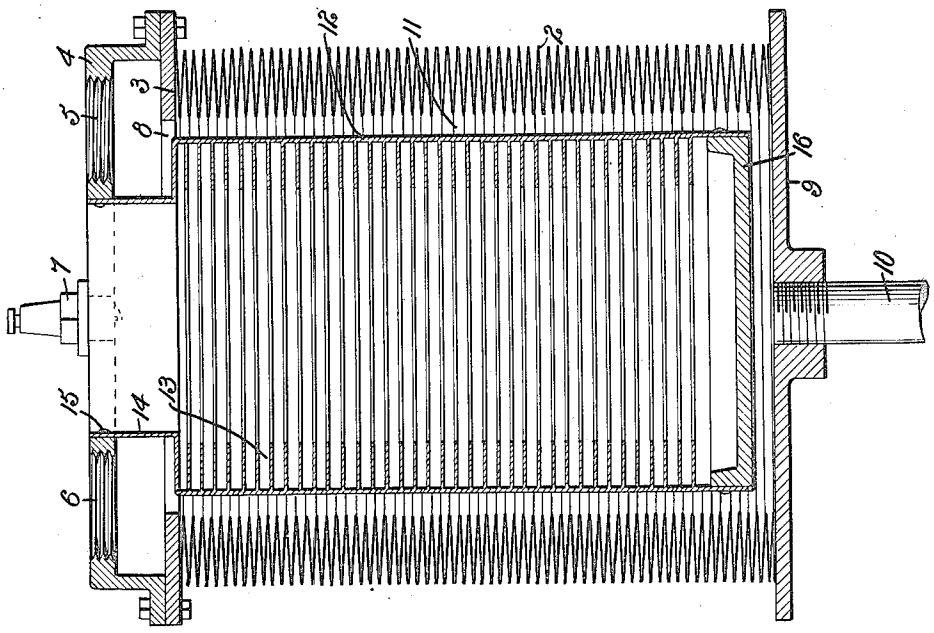


Fig. 1,



WITNESSES

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Fig. 2.

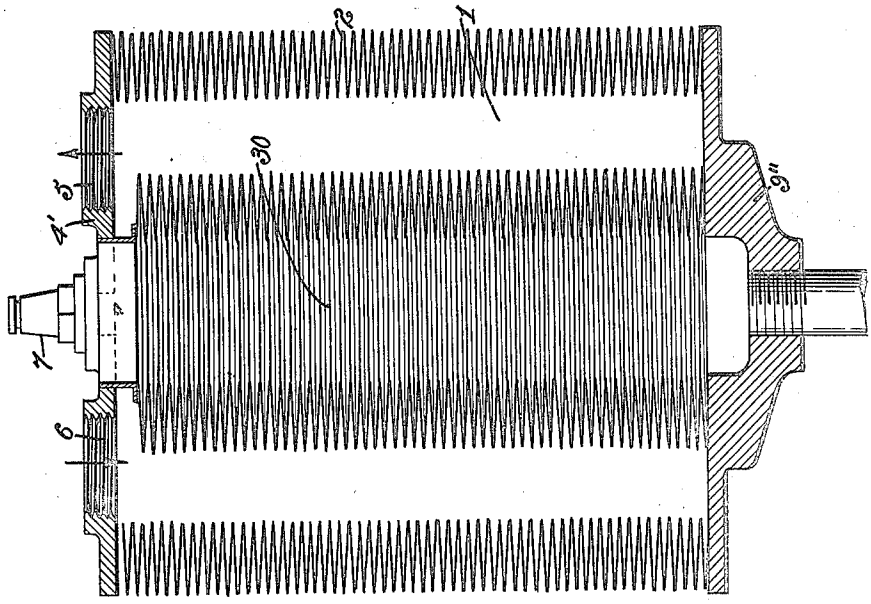
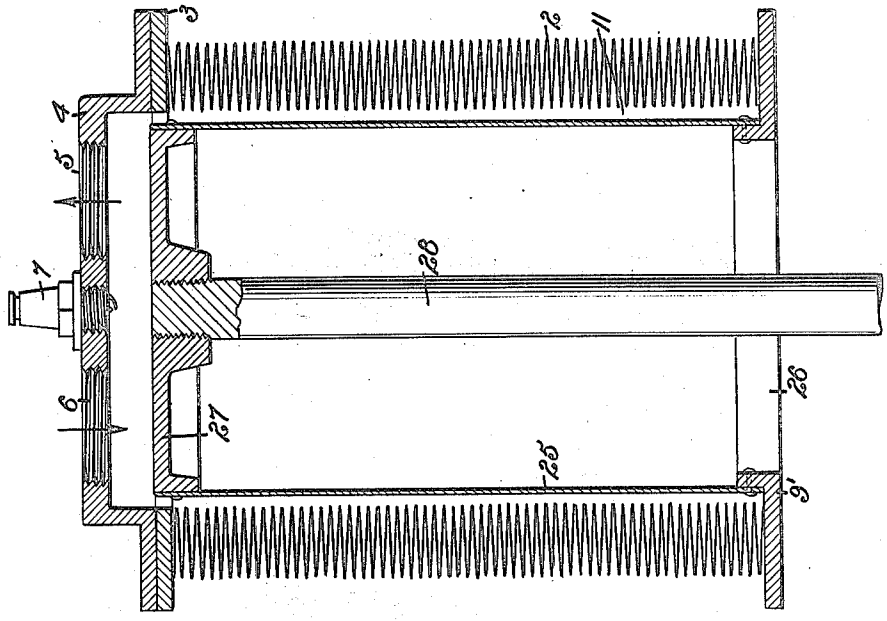


Fig. 3.



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POWER-CHAMBER.

1,231,302. Specification of Letters Patent. Patented June 26, 1917.

Application filed June 9, 1916. Serial No. 102,631.

To all whom it may concern:

Be it known that I, JAMES F. SCOTT, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Power-Chamber, of which the following is a full, clear, and exact description.

This invention relates to power members and particularly to an improved chamber especially designed for use in explosive engines, and has for an object the provision of an improved construction wherein any desired compression may be secured in order to produce a maximum result or maximum return for the fuel used.

Another object in view is to provide an improved arrangement which is an improvement over my former Patent No. 1,180,947, said improvement resulting in a better compression and a maximum return for the fuel used.

A still further object of the invention is to provide a power chamber in which an expanding bellows construction is used having central apertures or openings forming part of the area of the chamber and means arranged in said area for occupying all or part of the same in order to reduce the area so that a proper compression may be produced.

In the accompanying drawings:—

Figure 1 is a longitudinal vertical section through a cylinder disclosing an embodiment of the invention.

Fig. 2 is an enlarged detail fragmentary sectional view of part of the cylinder shown in Fig. 1, the same disclosing the detail arrangement of the plates forming the bellows.

Fig. 3 is a sectional view similar to Fig. 1 but disclosing a slightly modified form of the invention.

Fig. 4 is a sectional view similar to Fig. 1 disclosing a further modified form of the invention to that shown in Figs. 1 and 3.

In constructing power cylinders similar in the broad idea to that disclosed in my prior patent above mentioned, it has been found desirable to make the central openings in the disk comparatively large which consequently produces a large open space. This open space, by reason of its size, will prevent the proper compression of gases drawn into the cylinder unless special means are provided for causing a proper compression. The means utilized is a filling member of some kind which will almost fill the space thus provided centrally of the bellows structure, said filling member being either movable or stationary as desired.

The accompanying drawings show one embodiment of the invention in which the sections 1 form a cylinder 2, said cylinder being provided with an end plate 3 at one end to which is secured a casing 4 having inlet and exhaust ports 5 and 6, respectively, and also a spark plug 7. The plate 3 is provided with a comparatively large central opening 8 so that a free passage may be provided between the casing 4 and the chamber 2. At the opposite end of chamber 2 to plate 3 is a head or plate 9 to which a power transmitting member 10 is connected so that the power may be transmitted from the cylinder to do any desired useful work.

The sections 1, as shown in Fig. 1, are provided with large openings centrally which produce an open space 11, said open space being almost entirely filled by member 12, which member is preferably hollow and is also preferably provided with radiating fins 13, said fins being shown annular but it is evident that the same may be formed so as to extend longitudinally of the member 12 without departing from the spirit of the invention. The casing 4 is provided with an opening centrally thereof in which the extension 14 of member 12 projects, said extension being secured to the casing 4 in said opening by suitable securing means, as for instance, screws 15, whereby the interior of the chamber or filling member 12 is open to the atmosphere in order to allow a proper radiation of heat.

In case the parts are arranged as shown in Fig. 1 and the cylinder is operated for drawing in a charge of explosive mixture, the head 9 will move away from member 12 and in doing so will produce an open space between the end 16 of member 12 and head 9 whereby a strong suction is produced. Upon the return stroke the explosive mixture is forced away from between members 9 and 16 and compressed in the open space 11 which is not occupied by member 12. By

increasing or decreasing the size of member 12 substantially any compression may be secured.

As shown in Fig. 2, each of the sections 1 is made from plates 17 and 18 of resilient metal fitted into an outer member 19, said outer member being a ring. If desired, however, the outer edge of the plates 17 may be riveted or otherwise rigidly secured together. The inner ends of adjacent sections may be connected together by rivets, welding or any other way as preferred, the way shown in the drawing being by a ring 20 and nuts 21 and 22 threaded thereon, said nuts pinching the extensions 23 of plate 17 and the plate 18 of the next adjacent section 1. The plates or disks 17 and 18 are preferably very thin and flexible so as to easily flex without injury to the metal when in use. However, in order to withstand the pressure of the explosion a plurality of reinforcing ribs 24 of any suitable construction may be used, as for instance, the construction shown in my previous patent above mentioned.

In Fig. 3 a slightly modified arrangement is shown to that disclosed in Fig. 1 in which the cylinder or filling member 25 is connected to the head 9', which head is formed with a central opening 26 so that air may freely pass into the cylinder 25. A cylinder head 27 is connected with the cylinder 25 to which the rod or power transmission 28 is secured. In this form of the invention it will be observed that the filling cylinder moves back and forth as the power cylinder is used, whereas in Fig. 1 the power cylinder moves for actuating the member 10 while the filling member 12 is held stationary.

In Fig. 4 a slight further modified form of the invention is shown in which the same principles are involved but the filling member 30 is a bellows construction similar to the cylinder 2 though of less diameter and occupying any desired amount of the space 11. When the bellows construction 30 is used the same is connected to the casing 4' at one end and head 9'' at the opposite end and expands and contracts with the cylinder 2. It is evident that the filling members in all forms of the invention are gas tight or substantially gas tight so as to hold the gas during the compression and during the expansion whereby the gas may properly operate the parts. This arrangement of cylinder 2 is very desirable for structural reasons and as shown in the drawings discloses disks connected together having a large central opening into which a filling member is positioned so as to fill as much of the space as is necessary and afford a proper proportion for intake and compression of fuel.

What I claim is:

1. In a power chamber of the character described, a bellows construction having an opening centrally, a movable head connected with said bellows construction, a fixed head connected with the opposite end of said bellows construction, and a collapsible filling cylinder arranged in said opening.

2. In a power chamber of an internal combustion engine, a bellows structure formed of a plurality of collapsible sections connected together, said sections having a comparatively large opening at the point of connection, a collapsible filling member substantially filling said opening, a fixed end member connected to one end of said bellows structure, and a movable end member connected to the other end of said bellows structure.

3. In a power chamber for internal combustion engines, a plurality of collapsible sections connected together, said sections having a comparatively large opening centrally, each of said sections being formed from a pair of disks, means for connecting the outer periphery of said disks rigidly together and bracing means for supporting the disks, a head connected to one end of said sections, a flexible collapsible filling member substantially filling said opening, and means connected with the opposite end of said collapsible sections to said head for transmitting power.

4. In a power chamber for internal combustion engines, a head provided with an opening therein, a collapsible construction connected with said head, said collapsible construction having a comparatively large opening centrally thereof, a collapsible filling member connected with said head, said filling member substantially filling the opening in said collapsible construction, said filling member also being connected to said head and fitting in said opening in the head so that the interior of the filling member will be in free communication with the atmosphere, and a movable head connected with said collapsible construction for transmitting power therefrom.

5. In a power chamber for internal combustion engines, a collapsible bellows structure provided with a comparatively large bore centrally, a fixed head connected to one end of said bellows structure, said fixed head having an inlet and exhaust port, a movable head connected with the opposite end of said bellows structure, said movable head having an opening therein, a collapsible filling chamber connected with said heads and substantially filling the bore of said collapsible bellows when the bellows have been collapsed, and a power member connected to said movable head for transmitting power from the power chamber.

6. In a power chamber for internal combustion engines, a collapsible bellows structure having a bore centrally thereof, a fixed head connected with one end of said bellows

structure, said fixed head having inlet and outlet openings, a movable head connected with said bellows structure, and a collapsible filling cylinder connected with said fixed head and said movable head, substantially filling said bore when the bellows structure is collapsed.

7. In a power chamber of the character described, a collapsible bellows structure having a central bore, a head fixed to one end of said bellows structure, said head having inlet and outlet openings, a movable head connected to the opposite end of said bellows, and a filling bellows structure arranged in the end of the bore in the first mentioned bellows structure, said filling structure being connected to the fixed head and movable head and open at both ends whereby as the movable head moves back and forth air will be drawn into and expanded from the filling member and thereby maintain the same cool.

8. A power chamber having a plurality of flexible collapsible walls disposed one within the other and rigid end walls connected to the ends of all of said flexible walls, one of said end walls being movable toward and from the other end wall.

9. In a power chamber for internal combustion engines, a head provided with an inlet and exhaust, a collapsible cylindrical member connected with said head, said member having an opening centrally thereof, a movable head connected with said collapsible cylindrical member and adapted to be moved away from the said head when drawing in a charge of explosive mixture and moved toward said head for compressing said explosive mixture, and a filling member formed of collapsible sections substantially filling said opening when the collapsible member is in a collapsed condition, whereby the compression of said explosive mixture is increased in proportion to the distance as the movable head approaches its original position.

JAMES F. SCOTT.