

1,037,859.

Patented Sept. 10, 1912.

2 SHEETS—SHEET 1.

Fig. 1

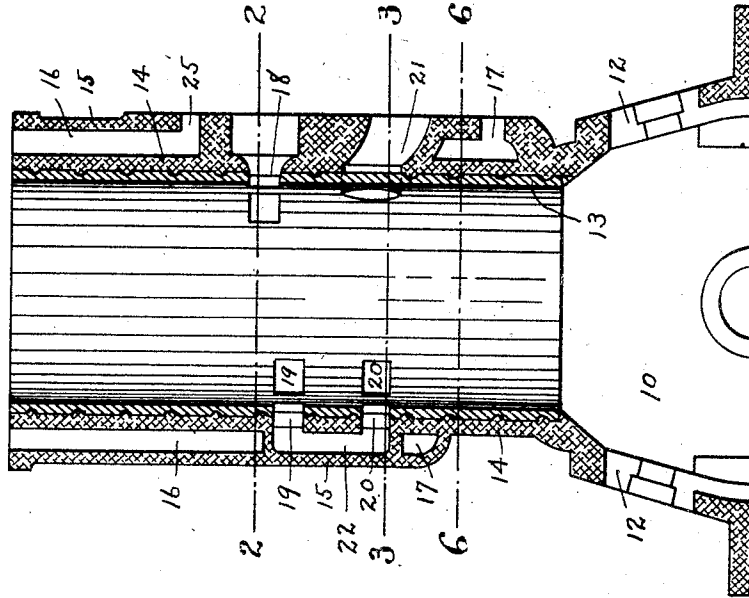


Fig. 2-

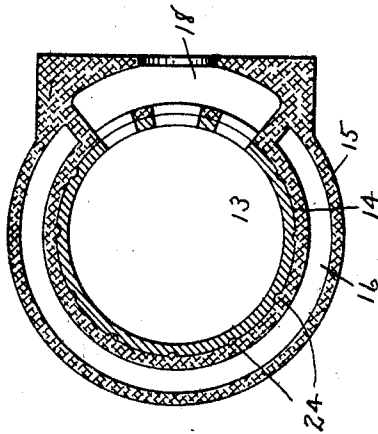
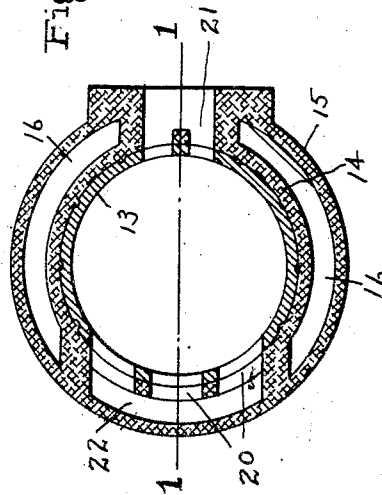


Fig. 3-



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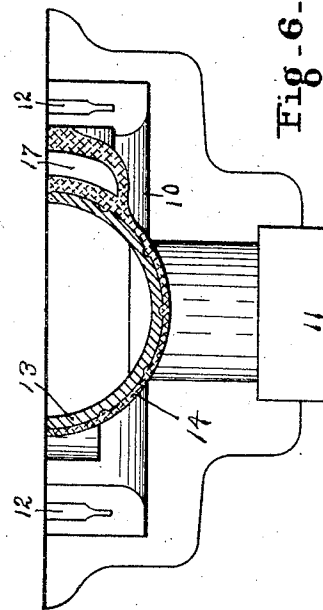
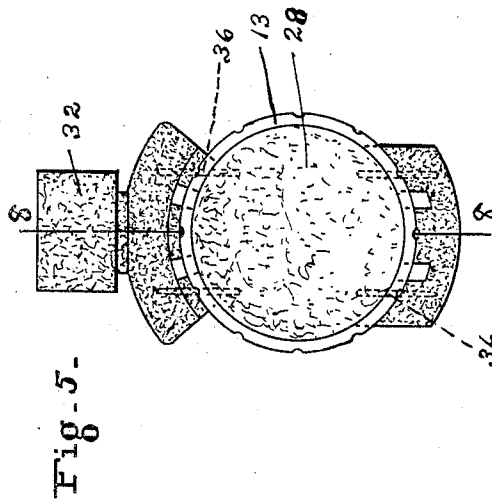
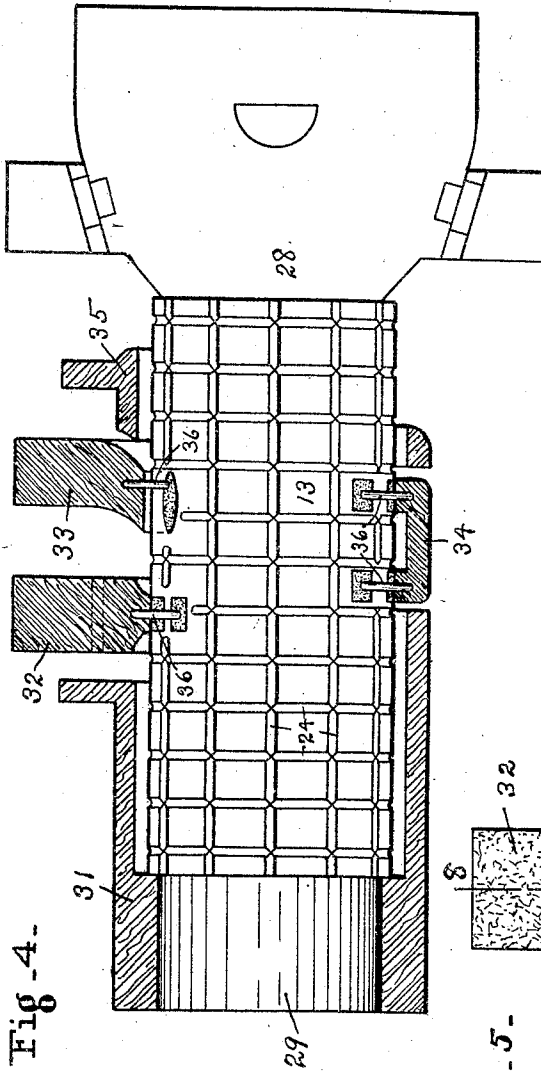
F. E. BURK.
CYLINDER CORE.

APPLICATION FILED JAN. 27, 1910.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

FREDERICK E. BURK, OF BAY CITY, MICHIGAN, ASSIGNOR TO EDWARD C. EWEN, OF SAGINAW, MICHIGAN.

CYLINDER-CORE.

1,037,859

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed January 27, 1910. Serial No. 540,297.

To all whom it may concern:

Be it known that I, FREDERICK E. BURK, a citizen of the United States, and a resident of Bay City, in the county of Bay and State of Michigan, have invented a new and Improved Cylinder-Core, of which the following is a specification.

This invention relates to the art of metal founding, and the object of my improvements is to provide cores for the cylinders of engines and pumps whereby the casting of cylinders having a body of a light metal lined with a thin shell of a harder heavier metal is rendered feasible.

In the accompanying drawings, Figure 1 is a vertical cross section of a cylinder of an explosion engine cast around my improved core. Figs. 2 and 3 are transverse cross sections on the lines 2—2 and 3—3 of Fig. 1 respectively. Fig. 4 is a view of my improved core together with auxiliary cores prepared for a cylinder of an explosion engine, part of the auxiliary cores being shown in cross section. Fig. 5 is an end view of the same with one of the auxiliary cores omitted. Fig. 6 is a half cross section on the line 6—6 of Fig. 1.

Similar reference characters refer to like parts throughout the several views.

Lined cylinders for pumps and engines may be formed without the labor of boring the cylinders and fitting in the liners by pouring the metal forming the body of the cylinder around the liner in the proper mold. Aluminum is the most desirable metal for the body of the cylinder because of its lightness in proportion to its strength, and cast iron liners have the most satisfactory wearing properties. Other metals such as bronze and steel may also be employed for liners.

This invention relates to a core so constructed that the metal shell shall be supported in proper position within the mold, and so that the softer lighter metal can flow around the core and shell to assume the correct form and at the same time hold the shell in position.

The construction shown in the drawing is a cylinder of a three-port, two-cycle, explosion-engine and the core for the same. The lower or base part 10 of the cylinder casting has the usual bearing-caps 11, and apertures 12 forming hand holes. Extending upward from the base part is the cylinder proper,

consisting of a liner 13, of wear-resisting metal, preferably of cast iron, and the body comprising the shells 14 and 15 of lighter metal and having a lower melting point than the liner, preferably aluminum, separated by the water spaces 16 and 17 in the usual manner. The usual exhaust ports 18, intake ports 19 and intermediate ports 20 may be provided, as well as the connection 21 for the explosive vapor from the carbureter. The ports 19 and 20 are shown connected by the by-pass 22. The liner may also be formed with these ports and with longitudinal and transverse grooves 24 as shown in the drawings. The cooling liquid may escape through the opening 25. The grooves preferably stop short of the ports. Any other desired irregularities may be formed on the shell.

The cylinder may be cast in the usual molds, with the liner 13 either horizontal or vertical in the mold as desired. In Figs. 4 and 5 the manner of uniting the cores is shown, Fig. 4 showing the main central core 28 having an extension 29, and one-half of the cores for forming the ports and the spaces for the cooling liquid; these auxiliary cores being shown in cross section in Fig. 5. The large core 31 (Fig. 4) will form the passage 16 for the cooling liquid and aperture 25. This core is not shown in Fig. 5. The cores 32 will form the exhaust ports 18; the core 33, the passage 21 for the explosive vapor; the small core 34, the by-pass 22; and the core 35 will form the passage 17 for the cooling liquid. The cores 32, 33 and 34 may be held in position by pins 36 extending up from those portions of the main core 28 which project through the ports in the liner 13.

The main core 28 should be formed from friable material, which will stand considerable heat without crumbling and may be baked before or after the liner is in position. The other cores will be of the usual composition.

When the mold has been prepared and the metal for the body melted, the liner 13 may be heated in any desired manner. After the liner is sufficiently heated, the auxiliary cores 31, 32, 33, 34 and 35 are secured in position and the united structure placed in the mold, whereupon the metal is poured in. The metal of the outer shell will conform to all the irregularities of the outer surface of

the liner 13, ridges being formed which extend into the grooves in the shell. If the outer surface of the shell 13 is left unfinished it will usually be irregular enough to insure
5 a sufficient union. The liner should always be made of a metal having a higher melting point than the shell that surrounds it.

Many modifications may be made in the details of the cores and liner without departing from the spirit of my invention.
10

Having now explained my improvements, what I claim as my invention and desire to secure by Letters Patent is:—

A core for combined aluminum and cast
15 iron cylinders, comprising a cylindrical

shell of cast-iron of substantially even thickness throughout and having shallow grooves, and a body of baked friable material extending through the shell and projecting from the ends thereof for supporting the same, 20 and auxiliary cores for forming passages in the wall of the cylinder.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FREDERICK E. BURK.

Witnesses:

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