

Aug. 11, 1931.

H. JUNKERS

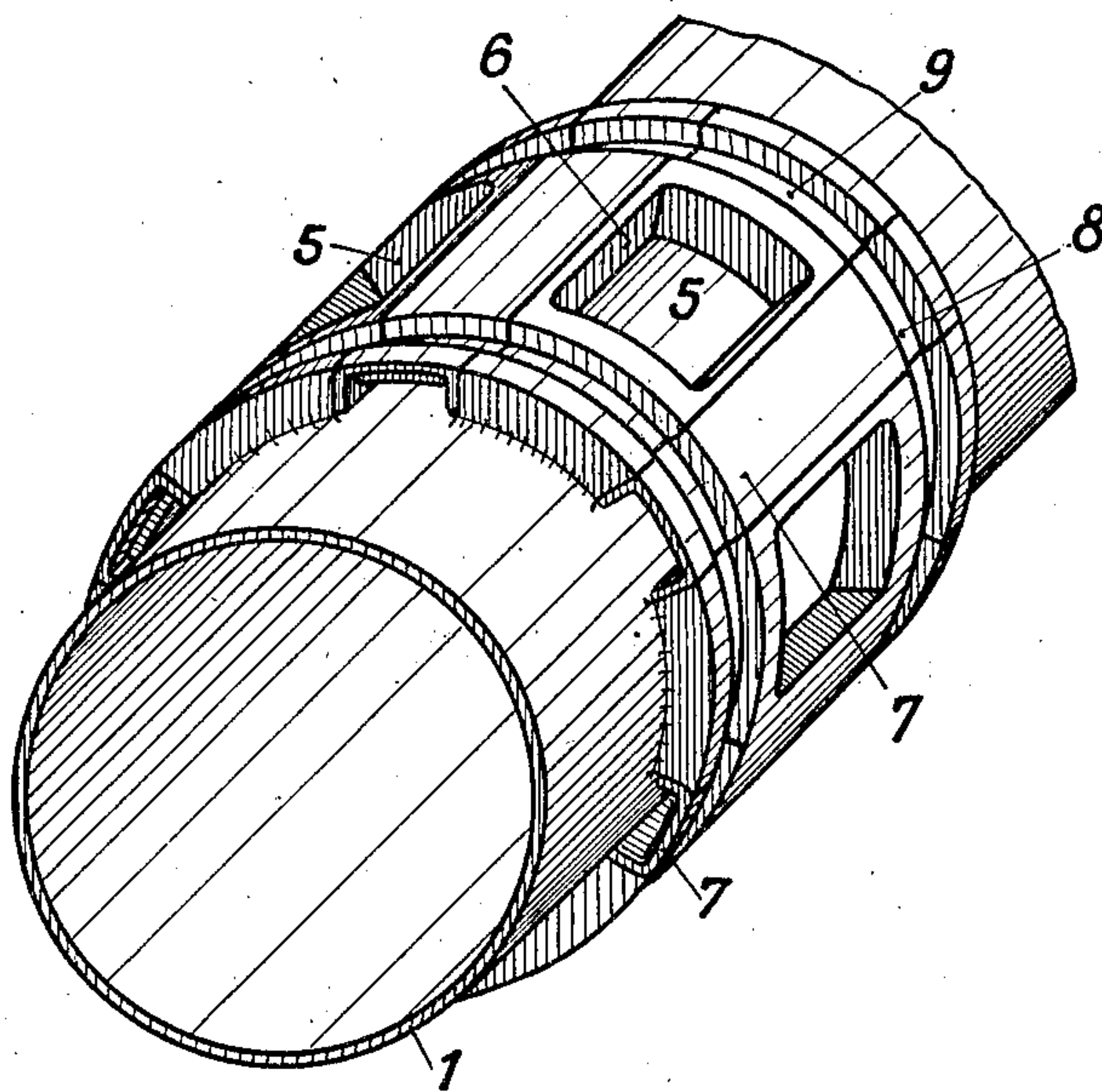
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CONSTRUCTION OF ENGINE CYLINDERS

Filed Nov. 8, 1929

2 Sheets-Sheet 1

*Fig. 1.*



*Inventor:*  
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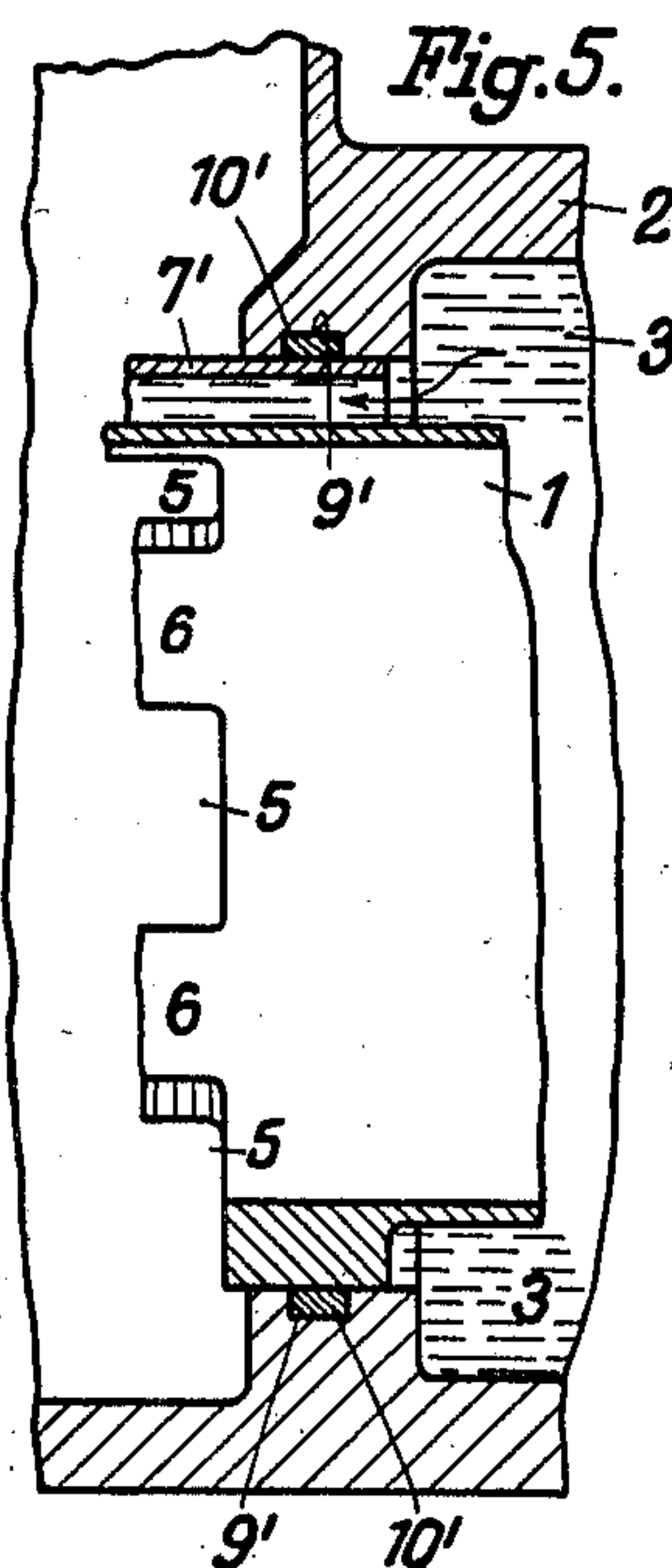
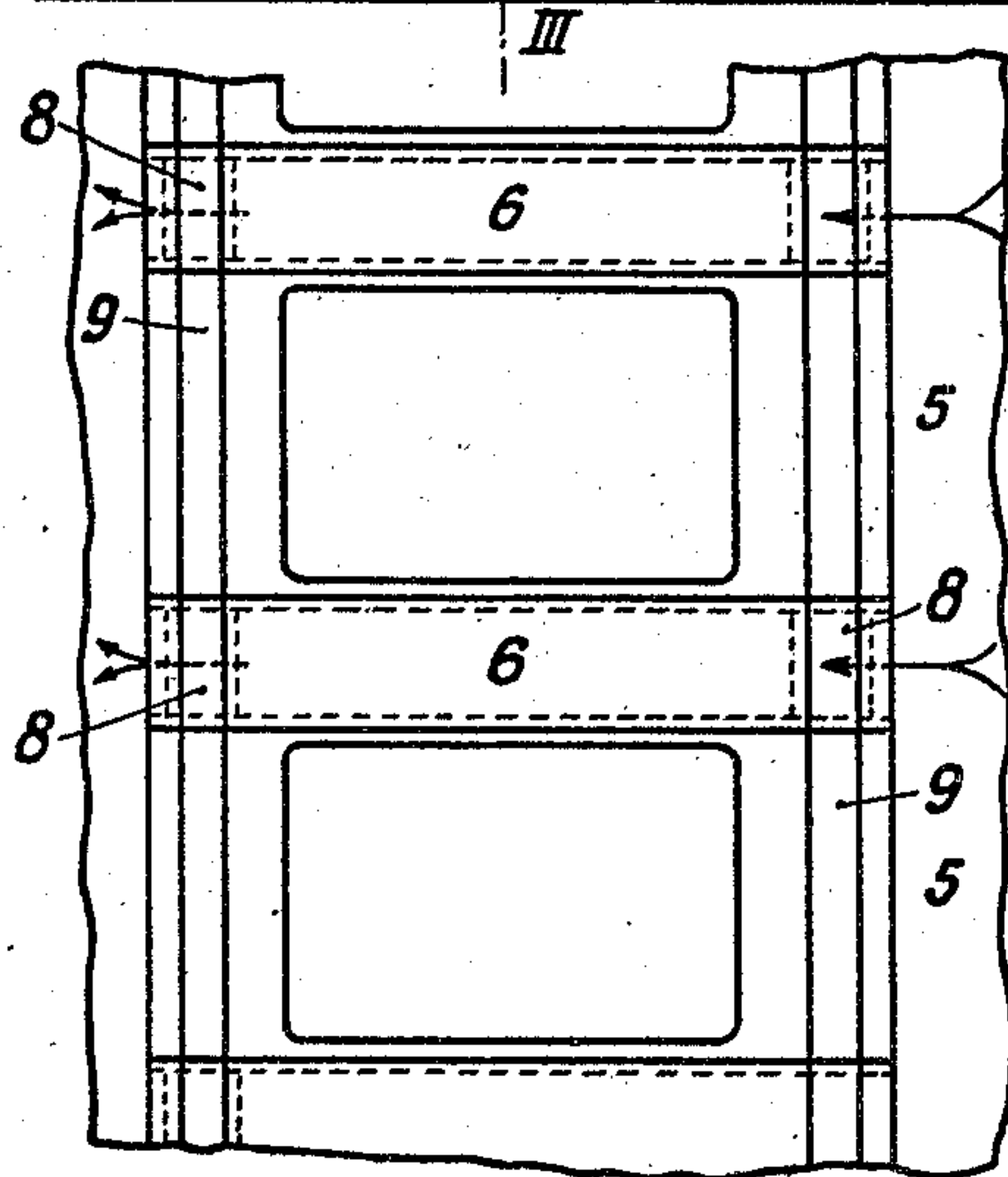
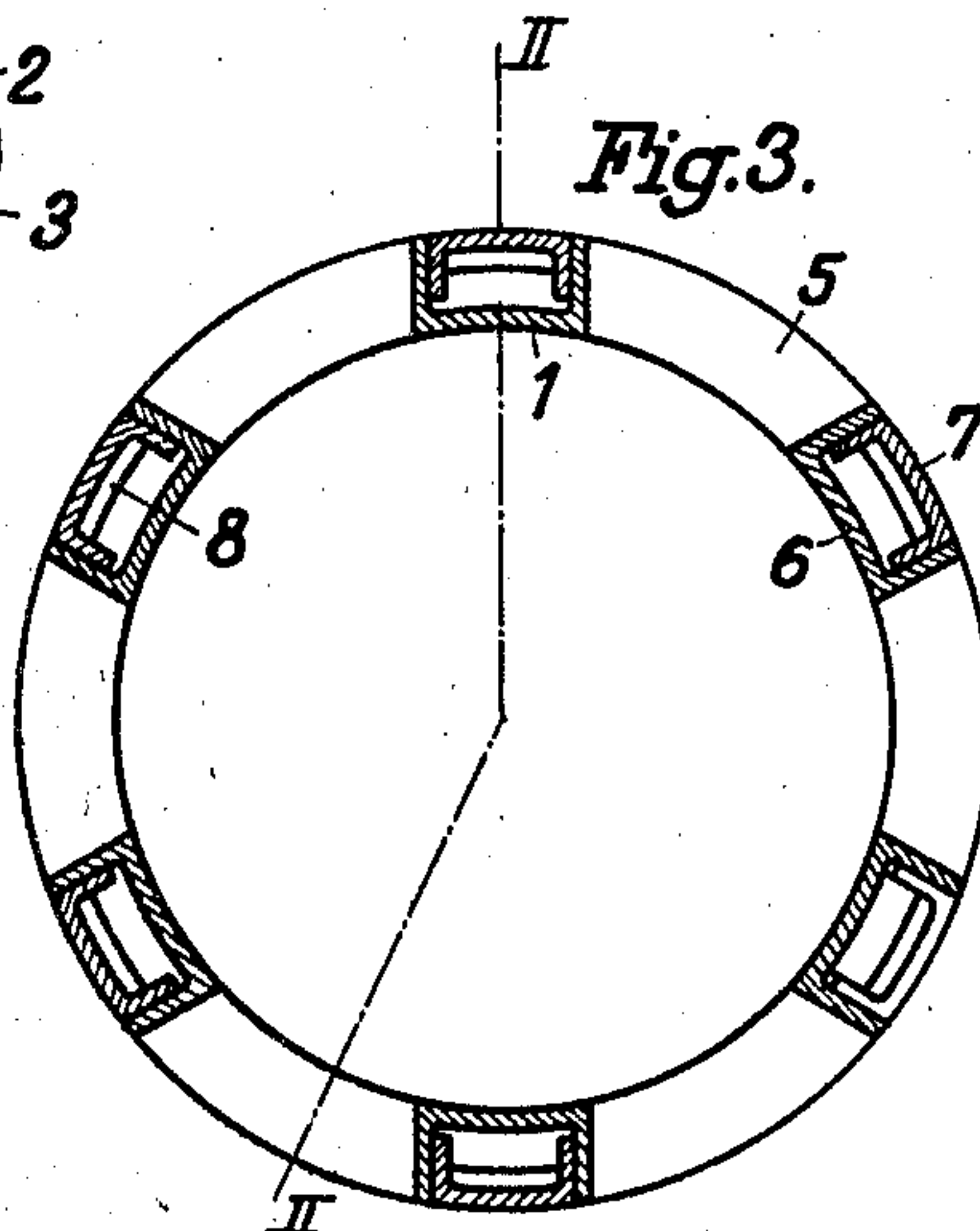
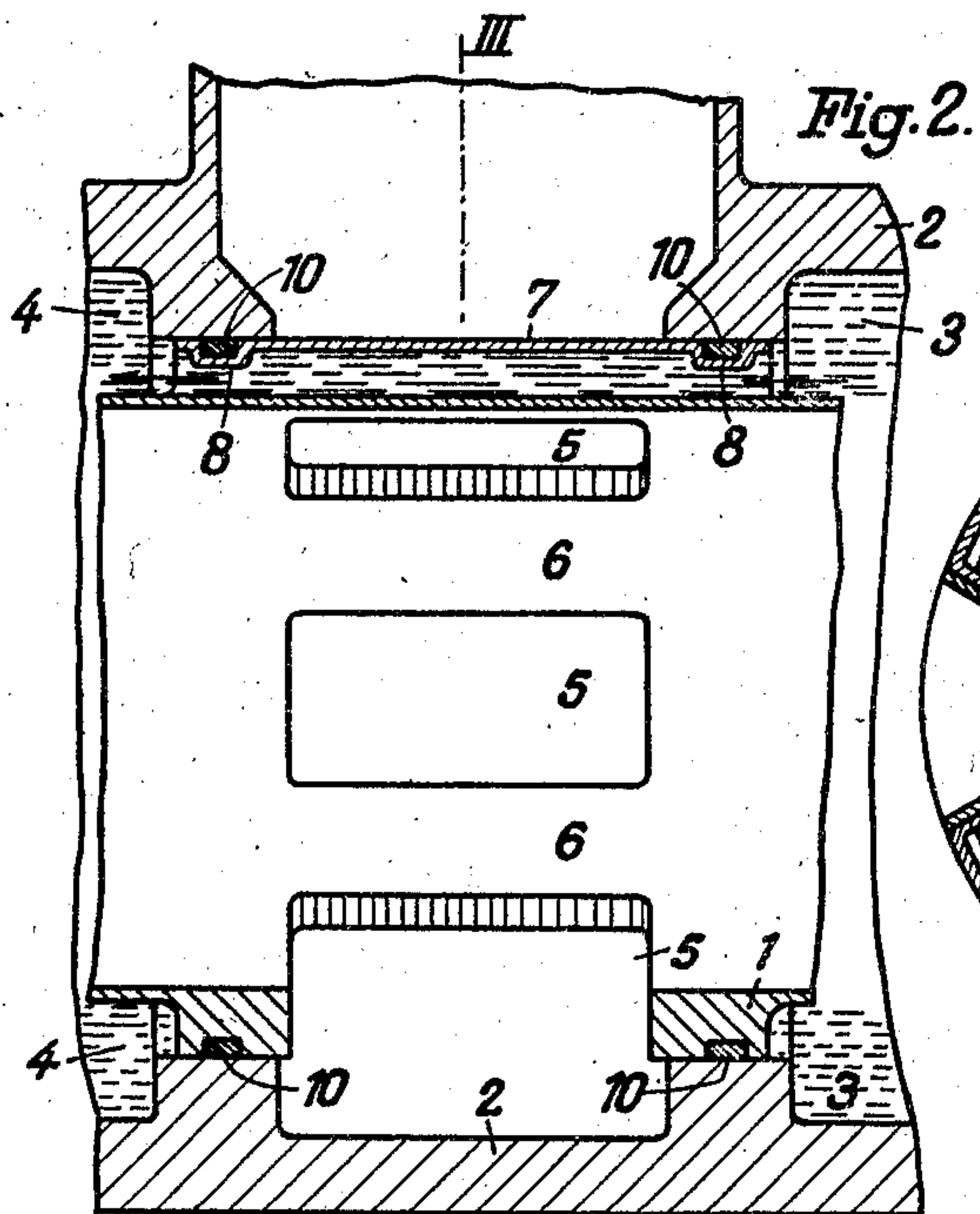
## H. JUNKERS

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## CONSTRUCTION OF ENGINE CYLINDERS

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**2 Sheets-Sheet 2**



*Fig. 4.*

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# UNITED STATES PATENT OFFICE

HUGO JUNKERS, OF DESSAU, GERMANY

CONSTRUCTION OF ENGINE CYLINDERS

Application filed November 8, 1929, Serial No. 405,750, and in Germany November 19, 1928.

My invention refers to internal combustion engines and more especially to the cylinders forming part of such engines. It is one of the objects of this invention to provide means for cooling certain parts of these cylinders in a more efficient manner than was hitherto possible.

In liquid-cooled cylinders of piston engines, in which intake and exhaust ports are provided in the cylinder wall, which are as a rule controlled by the piston itself, these ports, in order to provide sufficient guidance for the piston rings, are formed as a rule as juxtaposed slots. The wall sections between these slots are sometimes devoid of any cooling means; in that case the walls are made thicker in order to provide for the abduction of heat from these intermediate sections towards cooled portions of the cylinder wall. This increase of wall thickness leads to a disadvantageous reduction of the space available for the ports and is insufficient in the case of slots of greater length.

It has already been suggested to provide these intermediate wall sections with longitudinal canals for the passage of cooling liquid, however, even this arrangement does not prevent an undue heating of the sections inasmuch as these longitudinal canals cannot carry sufficient quantities of cooling liquid and the cooling surface presented to the liquid is too small.

I avoid these drawbacks by suitably designing these intermediate sections (bridges).

To this end I form these sections after the manner of channels open towards the outer surface of the cylinder and I provide covers for these channel-shaped sections, which are fixed thereon by welding, soldering, or the like, so that the cooling liquid can be introduced at one end and escape at the other end of the hollow body thus formed.

In the drawings affixed to this specification and forming part thereof, an engine cylinder embodying my invention is illustrated diagrammatically by way of example.

In the drawings

Fig. 1 is a perspective view,

Fig. 2 an axial section on the line II—II in Fig. 3,

Fig. 3 a cross section on the line III—III in Fig. 2,

Fig. 4 a development of the outer cylinder surface, and

Fig. 5 a cross section illustrating a modification.

Referring first to Figs. 1 to 4, 1 is the cylinder wall proper, and 2 is the cooling jacket, 3 and 4 being chambers filled with cooling liquid. 5 are the slots or ports formed in the cylinder wall 1 and 6 are the sections intermediate these ports, the cooling of which is the main object of the present invention. In the vicinity of the slots the cylinder has an increased wall thickness (Figs. 1 and 2). The sections 6 have the form of channels open towards the outside. 7 are channel-shaped covers mounted in the channel sections with the inner walls of the sections embracing the outer walls of the covers 7 (Fig. 3). The sections and covers form together closed liquid canals which communicate at their ends with the liquid chambers 3 and 4. The covers 7 are preferably fixed to the sections 6 by welding or soldering, the surfaces of contact being large enough to warrant a reliable fixation, whereby not only a good packing, but also increased strength is warranted, because the covers being rigidly fixed to the side walls of the channel sections considerably reinforce them and thus counteract the weakening of the cylinder wall by the slots. The character of the sections also enables their inner sides to be readily machined, so that their wall thickness can be small and large cross sectional area of passage for the cooling liquid and a good heat abduction are obtained.

Near their ends the covers are formed with transversely extending depressions 8, which cooperate with similar depressions 9 in the cylinder wall to form closed grooves for the reception of packing rings 10. In the modified form illustrated in Fig. 5, the depression 9' for the packing ring 10' is formed in the jacket 2 and therefore no



depression reducing the cross sectional area need be formed in the covers 7'.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:—

1. Engine cylinder with a row of ports formed in the cylinder wall, the wall sections intermediate the ports of said row having the form of channels open towards the circumference of the cylinder, covers being mounted on said channel-sections so as to convert same into closed canals and liquid cooling chambers at both ends of and communicating with said canals.

2. Engine cylinder with a row of ports formed in the cylinder wall, the wall sections intermediate the ports of said row having the form of channels open towards the circumference of the cylinder, channel-shaped covers being mounted on said channel-sections with their flanges engaging the walls of said channel sections so as to convert same into closed canals and liquid cooling chambers at both ends of and communicating with said canals.

3. Engine cylinder with a row of ports formed in the cylinder wall, the wall sections intermediate the ports of said row having the form of channels open towards the circumference of the cylinder, channel-shaped covers being mounted on said channel-sections so as to convert same into closed canals and liquid cooling chambers at both ends of and communicating with said canals, the side walls of said covers being inserted in said channel-shaped wall sections.

4. Engine cylinder with a row of ports formed in the cylinder wall, the wall sections intermediate the ports of said row having the form of channels open towards the circumference of the cylinder, covers being mounted on said channel-sections so as to convert same into closed canals and liquid cooling chambers at both ends of and communicating with said canals, said covers being connected with said channel-shaped wall sections by a metallic connection.

5. Engine cylinder with a row of ports formed in the cylinder wall, the wall sections intermediate the ports of said row having the form of channels open towards the circumference of the cylinder, covers being mounted on said channel-sections so as to convert same into closed canals and liquid cooling chambers at both ends of and com-

municating with said canals, said covers being formed with transversal grooves and packing rings in said grooves.

In testimony whereof I affix my signature.

HUGO JUNKERS. 70

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