

J. POPPER.

# Sediment Collector for Steam Boiler.

No. 168,779.

Patented Oct. 11, 1875.

Fig. 1

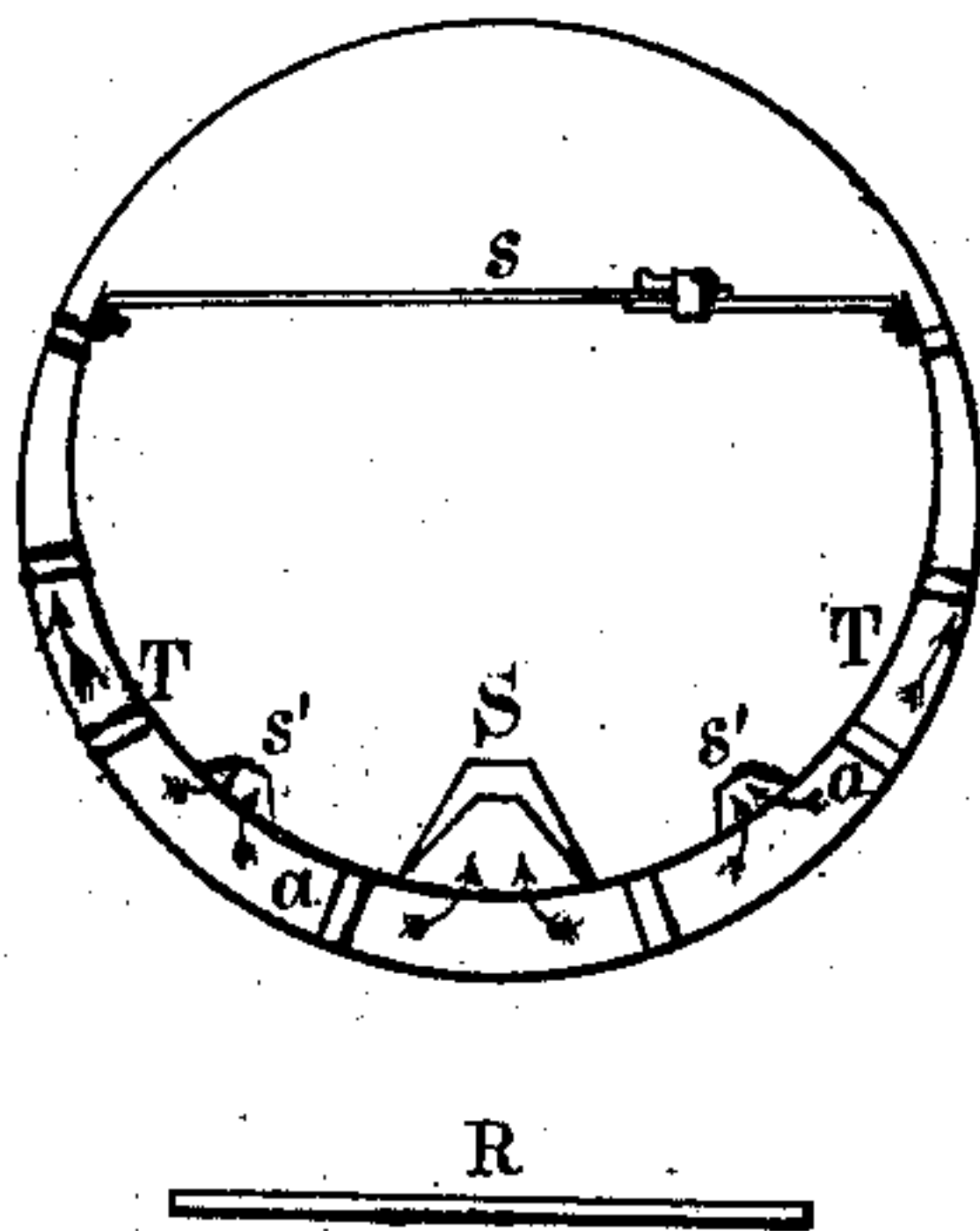


Fig. 2

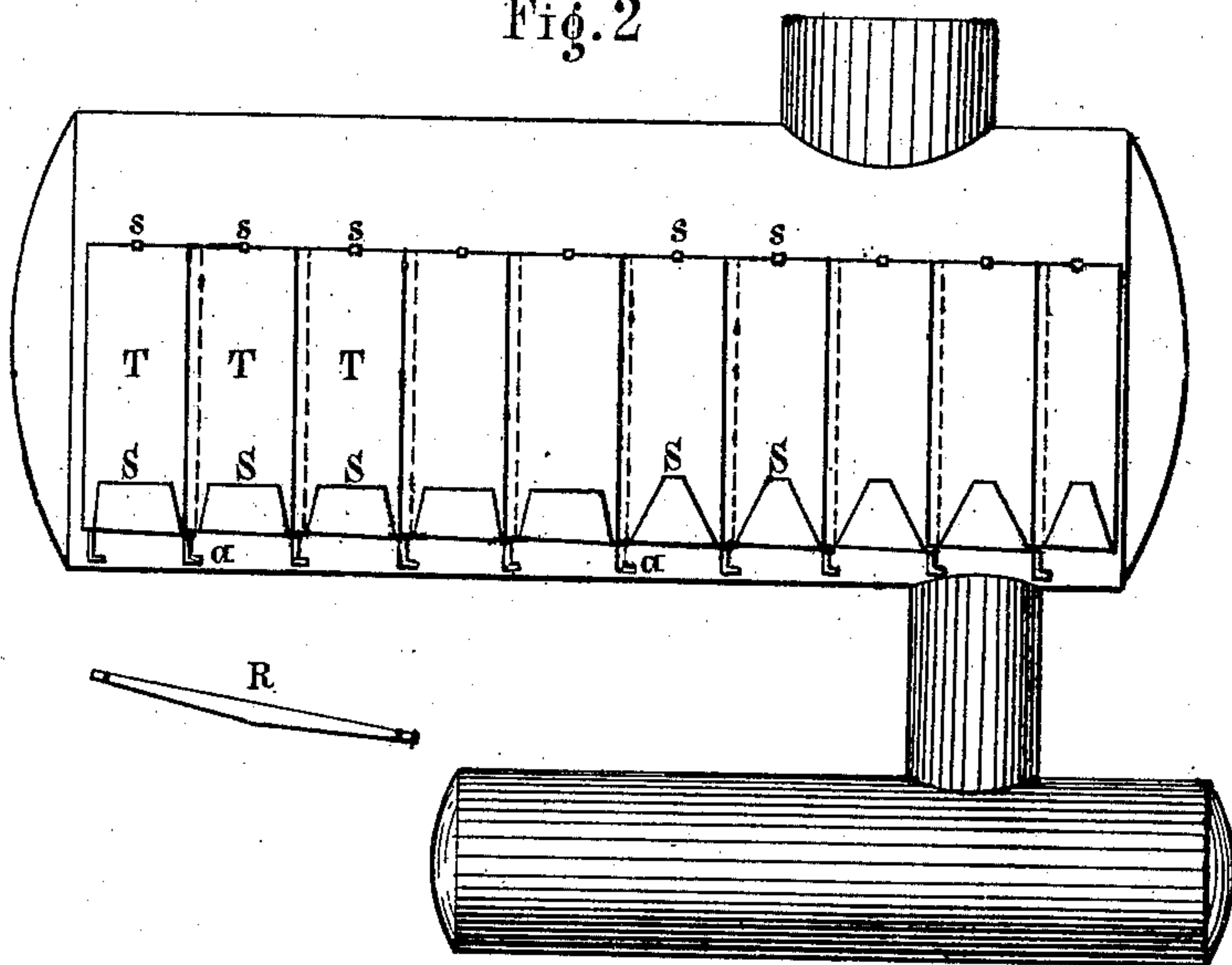


Fig. 3

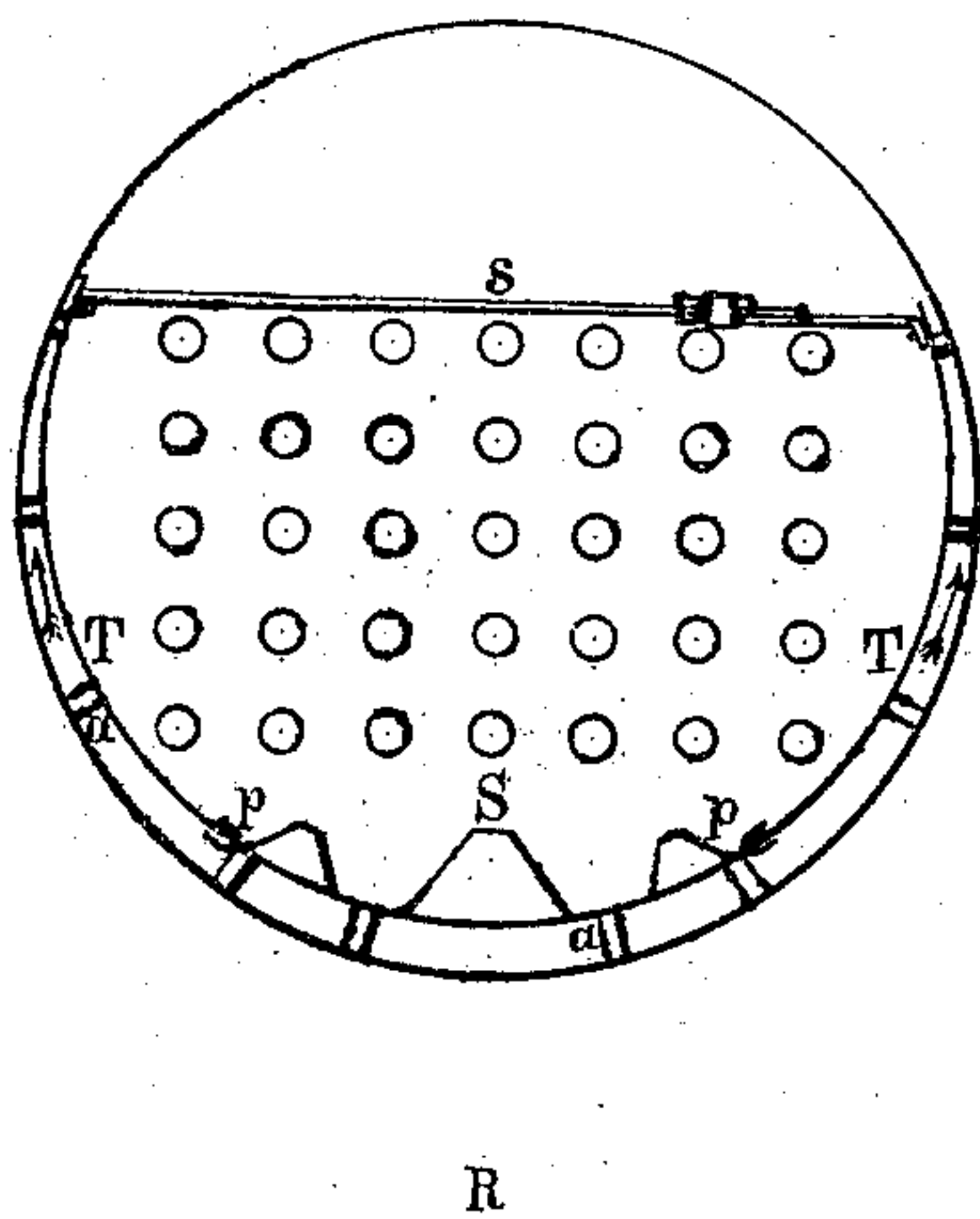
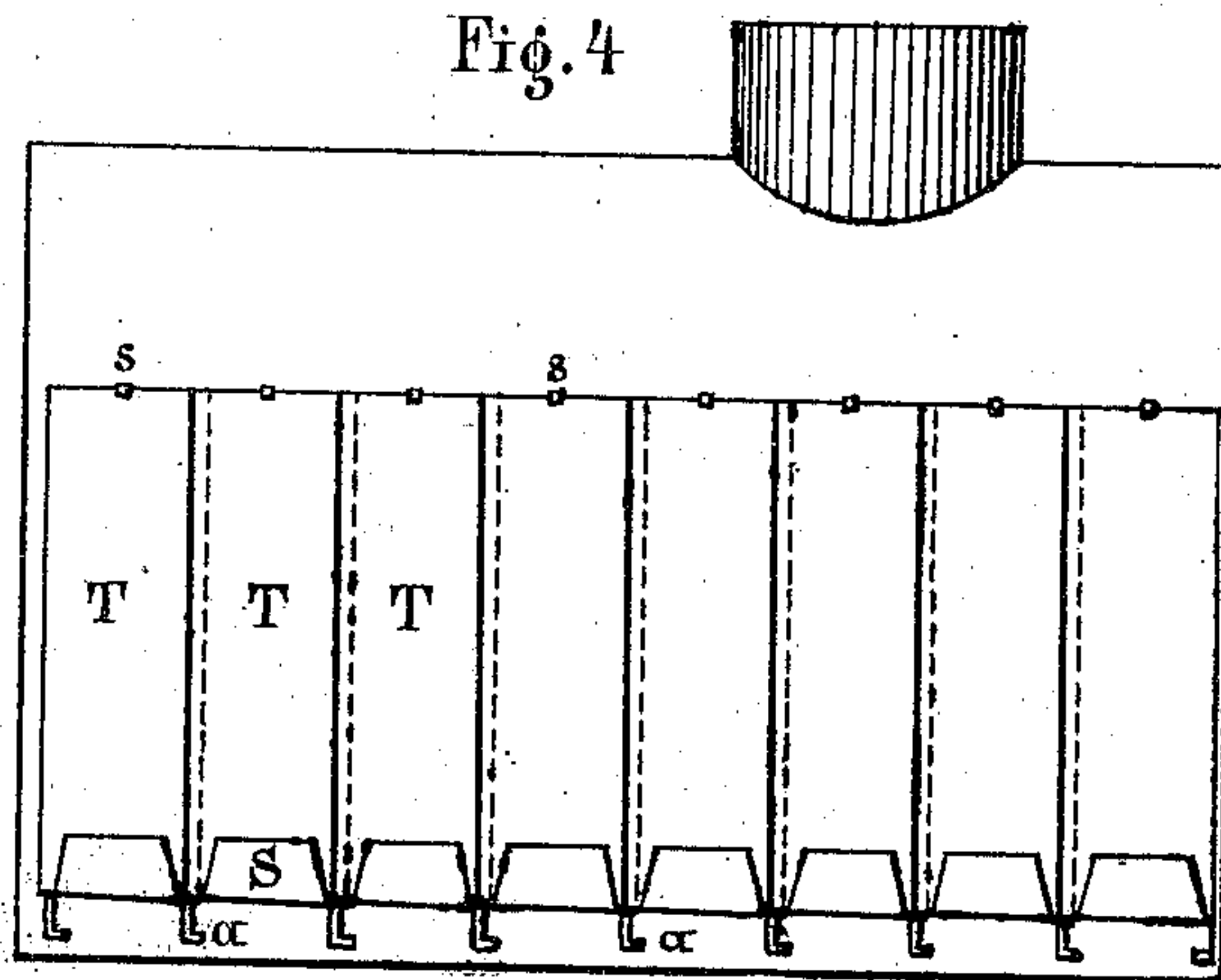


Fig. 4



Witnesses,  
Ch. Jacobson  
Henri Guillemin

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Joseph Popper  
By Henry Orth  
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Fig.9

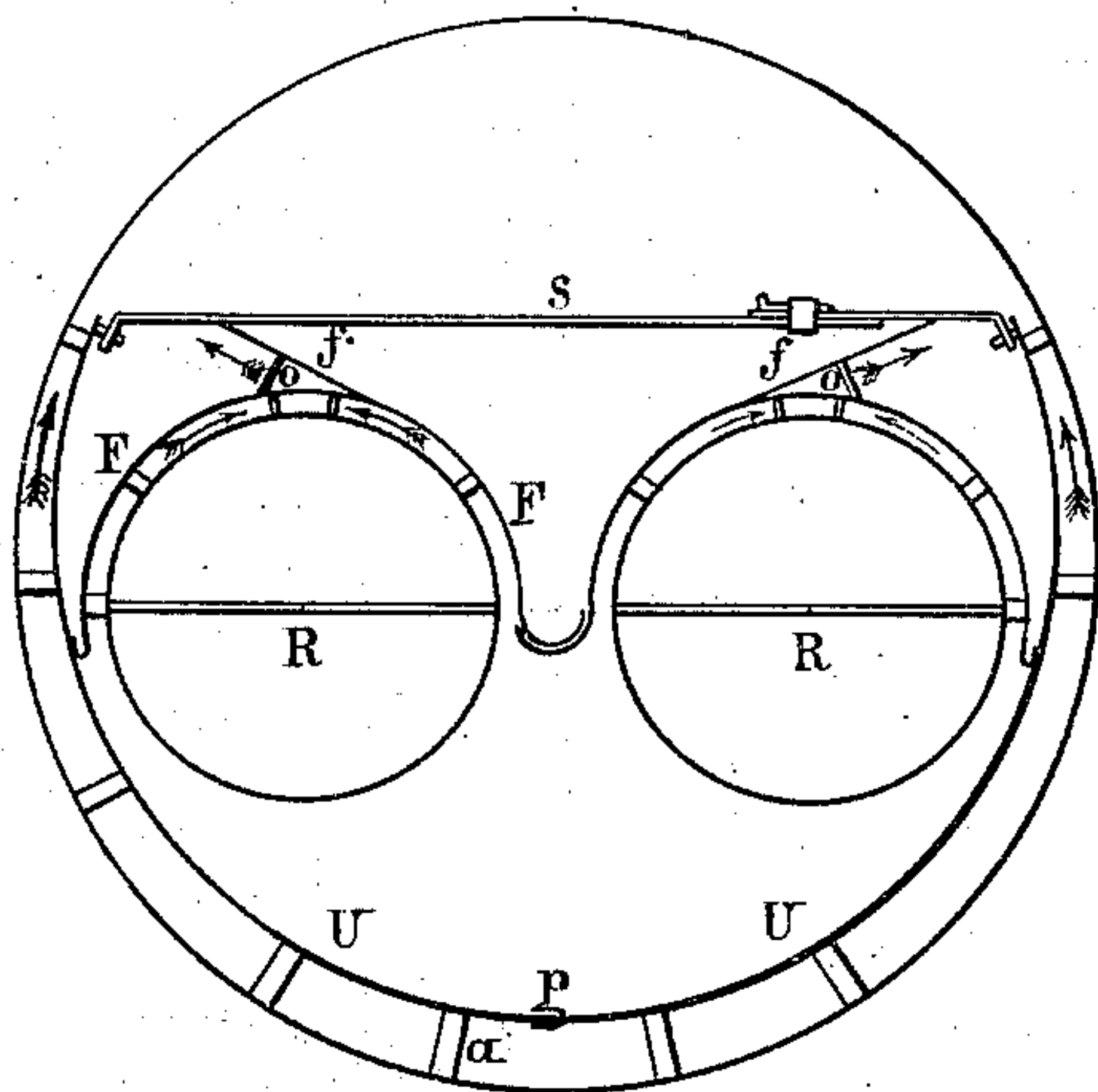


Fig.10

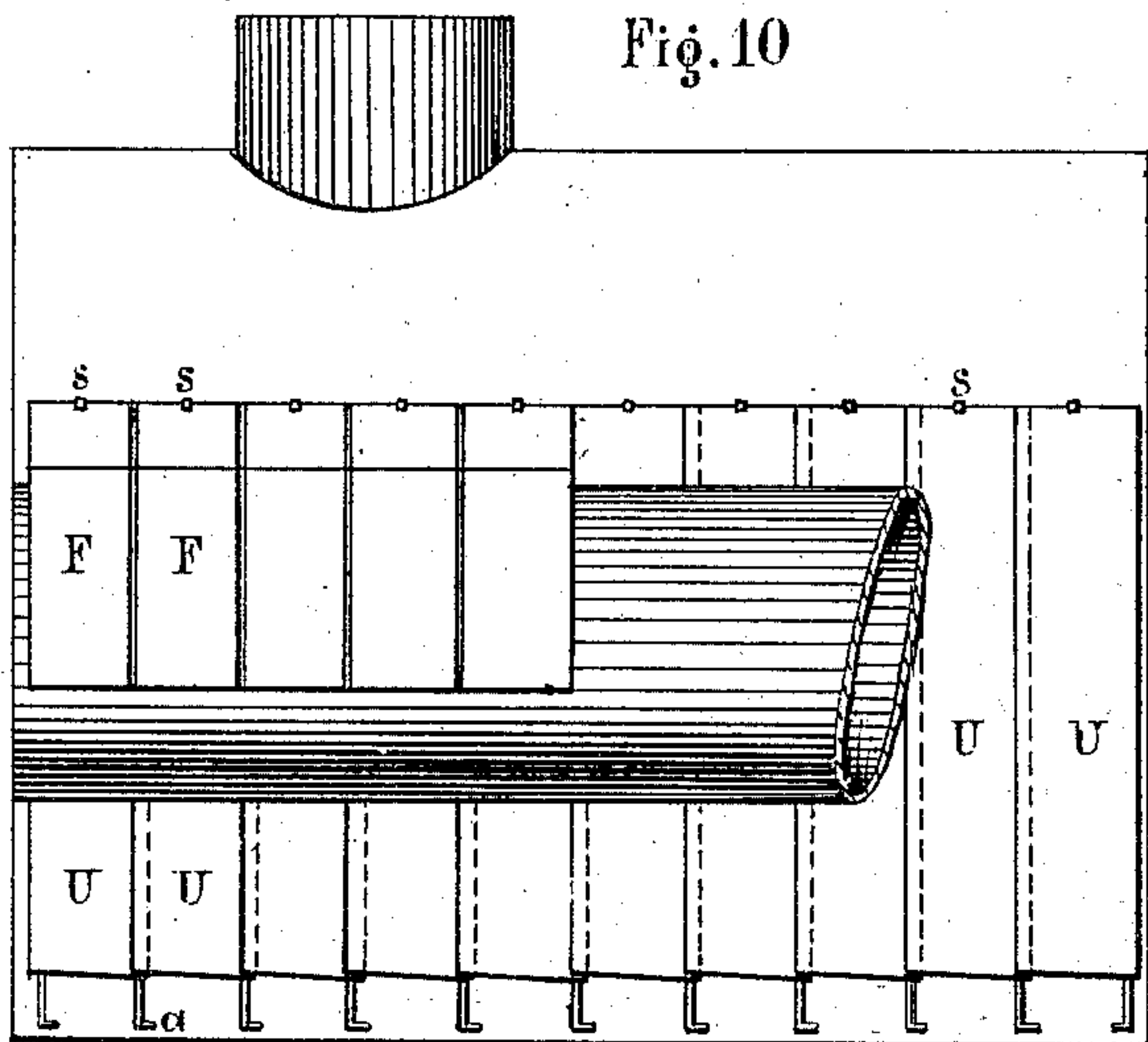


Fig.7

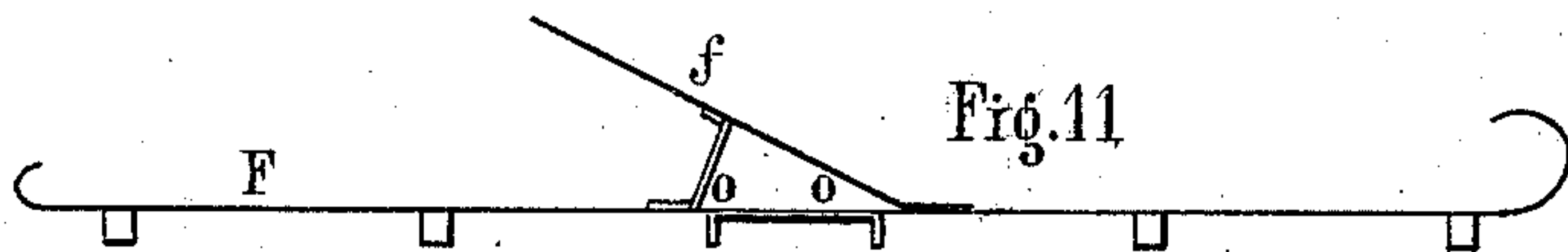
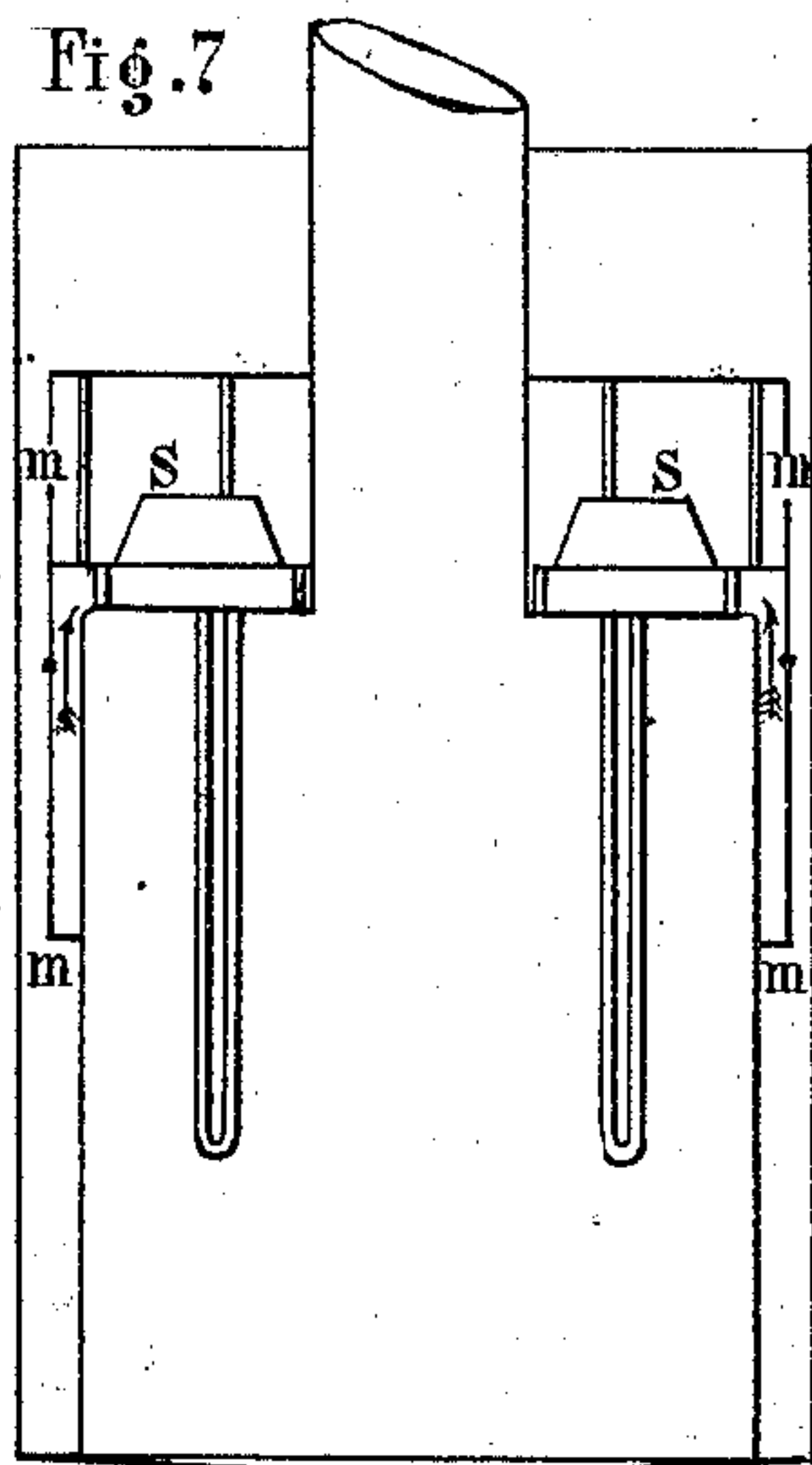


Fig.12

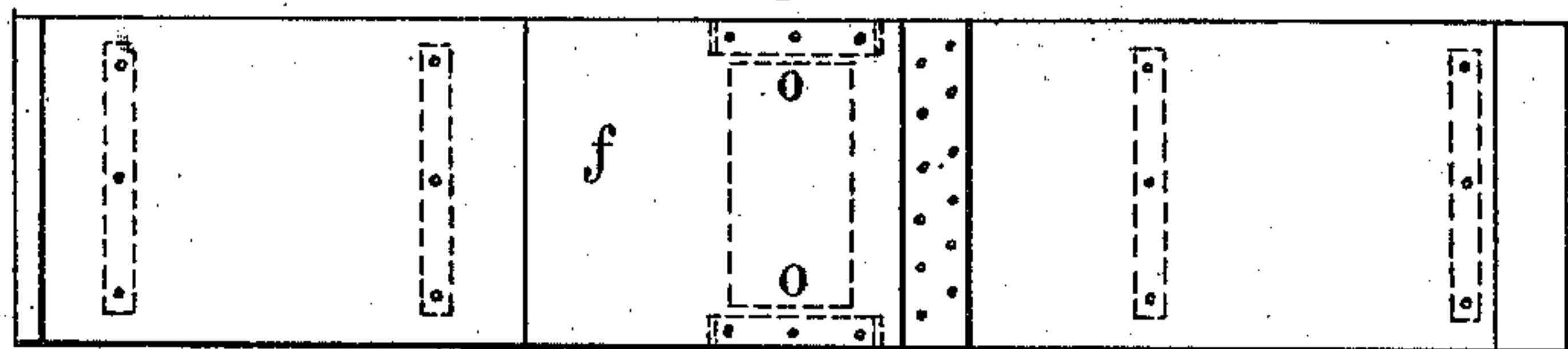


Fig.5

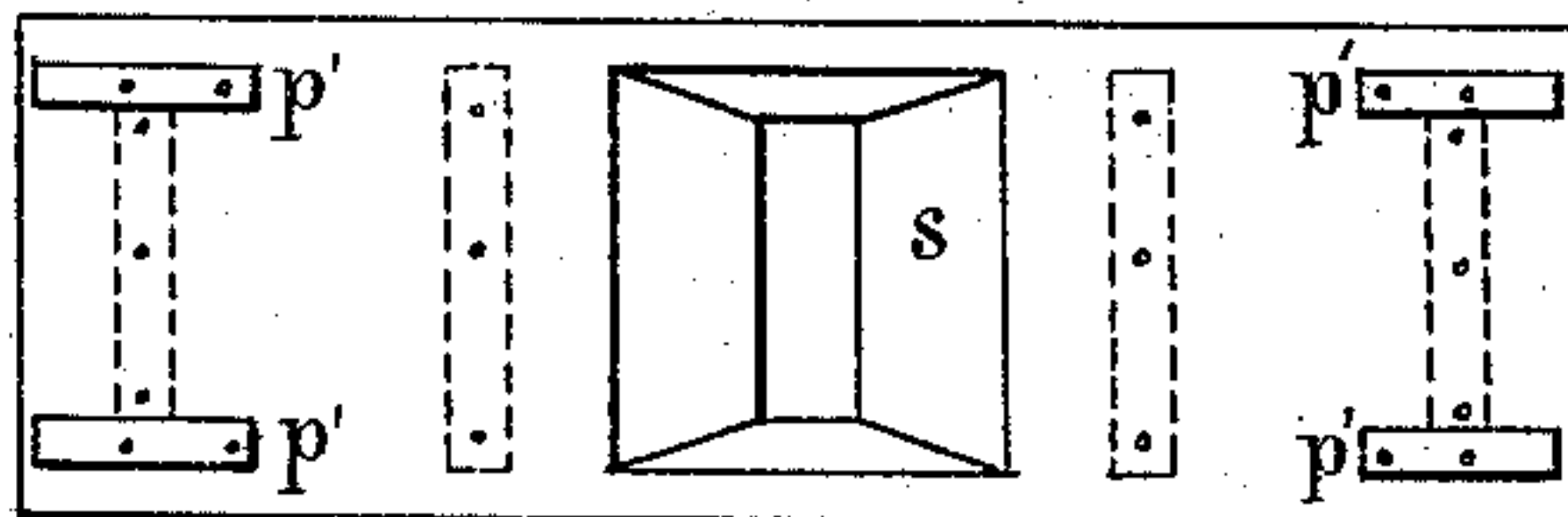


Fig.8

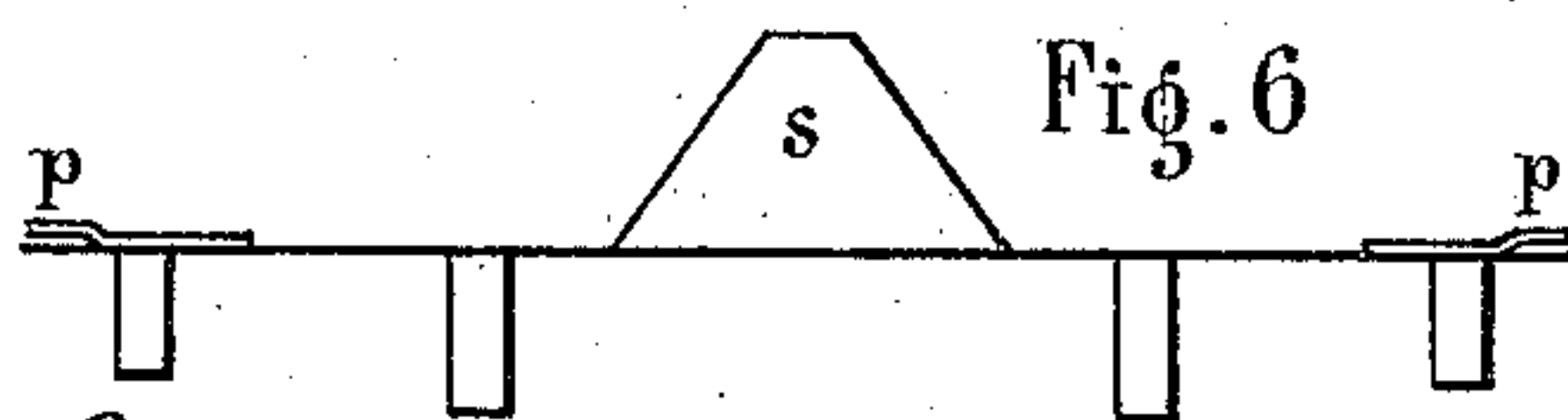
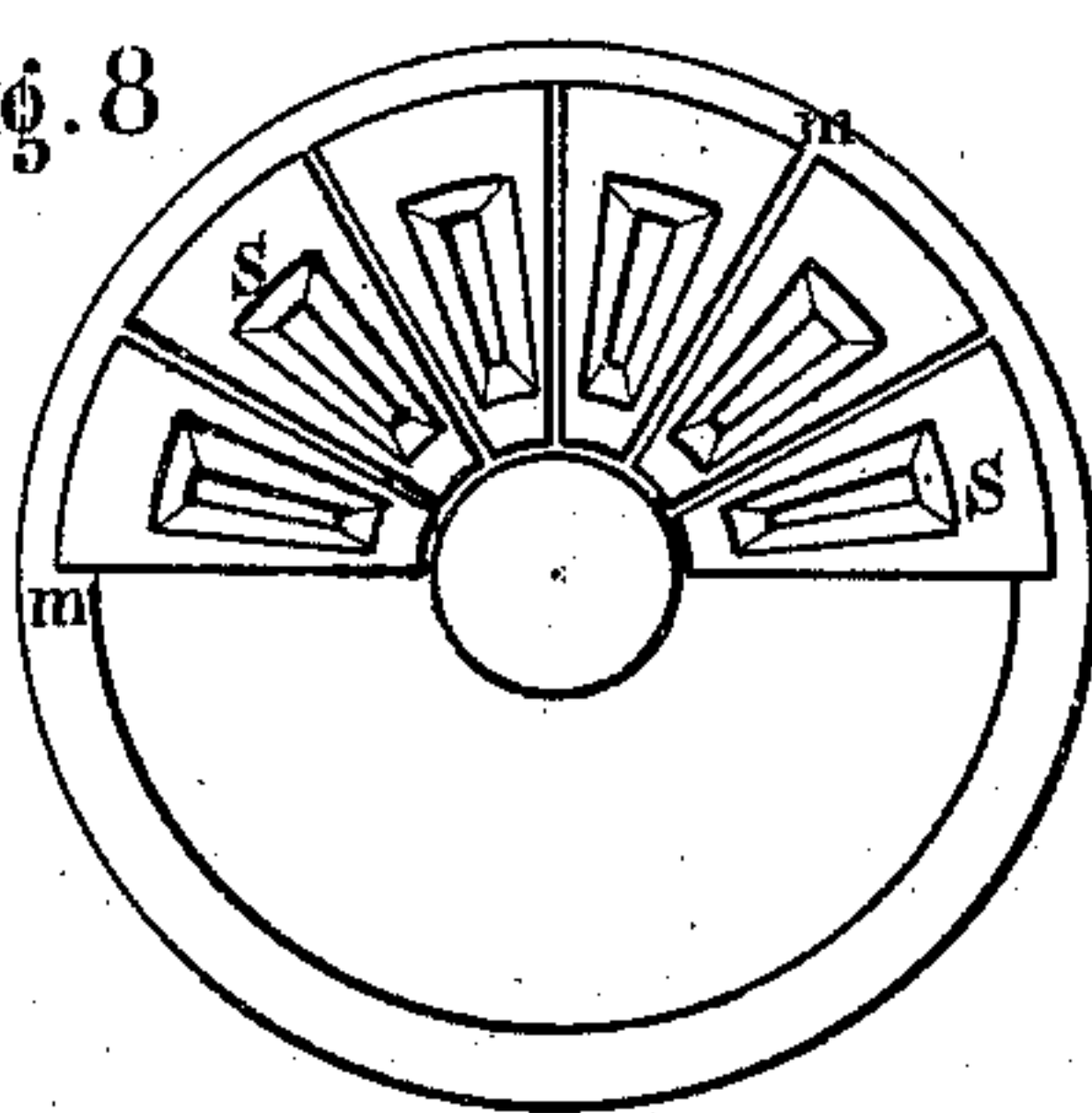


Fig.6

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# UNITED STATES PATENT OFFICE.

JOSEPH POPPER, OF VIENNA, AUSTRIA, ASSIGNOR OF ONE-HALF HIS  
RIGHT TO DAVID POPPER, OF SAME PLACE.

## IMPROVEMENT IN SEDIMENT-COLLECTORS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **168,779**, dated October 11, 1875; application filed  
June 26, 1875.

*To all whom it may concern:*

Be it known that I, JOSEPH POPPER, of Vienna, Empire of Austria, (assignor to himself and DAVID POPPER, of Vienna, Empire of Austria,) have invented an Improvement in Apparatus for Preventing the Incrustation of Steam-Boilers, of which the following is a specification:

This invention has for its object the construction of an apparatus for preventing the inconveniences resulting from the use in steam-boilers of water containing substances (such as lime or mud) liable to form sediments or incrustations.

This apparatus is applicable to most forms of boilers; and consists of a number of thin narrow strips of sheet-iron, of suitable form, introduced into the boiler, and placed next to each other in such manner as to form a lining, and consequently to induce currents of water in certain portions of the boiler, leaving places of rest in other portions of the boiler. The said sheets, which can be introduced by the man-hole, are not secured to the boiler, but rest on small supports or lugs, and overlap each other where necessary, in order to retain the sediment collected in them, and they can be readily removed when the boiler is to be inspected or repaired.

The linings extend to the average water-line, or thereabout, and in most cases are held asunder by cross-bars or braces, stretching them against the sides of the boiler; and I prefer to construct such linings of curved forms of boilers in such a manner that the distance between the internal boiler-surface and the lining-plates is smaller near water-level than at the bottom of the boiler, so that the water and steam escape at the top with accelerated speed. This construction differs advantageously from other known systems, in which the linings run parallel to the contour of the boiler, or where they are so arranged that the boiling water is forced to pass upward on the one side and downward on the other side.

In boilers with outside firing I arrange conical or pyramidal tubes on the upper side of the lining, the size and number of these tubes varying according to the diameter of the boilers. Through these tubes the fragments of

incrustations, detached from the boiler-surface by the ebullition of the water, pass into the receptacle formed by the lining. The peculiar features of these linings are that, first, they purify the water of the boiler of sediment, thus diminishing the wear and tear, and keeping clean the whole of the valves, the water-gage, and the steam-pipes; secondly, they completely clean the heated boiler-plates of accumulations of sediment and of particles of firm incrustation, thus preventing the boiler-plates from burning and blistering; they diminish the incrustation in the boiler, especially on the hottest spot of the boiler, and make the incrustation much more brittle, so that it can be easily broken off; fourthly, they render impossible that retardation of ebullition which has been looked upon as the principal cause of explosions.

In the annexed sheets of drawings the linings are shown as applied to different kinds of boilers.

Figures 1 and 2 show the linings arranged within a French boiler. Figs. 3 and 4 show the arrangement of the linings within a tubular boiler. Figs. 7 and 8 show the linings applied to a Field boiler; and Figs. 9 and 10 represent a Cornish boiler fitted with the linings. Fig. 5 is a top view, and Fig. 6 a side view, of one of the plates forming the linings of French and tubular boilers, and provided with the pyramidal tubes; and Figs. 11 and 12 are a side view and a top view of one of the plates as fitted above the fire-tubes of Cornish boilers.

Similar letters indicate similar parts in the whole of the figures.

T are the plates, forming the lining, and provided, as shown by the drawings, in the case of French boilers, tubular boilers, and Field boilers, with conical or pyramidal tubes *S'* and *s'*, open at the top and bottom, through which tubes the main flow takes place vertically upward, as indicated by the arrows, and through which not only the sediment, but also solid pieces of old incrustation can escape. The number and size of these tubes vary according to the diameter of the boiler. *s* are the brace-rods, stretching the lining-plates to the internal surface of the boiler. *a* are the lugs



or supports on which the lining-plates rest, and the letters R indicate the grate-bars. The course of the current induced by the lining is indicated by the arrows.

In boilers of the construction known as Field's system the shape of the lining is suitably modified, as shown in Figs. 7 and 8. The linings are provided with open pyramidal tubes S above the boiler-tube plate, and other linings, *m*, are also arranged around the fire-box. The linings with the pyramidal tubes S' extend as far as the water-line, and are constructed according to the same principle as in other boilers. In Field boilers it is especially desirable to have means for keeping the steam from priming, and free from particles of sediment which might be carried along with it, and this is effected by the linings, the sediments remaining at rest on the top of the lining-plates and around the pyramidal tubes, and the water remaining without undulating motion.

In boilers with internal furnace, such as Cornish boilers, (see Figs. 9 and 10,) the application of two kinds of lining are required, one form, U, being placed over the bottom of the boiler, while the other, F, is fitted over the fire-tubes. The linings F are laid over about half the length of the fire-tubes, near the fire-place, and serve for compelling the steam to escape in the direction of the arrows—that is, between the lining-plates and the fire-tubes, thence through the slit *o o*, (see detailed Figs. 11 and 12,) and in an oblique direction along the flap or wing *f*—thereby causing the water in the gage to remain steady and free from sediment, and diminishing the priming of the

steam, as the whole surface of the water remains steady.

*p' p'* in Figs. 5 and 6 are the lugs for fastening the brace-rods *s*.

Having now explained the nature of my invention, and the mode of carrying out the same, I claim—

1. Boiler-linings consisting of a series of detached curved metal plates, T, provided with pyramidal tubes or cones S *s'*, constructed as shown and described, and lugs or supports *a*, said series of plates being so arranged as to overlap each other, inducing currents in certain portions of the boiler, leaving places of rest in others, substantially as and for the purposes specified.

2. Boiler-linings consisting of a series of metal plates T, arranged above the fire-tubes, and provided with slits *o o* and oblique flaps *f*, substantially as described, in combination with the bottom linings U, arranged and operating substantially as shown, and for the purposes specified.

3. Boiler-linings consisting of a series of removable curved and overlapping metal plates, T, constructed substantially as shown and described, and arranged not parallel to the boiler-plates, but approaching nearer to them toward the water-line, for the purposes set forth, said series of plates being held in position by means of the supports or lugs *a* and *p' p'* and the brace-rods *s*, as shown and specified.

JOSEPH POPPER.

Witnesses:

C. O. PAGET,  
ED. HAAG.