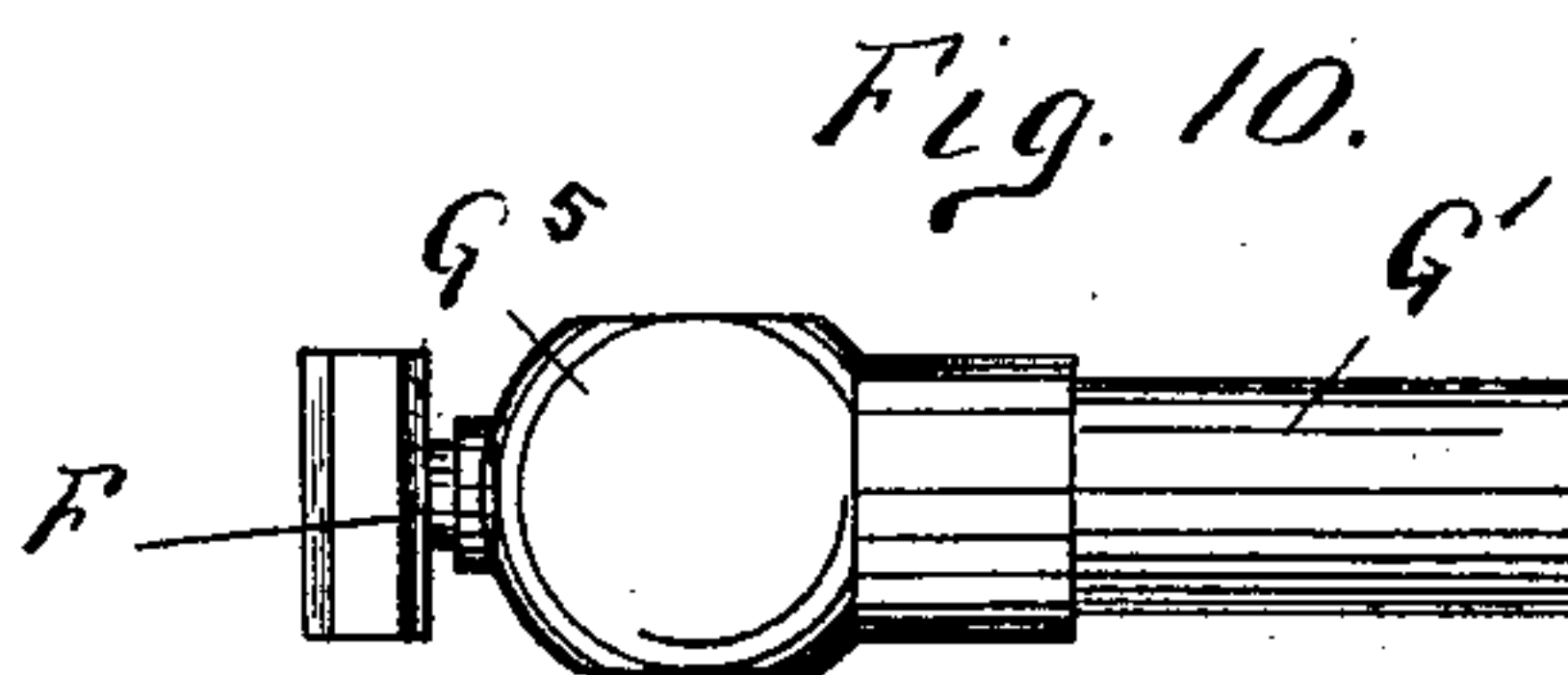
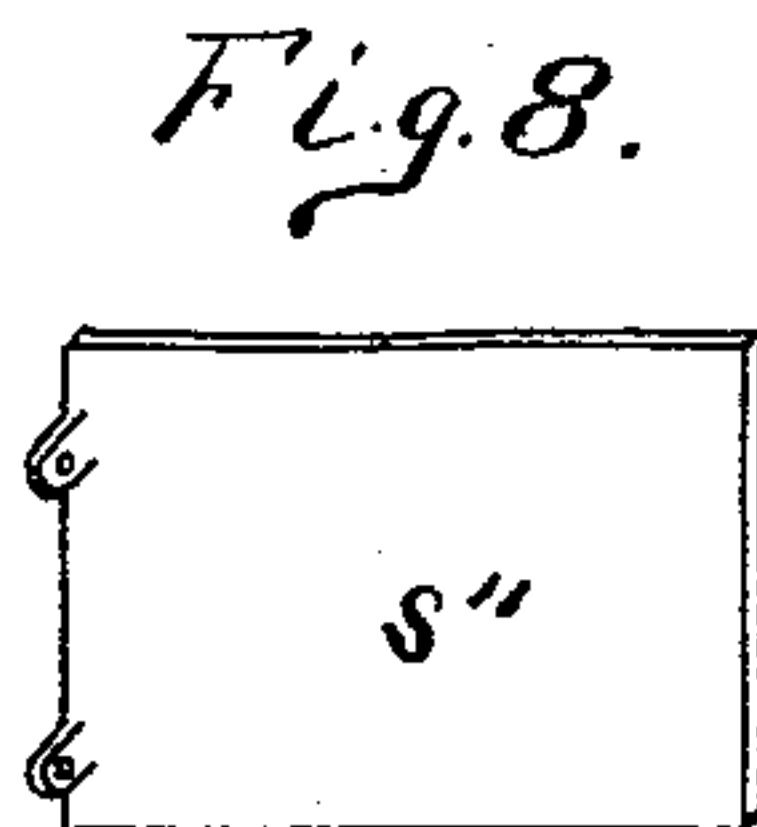
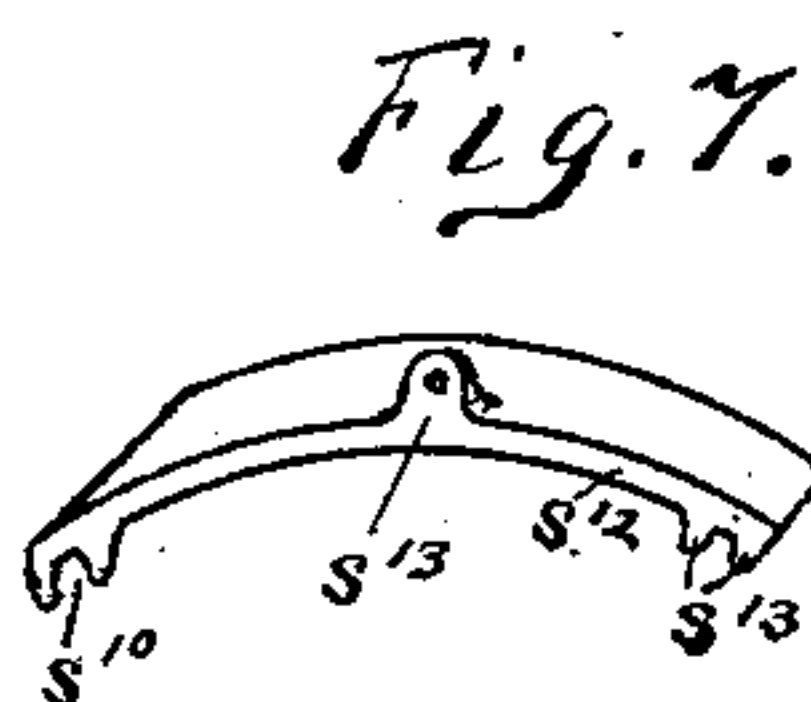
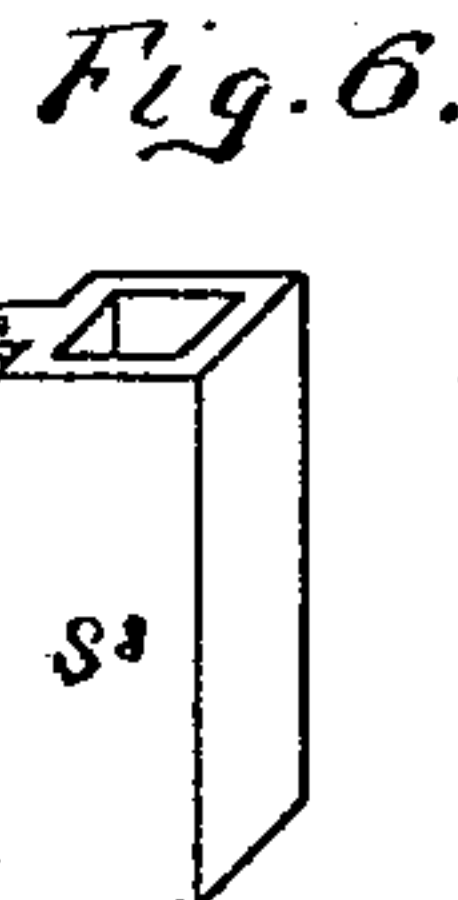
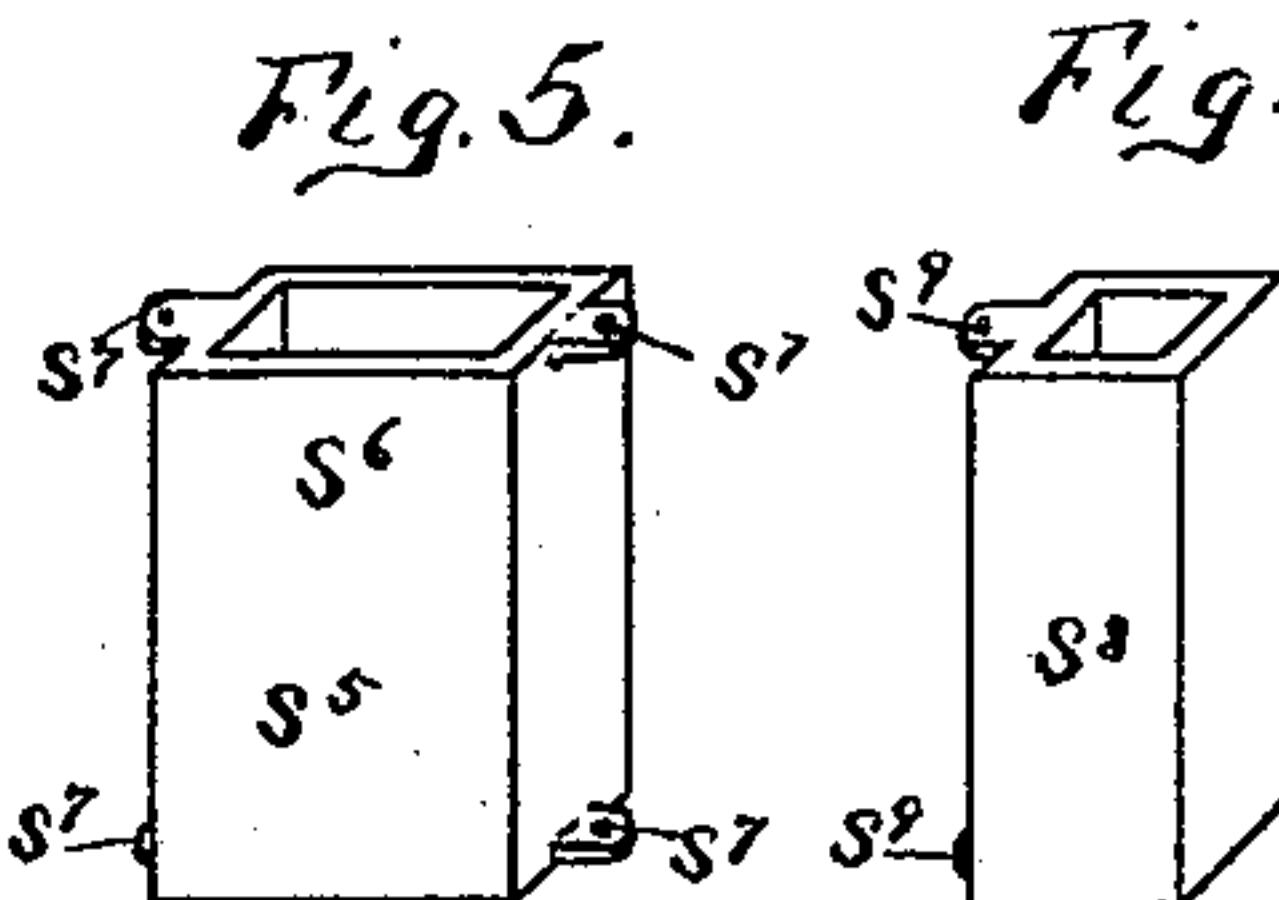
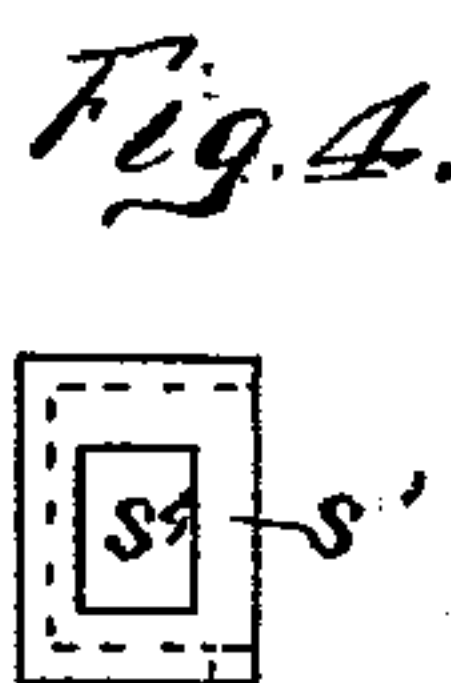
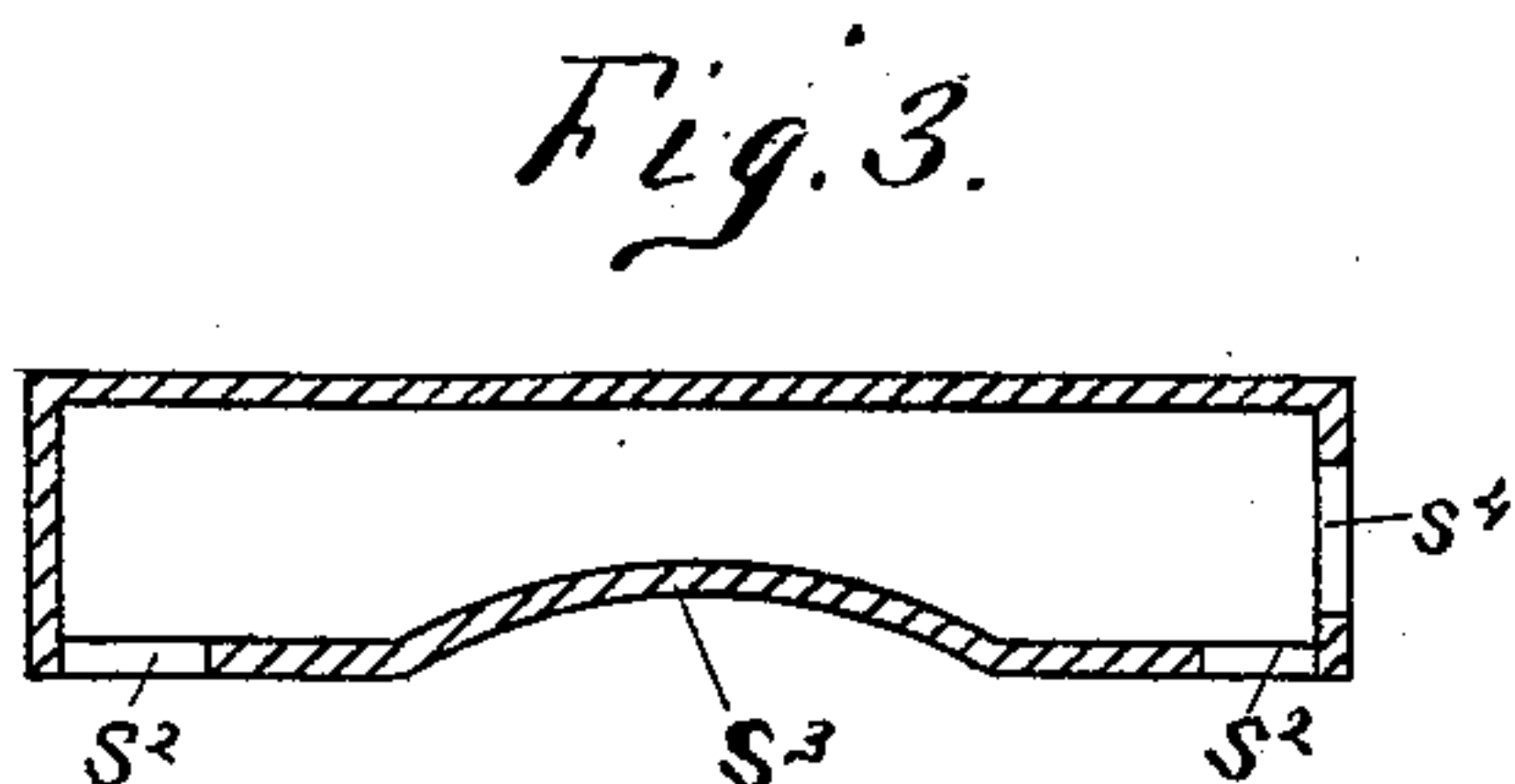
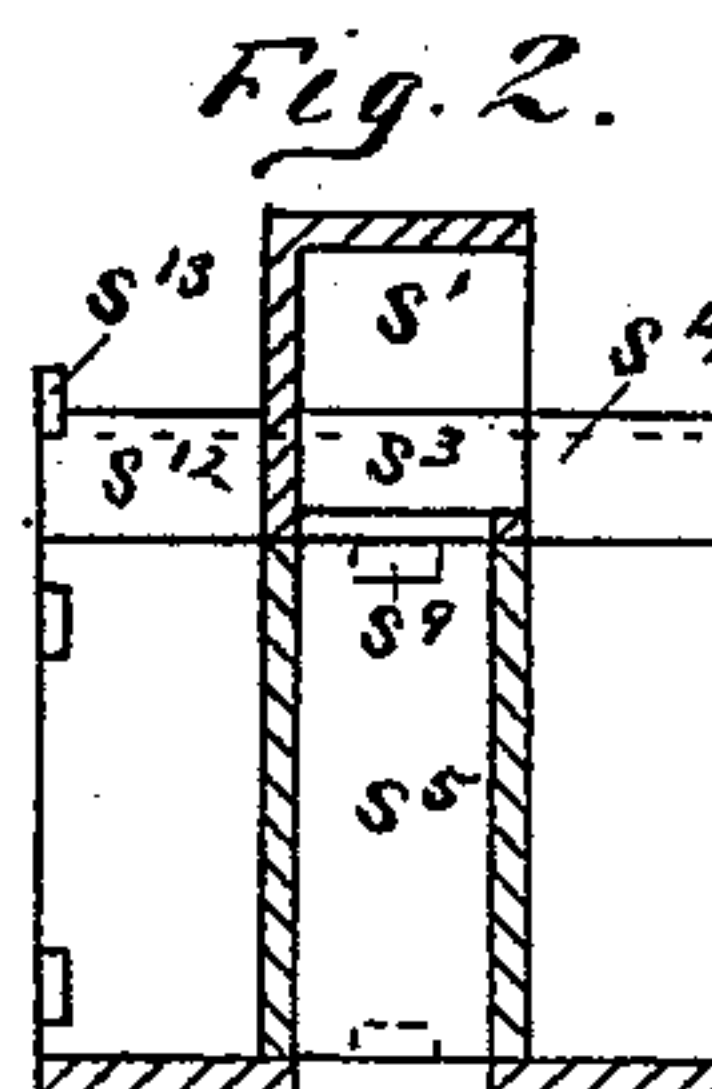
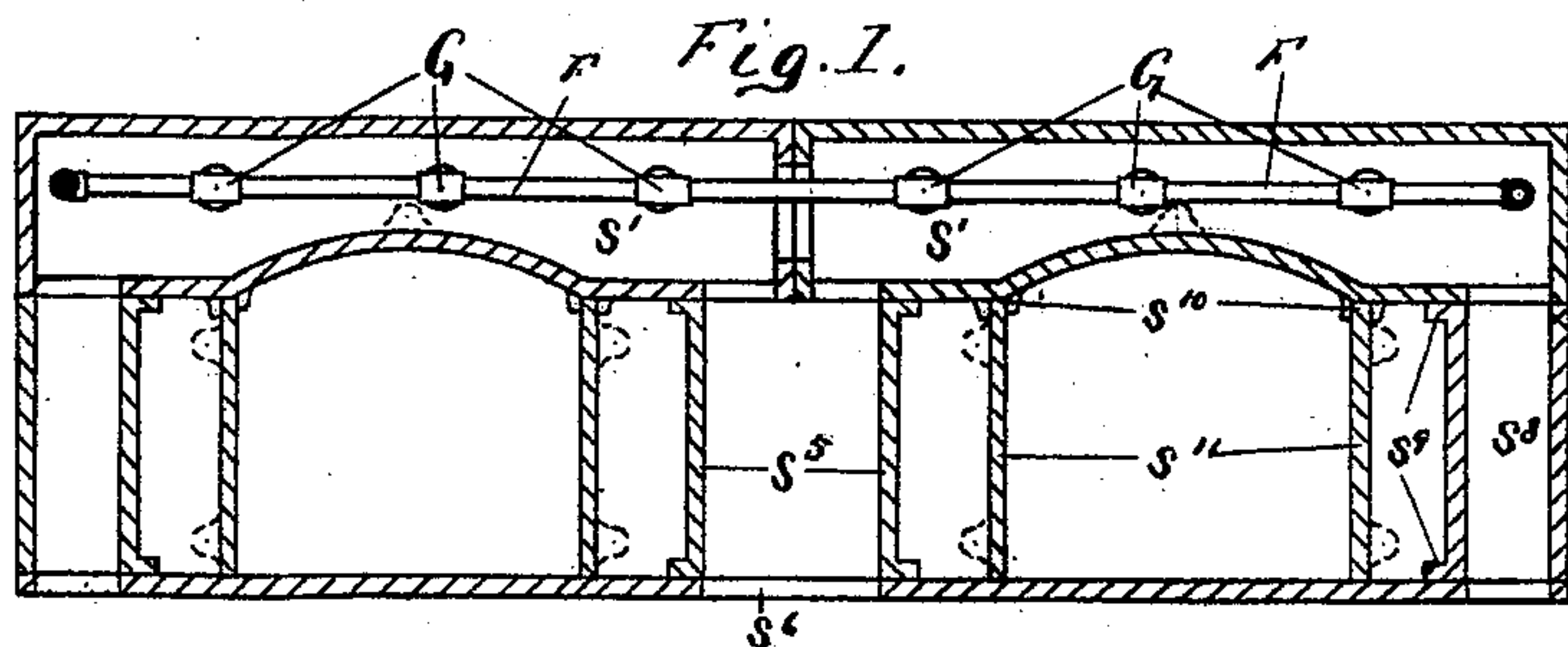


W. S. HUTCHINSON.

FURNACE.

No. 480,327.

Patented Aug. 9, 1892.



Witnesses

Wm. R. Chapman.

W. E. Gastman.

Inventor

William S. Hutchinson

By *Frederick W. Parker*  
Attorney.

(No Model.)

2 Sheets—Sheet 2.

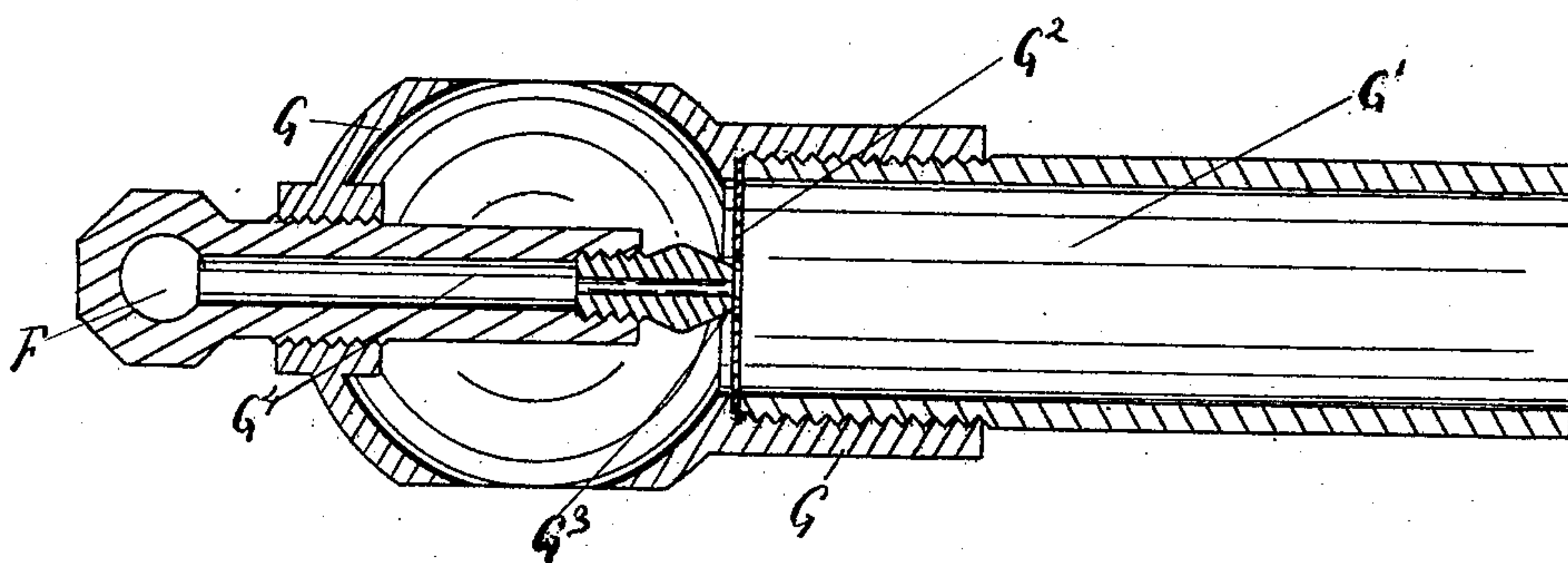
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*Fig. 9.*



*Witnesses*

*Celestine R. Chapman.*

*Virginia Wiley*

*Inventor*

*William S. Hutchinson*

*By Francis W. Parker,*  
*Attorney.*



# UNITED STATES PATENT OFFICE.

WILLIAM S. HUTCHINSON, OF CHICAGO, ILLINOIS.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 480,327, dated August 9, 1892.

Application filed June 5, 1891. Serial No. 395,221. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM S. HUTCHINSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Furnaces and Devices and Attachments Connected Therewith for the Production and Combustion of Water-Gas, of which the following is a full, clear, and exact specification.

My invention relates to improvements in furnaces for the production and combustion of water-gas, and has for its object to provide simple and convenient means whereby the same may be accomplished. It is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical cross-section through the plates, which are not illustrated, though they may be applied to a construction substantially the same as that shown in Figs. 1 to 4. Fig. 2 is a section through such plates. Figs. 3, 4, 5, 6, 7, and 8 are details of the various portions which make up such plate construction. Fig. 9 is a longitudinal section through the burner. Fig. 10 is a plan view thereof.

Two boxes  $S'$   $S'$  are supported centrally by the short plates and within the wall and transversely disposed, so as to form a transverse air chamber or passage in which the pipe  $F$  may lie. They are upwardly curved, as at  $S^3$ , for the opening, and are connected by the apertures  $S^4$  with each other and perforated on their lower sides at the points  $S^2$   $S^2$ .

$S^5$   $S^5$  are vertical plates upon which the inner ends of these boxes rest, and  $S^6$  is a perforation in the base-plate whereby an air-passage is made from the ash-chamber between the plates  $S^5$  into the boxes  $S'$   $S'$ .

$S^8$   $S^8$  are vertical boxes open at both ends and adapted to support on the outer end of each of the boxes  $S'$  on the base-plate and form an air-passage from the ash-pit to the outer end of such box  $S'$ .

$S^{12}$  is a curved plate conforming to the curvature  $S^3$ , and when built is continuous therewith, having the grooves  $S^{10}$   $S^{10}$ , as shown, into which the vertical plates  $S^{11}$  pass.

$S^{14}$  is a front curved piece similar to the plate  $S^{12}$ . The curved pieces  $S^{14}$   $S^{12}$  and  $S^3$  form arches for the opening into the furnace, through which the ordinary fuel is supplied.

These several plates and boxes may be provided, as indicated, with lugs  $S^7$   $S^9$   $S^{13}$ . These or additional lugs might be used to secure the parts in position. These plates and boxes are of course used to support the brick, clay, and the like, of the furnace-wall in the manner shown in Figs. 1 and 2, the object being to furnish air-passages within the furnace-wall leading to and surrounding the pipe  $F$ .

The form of the injector is shown in Figs. 13 and 14, where  $F$  represents a pipe provided with a series of short lateral pipes  $G^4$ , terminating each in the tip  $G^3$ , within the surrounding globe  $G^5$ . Projecting from this globe is the pipe  $G'$ , and transversely disposed within the same is a centrally-perforated diaphragm  $G^2$ . The steam is discharged from the tip  $G^3$ , and the air passing in through the side apertures of the globe is forced by the rush of steam through the pipe  $G'$  into the furnace.

The use and operation of my invention are sufficiently shown in the drawings and the foregoing description; but it may be well to state that a continuous but comparatively small discharge of steam is made through the discharge-nozzles  $G' G'$ .

Referring to the brick or plate formed furnace, the large air-passages opening upward from the ash-pit take the air (more or less) heated and deliver it about the globes of the injectors, whence it is injected into the furnace, the air and steam being mixed, preferably, so as to have oxygen and hydrogen in the proportion of fifty to one. The oxygen of the air, when it is taken in suitable proportions and mingled with hydrogen from the steam in suitable proportions, forms a mixture which is discharged into the furnace and is capable of and does combine with suitable carbon-carrying vapors or gases to create or generate what is known as "water-gas," which water-gas, so generated and created, burns within the furnace, producing a high degree of heat and making a practically brief combustion. In this way the device also operates in a substantially satisfactory manner as a smoke-preventer. The diaphragm performs two functions. In the first place it is desirable for the purpose of enabling me to adjust the injector by making the discharge-aperture of exactly the right diameter for the diaphragm



to be put in place and then subsequently bored out to the exact desired diameter. The diaphragm may be variously positioned with reference to the discharge-tip, but is preferably slightly in advance of it. The diaphragm also serves the purpose of deadening the noise which otherwise would be made by the action of the injector.

I claim—

- 10 1. A furnace-front consisting of upper transverse long boxes with connecting-aper-  
tures, vertically-separating plates, and boxes  
on which such boxes rest and whereby the  
door-spaces are formed, as also air-spaces  
15 from the ash-pit to the boxes and surrounding  
masonry, whereby a hollow-front furnace is  
formed, substantially as shown and described.
2. A furnace-front consisting of upper

transverse long boxes with connecting-aper-  
tures, vertically-separating plates, and boxes 20  
on which such boxes rest and whereby the  
door-spaces are formed, as also air-spaces  
from the ash-pit to the boxes and surrounding  
masonry, whereby a hollow-front furnace is  
formed, and a transverse steam-pipe through 25  
such transverse boxes, with forwardly project-  
ing steam-nozzles, and a series of air-discharg-  
ing and injector nozzles about and upon such  
steam-pipe nozzles and projecting through  
such boxes into the furnace, substantially as 30  
shown and described.

WILLIAM S. HUTCHINSON.

Witnesses:

CELESTE P. CHAPMAN,  
HARRIET M. DAY.