

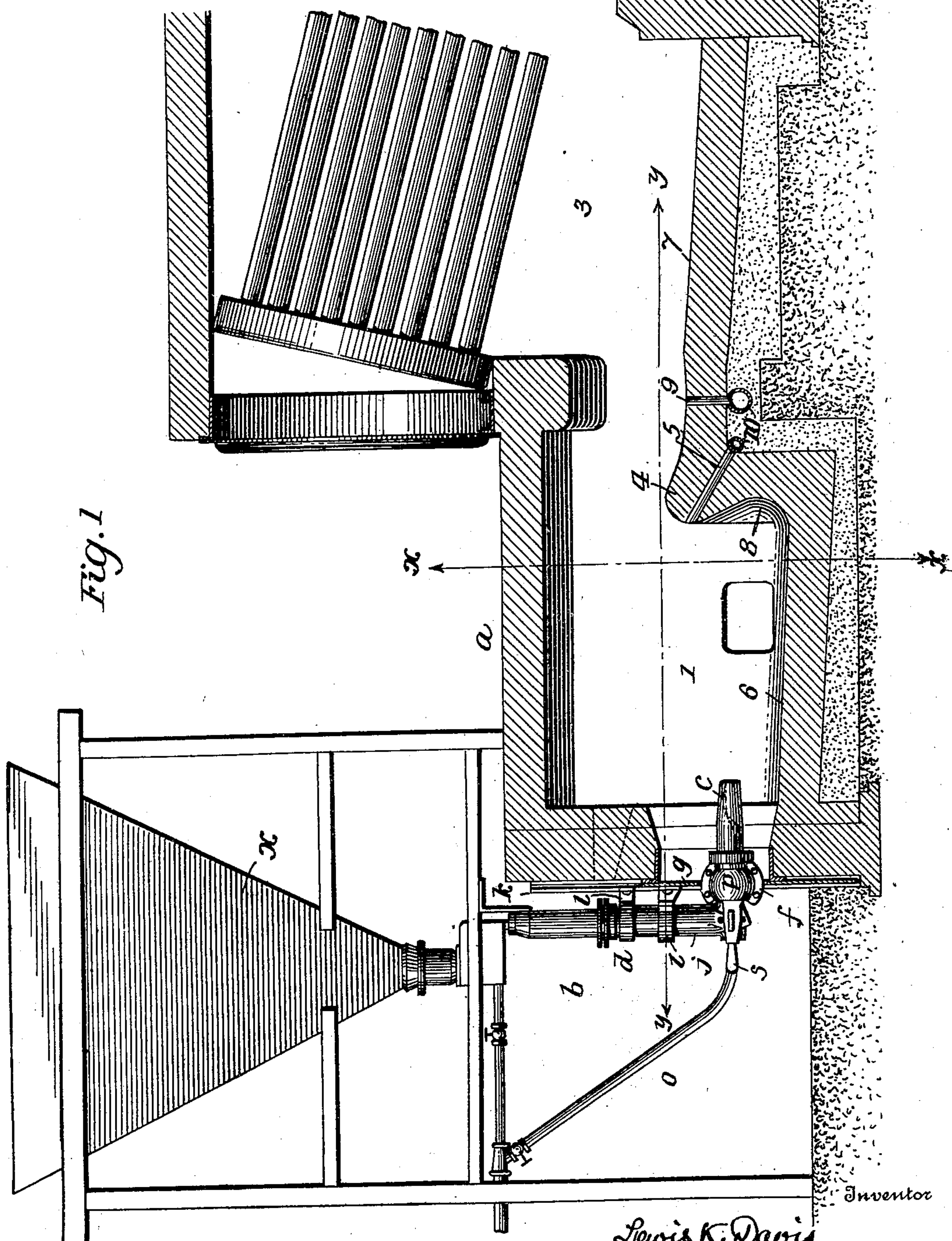
No. 730,883.

PATENTED JUNE 16, 1903.

L. K. DAVIS.
FUEL FEEDING APPARATUS.
APPLICATION FILED MAR. 12, 1902.

NO MODEL.

2 SHEETS-SHEET 1.



Witnesses
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384

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2 SHEETS—SHEET 2.

Fig. 2.

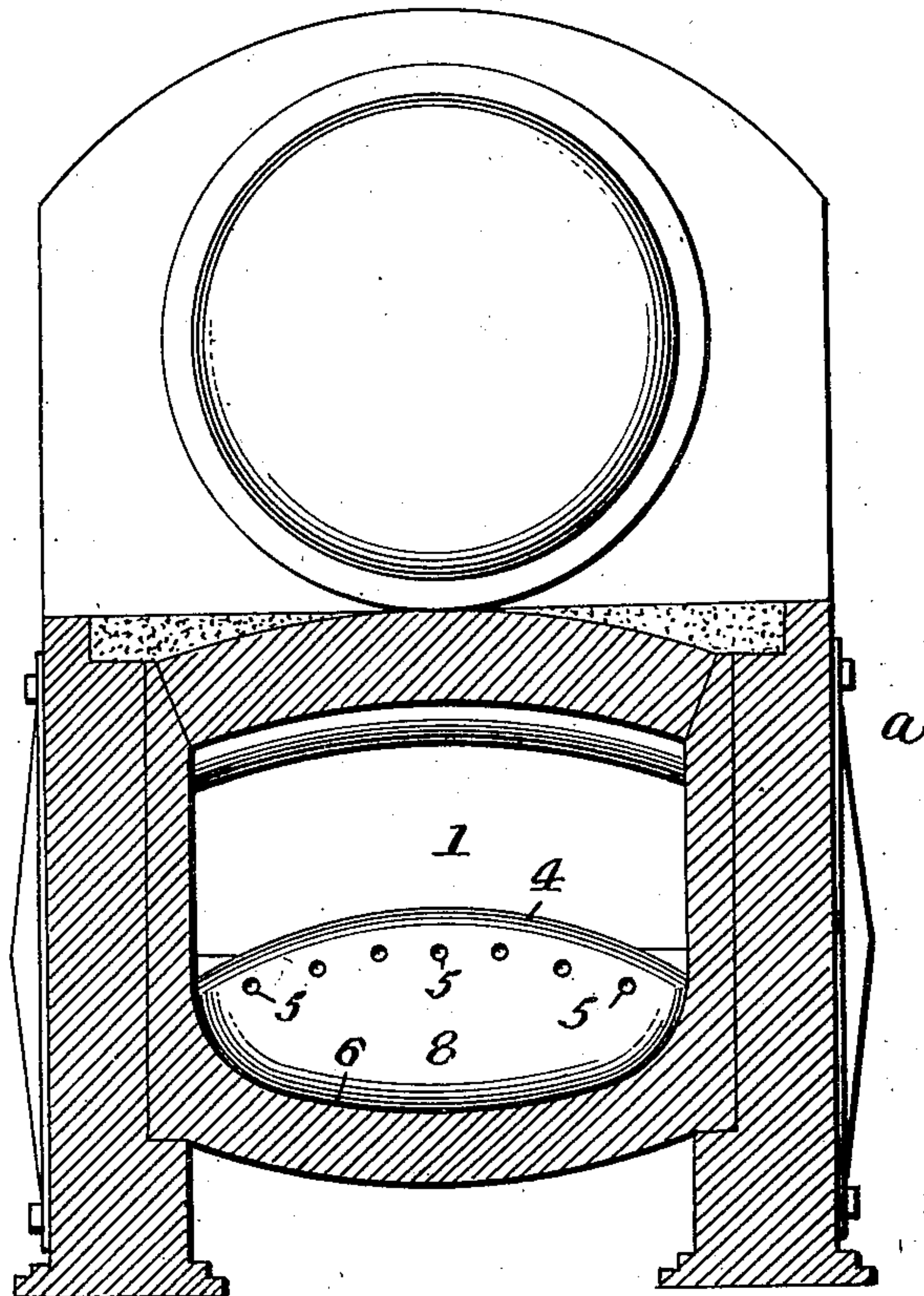
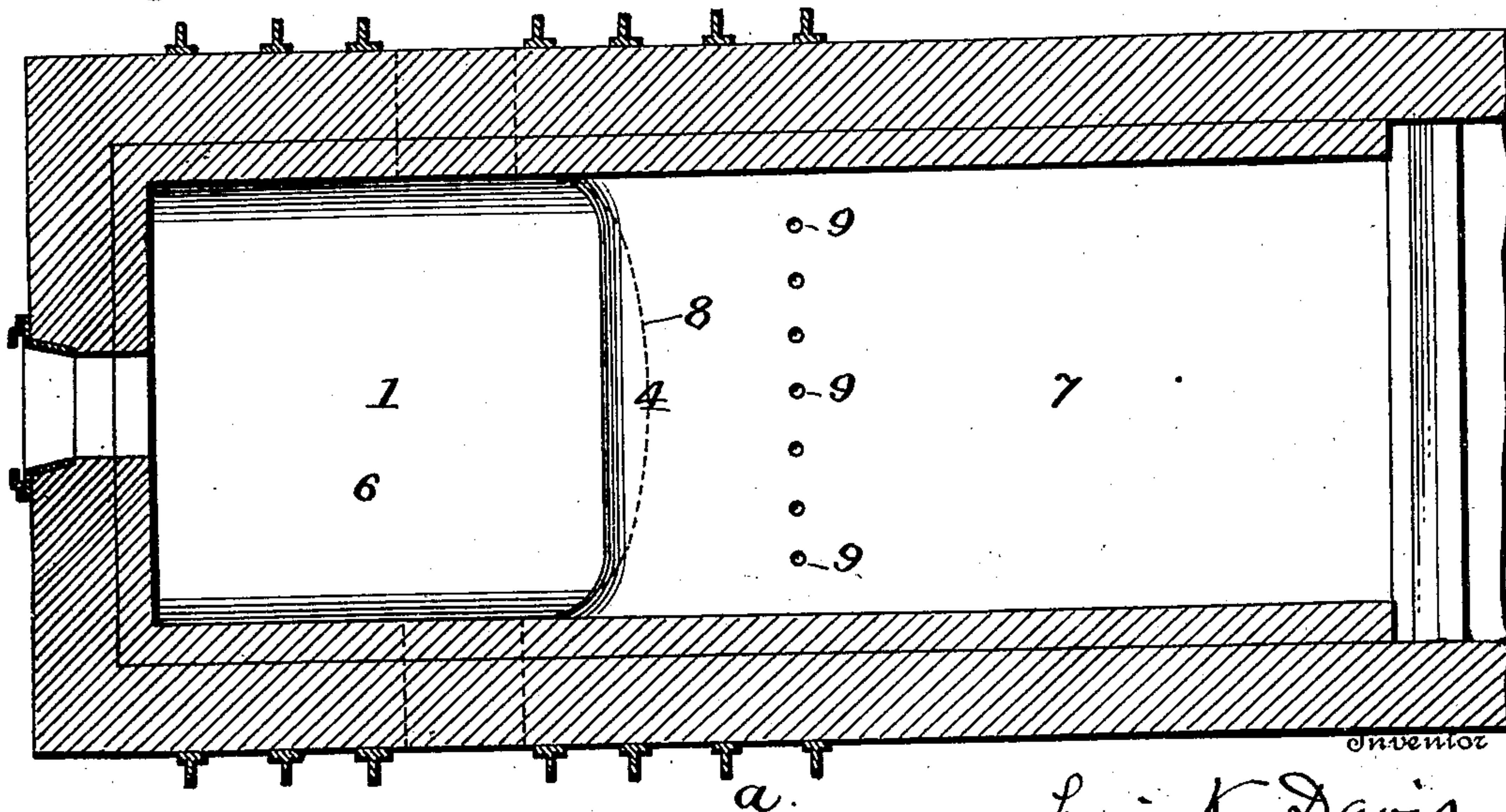


Fig. 3.



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FUEL-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 730,883, dated June 16, 1903.

Application filed March 12, 1902. Serial No. 97,878. (No model.)

To all whom it may concern:

Be it known that I, LEWIS K. DAVIS, of Indianapolis, Indiana, have invented new and useful Improvements in Fuel-Feeding Apparatus, of which the following is a specification.

My invention relates to furnaces for burning fine fuel, as coal or coke, coal-dust, and the like, and to fuel-feeding apparatus therefor.

The object of my invention is to provide a furnace in which the combustion of the fine fuel is complete, thereby obtaining a high degree of efficiency, and in which the fuel is evenly distributed in the combustion-chamber by means of fuel-feeding apparatus.

My invention consists in means for carrying out the above objects; and it further consists in the apparatus and devices having the general mode of operation substantially as hereinafter more fully described and shown in the accompanying specification and drawings, in which—

Figure 1 is a side view, partly in section, of my improved apparatus for burning fine fuel. Fig. 2 is a sectional view taken on the line *x x* of Fig. 1, and Fig. 3 is a sectional view on line *y y* of Fig. 1.

Referring to the drawings, *a* represents a furnace for burning fine fuel constructed according to my invention, while *b* represents a fuel-feeding apparatus, shown in this instance as of the character fully disclosed in my pending application, Serial No. 97,877, filed March 12, 1902. While the fuel-feeding apparatus described in the application referred to is suitable for use in connection with any furnace to which it may be applicable, I have devised a furnace which when used with the fuel-feeding apparatus described in the application referred to and illustrated in the present application will produce a complete combustion of the fuel, thereby obtaining the utmost degree of heat with a given consumption of fuel. The fuel-feeding apparatus referred to is provided with a nozzle *c*, to which fluid under pressure is led for discharging the fuel therefrom, and this nozzle is so arranged that its angle of discharge may be varied, thus directing the fuel to any part of the combustion-chamber 1 of the furnace, while the nozzle *c* may be ad-

justed vertically as a whole, or, in other words, it may be bodily raised and lowered at the entrance to the furnace. The fuel-feeding apparatus is shown as arranged at the front of the furnace, where it should be placed in a furnace of the character described, but with other furnaces or with a different arrangement of the furnace illustrated it could be placed in other positions.

In the furnace illustrated and constructed according to my invention the combustion-chamber 1 is separated from the furnace-flue 3 by a bridge 4, provided with means for injecting fluid under pressure into the furnace, as shown, the fluid being injected into the combustion-chamber by means of twyers 5, of which there may be any desired number, the convenient number being illustrated in Fig. 2 and placed at about the proper distance.

The bottom portions 6 and 7 of the combustion-chamber 1 and flue 3 preferably slope backward from the front of the furnace, as shown, this construction aiding in the operation of the apparatus, as hereinafter described.

The bridge 4 is preferably arched, as shown, and projects toward the front of the furnace and above the level of the highest portion of the bottom 7 of the flue 3, while beneath the bridge I prefer to arrange a pocket or hollowed portion 8, communicating with the combustion-chamber 1. This pocket or hollowed portion 8 may be of any suitable shape and of any desired depth, a convenient shape being that illustrated in the drawings. The bottom of the flue 3, as shown, is also provided with twyers 9, and fluid under pressure is led to the twyers 5 and 9 by suitable connections or piping 10. By the arrangement of twyers as shown a blast of fluid under pressure, as compressed air, is discharged into the combustion-chamber and toward the front of the furnace at an upward angle, while fluid under pressure is also discharged from the twyers 9 at a point just beyond the bridge 4, this second line of twyers 9 being auxiliary in action and assuring a complete combustion of the fuel, if that has not already taken place in the combustion-chamber 1.

A fuel-feeding apparatus *b* having been fully disclosed in my application hereinbe-

fore referred to but a brief description will be given here of its construction and operation, it being sufficient to state that a rifled nozzle *c* for injecting fluid under pressure and fuel into the furnace is connected to telescoping piping *d* by means of a universal joint or connection *p*, this universal joint being formed by a spherical portion of the piping and a socket-piece *f*, connected to the nozzle and adapted to the spherical portion of the piping. Suitable arms *s*, connected to the socket *f*, provided with means for adjusting the same, allow the angle of discharge of the nozzle to be varied within the desired limits at will. The piping *d*, as stated, is telescopic in order to allow the vertical height of the nozzle to be changed, and, as shown, the portion *j* of the piping is connected by struts *l* to a sliding plate *g*, supported on slides *k*, arranged on the front of the furnace. Fuel is fed to the nozzle *c* through a suitable hopper *x* and through the piping *d*, while fluid under pressure, as compressed air or oil, is led to the nozzle by means of the flexible hose *o*.

In the operation of the furnace and the apparatus for feeding fuel thereto the stream of fuel discharging from the nozzle is first directed against the wall of the hollowed portion 8 beneath the bridge 4, the nozzle *c* being then substantially in the position relative to the bridge as shown in Fig. 1, and then the nozzle is raised bodily until it is discharging injecting fuel directly into the path of discharge of the twyers 5, when it will be readily seen that a very complete combustion of the fuel will be had, while any portion of the fuel which is not burned at any point substantially in front of and above the outlet of the twyers 5 will be burned through the action of the twyers 9, arranged just beyond the bridge. The rifling, as described, given to the nozzle *c* produces a whirling motion of the fuel as it leaves the nozzle, tending to spread the same, and thus an even distribution and regulation is obtained, and this spreading of the fuel further aids in combustion in conjunction with the entering stream of fuel under pressure from the twyers 5 and 9.

I have found that with the arrangement of fuel-feeding apparatus described and furnace constructed as set forth every part of the combustion-chamber 1 is heated to a most intense degree and complete combustion takes place.

Without limiting myself to the precise details of construction hereinbefore shown and

described, I claim and desire to obtain by Letters Patent—

1. In a furnace having a combustion-chamber and a bridge at its rear end, the combination of adjustable means for feeding fine fuel under pressure through the front wall of said chamber, and means for injecting air under pressure through the bridge toward the front end of the chamber, substantially as set forth.

2. In a furnace having a combustion-chamber, a flue and a bridge between them, the combination of adjustable means for feeding fine fuel under pressure into the chamber toward the flue, and means for injecting fluid under pressure through the bridge into the chamber and toward the fuel-feeding apparatus and simultaneously into the flue in rear of the bridge, substantially as set forth.

3. In a furnace having a combustion-chamber, a flue and a bridge between them, the combination of means for feeding fine fuel under pressure into the chamber at its front end and toward the flue, means for injecting fluid under pressure upwardly through the bottom of the flue behind the bridge, and means for injecting fluid under pressure through the bridge into the chamber in a direction away from the flue and toward the front of the chamber, substantially as set forth.

4. The combination of a furnace, its combustion-chamber, a forwardly-projecting arched bridge at its rear end having a hollowed portion beneath the same and provided with twyers for injecting fluid into the combustion-chamber toward its front end, and a fine-fuel-feeding device at the front end of the combustion-chamber and provided with means for directing its discharge into the furnace at any desired angle toward said bridge, substantially as described.

5. The combination of a furnace, its combustion-chamber, an arched bridge at its rear end provided with twyers discharging toward the front of the furnace, a hollowed portion beneath the bridge connecting with the combustion-chamber, a universal adjustable fuel-feeding device for directing fine fuel, first against the bridge and then into the line of discharge of the twyers, substantially as described.

Signed this 27th day of February, 1902, at Indianapolis.

LEWIS K. DAVIS.

Witnesses:

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CLEMENS BLANK.