

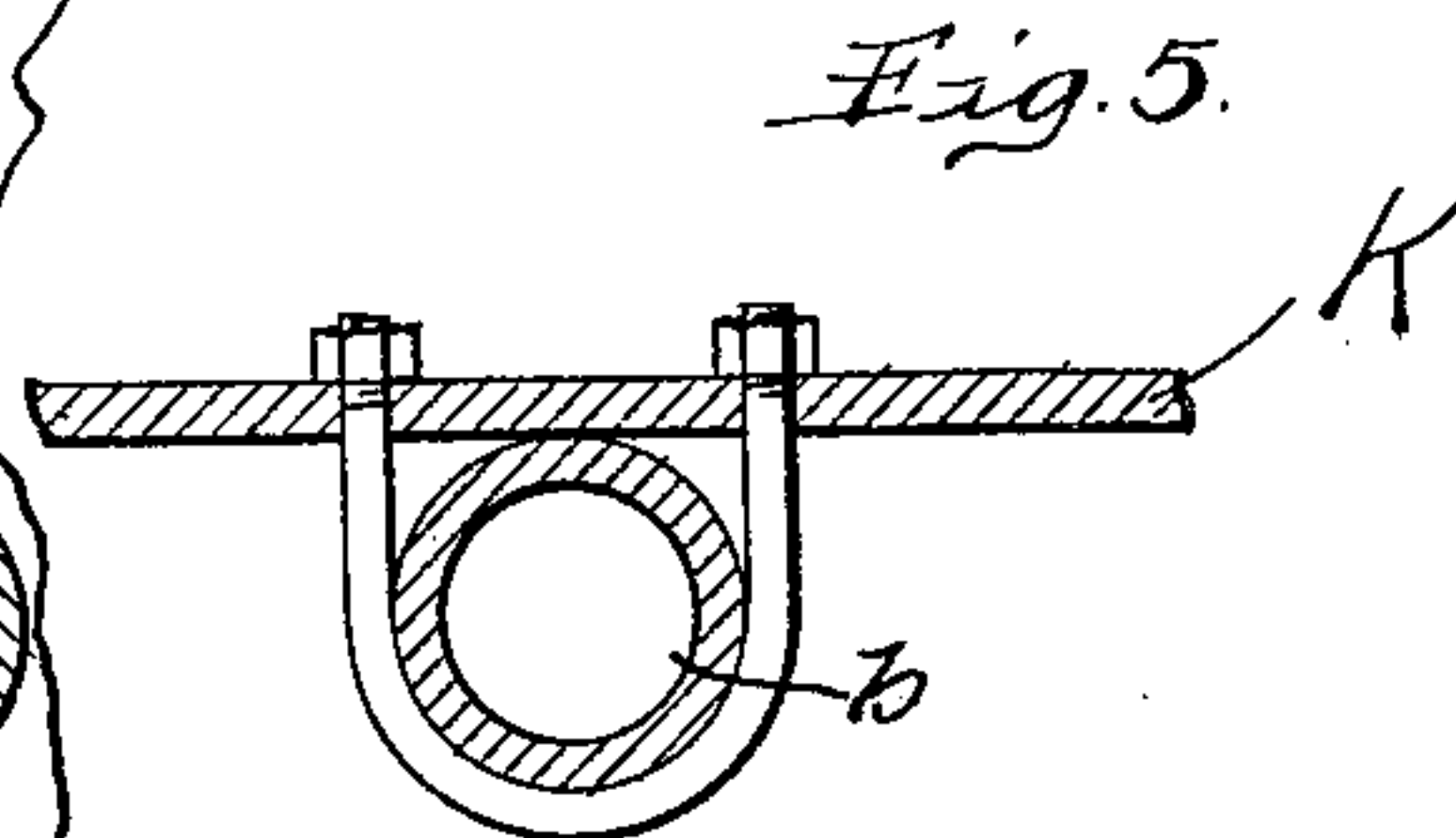
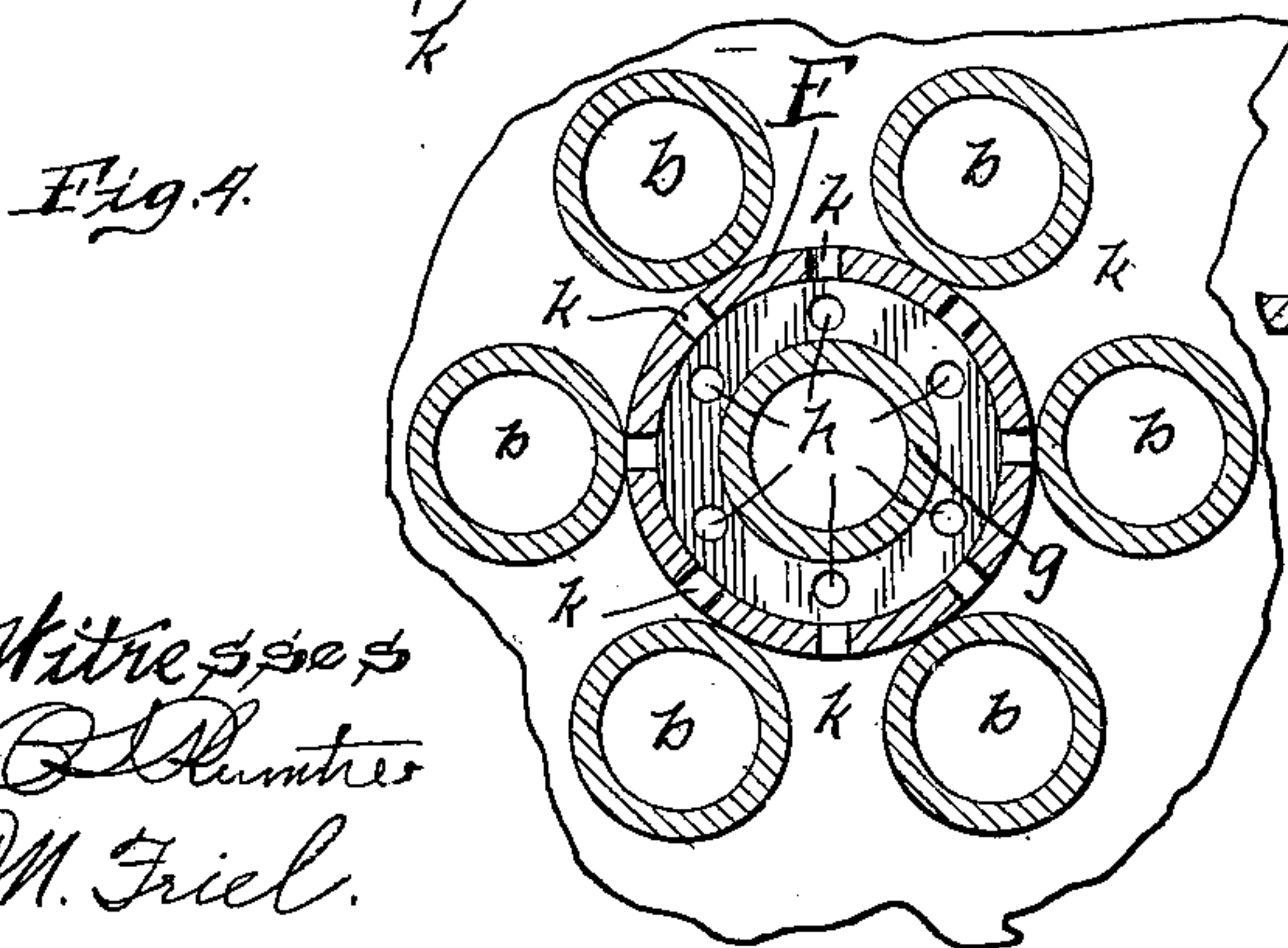
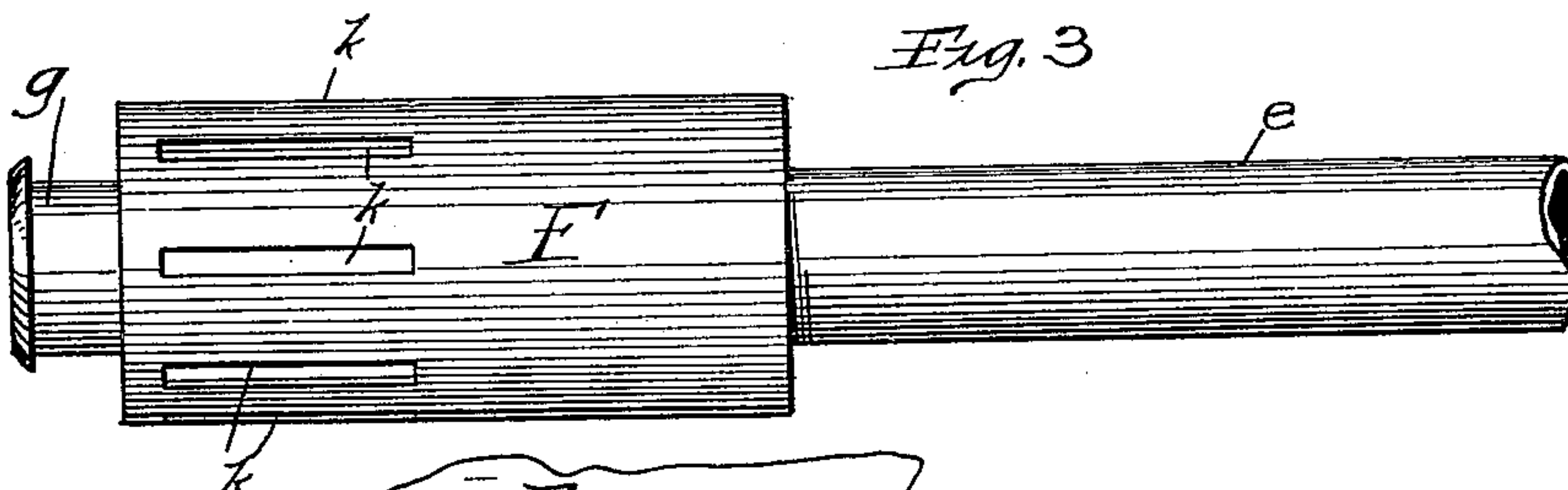
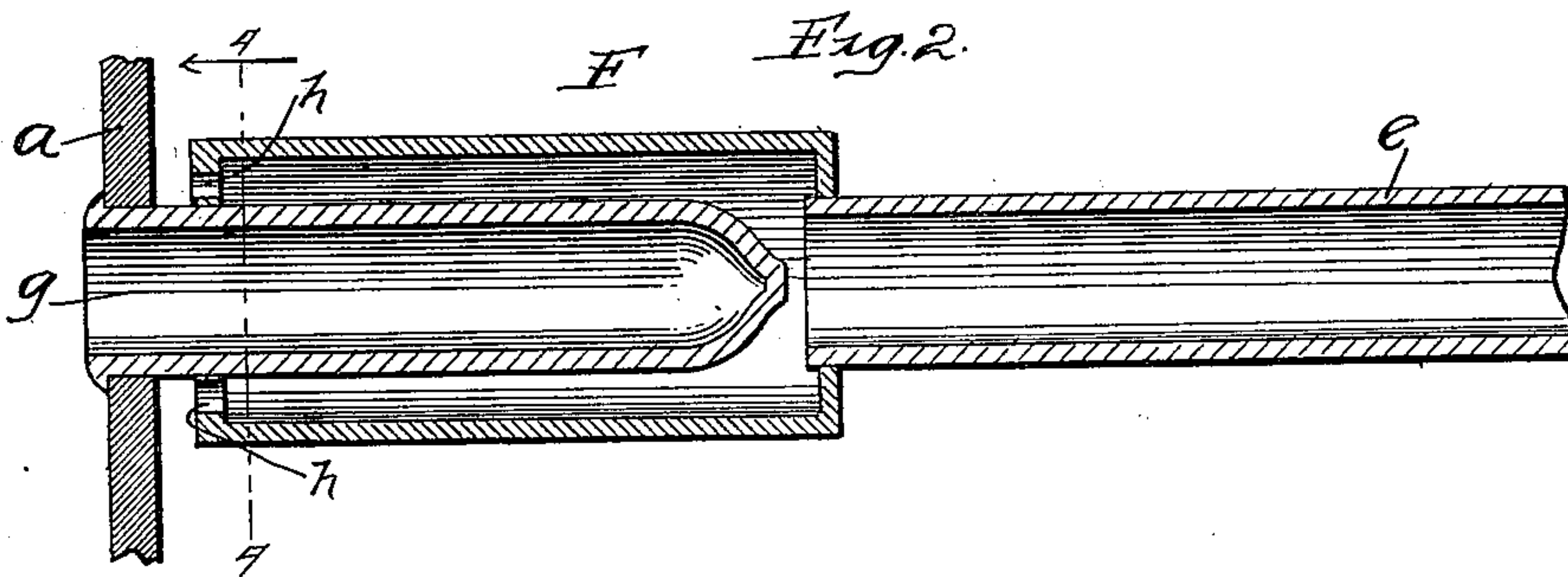
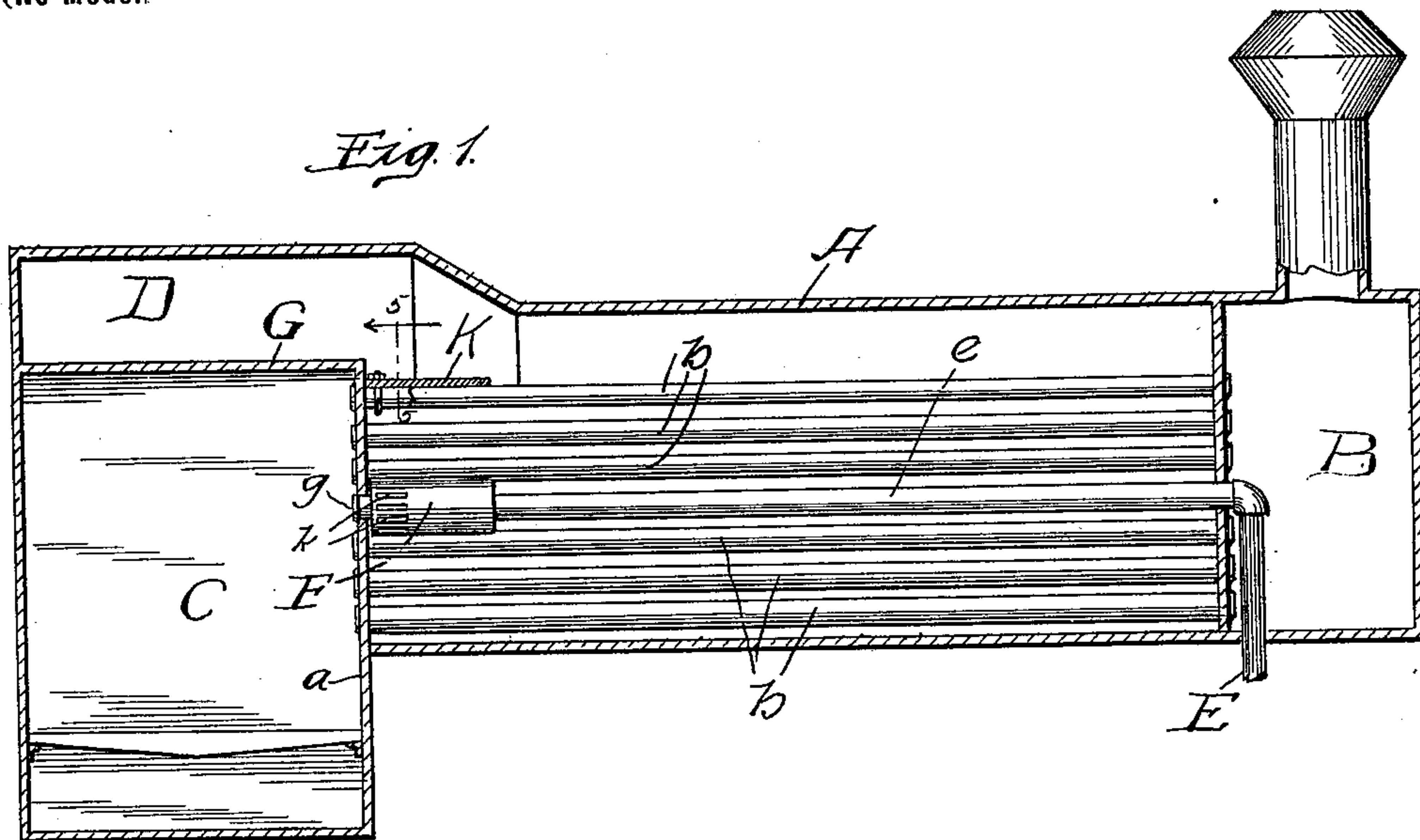
No. 652,766.

Patented July 3, 1900.

T. G. FORSTER.
BOILER CLEANER.

(Application filed July 22, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

THOMAS G. FORSTER, OF NEWTON, KANSAS.

BOILER-CLEANER.

SPECIFICATION forming part of Letters Patent No. 652,766, dated July 3, 1900.

Application filed July 22, 1899. Serial No. 724,748. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. FORSTER, a citizen of the United States, and a resident of Newton, in the county of Harvey and State of Kansas, have invented certain new and useful Improvements in Locomotive-Boiler Cleaners, of which the following is a full, clear, and exact specification.

Heretofore the manner of injecting water into locomotive-boilers and the method of cleaning the same has been such that the foreign substances and mineral residuum deposited by the same became in a very short time incrustated around the tubes where they connect with the tube-plate next the fire-box, and thus render it possible for the tubes to be burned out and ruin the boiler, if nothing worse occurs.

The object of my invention is to cause the agitation of the water at the rear of the boiler and prevent the accumulation of this dangerous sediment and deposit thereabout in such quantities as to be a menace either to the person or to the locomotive. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal central section of a locomotive-boiler having my improvements applied thereto. Fig. 2 is a longitudinal central section of the rear end portion of the feed-water tubes broken away from the surrounding construction of the boiler. Fig. 3 is a side view thereof. Fig. 4 is a transverse section taken on dotted line 4-4, Fig. 3, looking in the direction indicated by the arrows. Fig. 5 is a detail view showing the means of connection between upper flues and overlapping plate.

In the drawings, A represents a locomotive-boiler; B, the smoke-arch; C, the fire-box, and D the steam-chamber above the fire-box.

In the current construction of steam-boilers for locomotives it is usual to inject water near the forward end thereof in the vicinity of the steam-chests. The water thus supplied precipitates a sort of slimy ooze, which, owing to the motion of the locomotive and owing to the fact that the greatest heat is generated at that point, works its way to the rear tube-plate *a* of the boiler and collects and hardens and incrustates around the rear ends of the flues *b b* of the same and forms a non-conduc-

tor around said flues where they are connected to the flue-plate, and thus subjects them to the intense initial heat from the fire-box, which, if care is not taken by removing this solid matter, will soon burn said tubes out and ruin the boiler. It is customary to clean the locomotive-boiler out every four or five months, according to the locality and the quality of the water used in it. By my invention, which keeps this precipitated matter away from the rear flue-plate, the boiler can be used for a period of time fifty to one hundred per cent. longer than it is now possible. Instead of injecting the water laterally into the boiler I employ a supply-pipe *E*, which enters the bottom of the smoke-arch and extends vertically and is connected to the forward end of a longitudinal feed-pipe *e* by means of a suitable elbow, as shown. There may be one or several of these feed-pipes *e* in the boiler, located so that the discharge from their rear ends, as will hereinafter more fully appear, will wash the precipitated matter from the rear end of the boiler and by means of the currents thereby created carry the same back into the more central and forward parts of the boiler, where the presence of the same, even if it should become incrustated on the flues, will not injure the flues.

The rear ends of the feed-water tubes *e* are tapped into the forward head of a cylindrical chamber *F* of such increased diameter that it comes in contact with the surrounding flues. (Substantially shown in Fig. 1.) The opposite head of this chamber *F* is connected to the flue-plate by means of the nipple *g*. The forward end of this nipple extends longitudinally into chamber *F* within a comparatively-short distance of the opposite end of the same and is closed by a more or less cone-shaped or truncated-cone-shaped end. The rear open end of the nipple extends through the flue-plate and is suitably swaged and spread, so as to secure it thereto. The head of chamber *F* next the flue-plate is provided with a series of openings *h h*, which surround said nipple, and the circumference of said cylinder near said perforate head is provided with a circumferentially-arranged series of openings *k k*, which, as shown in the drawings, are preferably elongated longitu-

dinally into slots. I prefer to use both these slotted openings *k* in the sides of said chamber and the openings *h* in the head of the same; but it is apparent either one of said series may be dispensed with.

When the water is injected through the feed-water tube into the chamber F, it becomes heated to such an extent that when it forcibly issues from slots *k* and openings *h* it is generated into steam. This forcible expulsion of said feed-water from chamber F creates a strong rearward current which impinges against and is deflected back from the flue-plate and creates a radiating movement of the water in the boiler, which causes it to circulate around the flues, so that the matter precipitated against the said rear flue-plate and contiguous end portion of the flues during the interim when water is fed to the boiler is washed off the same and forced back toward the center portion of the boiler, at which latter point the presence of said precipitated matter is not likely to cause trouble.

The rear flue-plate and contiguous ends of the flues secured thereto besides being peculiarly subject to the collection and incrustation of the foreign matter in the water are subject to the gravitation of such deposits as may have collected upon the crown-plate G of the fire-box and fall over the forward edge of the same and settle upon the said flue-plate and flues. This I avoid by means of a horizontally-disposed plate K, which is clipped to some of the uppermost flues or is otherwise suitably secured thereto and which extends substantially from side to side of the boiler and from the upper portion of the flue-plate, with which it preferably comes in contact, forward a suitable distance. This plate K roofs over the rear portions of the flues and sheds the sediment that has collected thereon at a point so far forward of the rear flue-plate that the latter is not materially affected thereby. The accumulation of foreign matter or sediment at a point forward of the rear flue-plate removes the element of danger due to the burning out of the rear ends of the flues and renders the cleaning out of the boiler at the comparatively-frequent intervals now customary unnecessary.

What I claim as new is—

1. The combination with a horizontal boiler, and longitudinal flues, of a longitudinal feed-water pipe, a cylindrical chamber of increased

diameter to which the rear end of said pipe is connected, and a nipple connecting said chamber to the rear flue-plate of the boiler but closing it to the fire-box, said chamber being provided with a series of openings at or adjacent to its rear end.

2. The combination with a horizontal boiler, and longitudinal flues, of a longitudinal feed-water pipe, a chamber of increased diameter to which the rear end of said pipe is connected, a nipple the forward closed end of which extends longitudinally into said chamber and the edges of the rear open end of which are secured to the rear flue-plate of said boiler, said chamber being provided with a series of openings at or adjacent to its rear end.

3. The combination with a horizontal boiler, and longitudinal flues, of a longitudinal feed-water pipe, a chamber of increased diameter to which the rear end of said pipe is connected, a nipple the forward closed end of which extends longitudinally into said chamber and the edges of the rear open end of which are secured to the rear flue-plate of said boiler, said chamber being provided with a series of openings in its end and a series of circumferentially-arranged openings in its side contiguous thereto.

4. The combination with a horizontal boiler, longitudinal flues, and a longitudinal feed-water pipe connected to the rear flue-plate but closed to the fire-box, and provided with a series of openings at or adjacent to its rear end, of a horizontal plate secured to and projecting forward over the rear portion of the flues from its point of contact with the rear flue-plate.

5. The combination with a horizontal boiler, longitudinal flues therefor, a longitudinal feed-water pipe, a cylindrical chamber of increased diameter to which the rear end of said pipe is connected and which is provided with a series of discharge-openings at or near its rear end, and a nipple by means of which said chamber is connected to the rear flue-plate of the boiler, but closed to the fire-box, of a horizontal plate secured to and projecting over the rear portion of said flues from its point of contact with the said rear flue-plate.

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Witnesses:

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