T. H. CURTIS.

LOCOMOTIVE ASH PAN.

APPLICATION FILED JAN. 12, 1909.

973,765.

Patented Oct. 25, 1910.

3 SHEETS—SHEET 1.

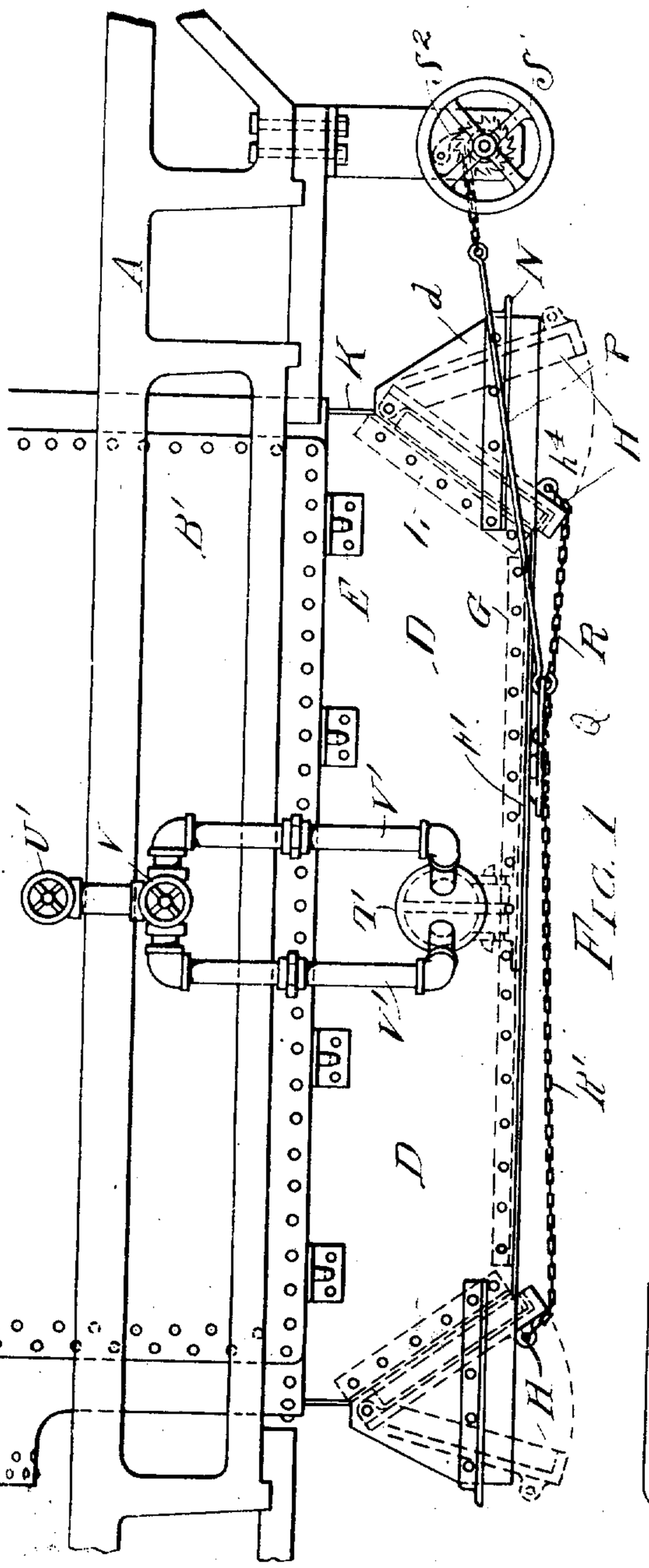

FIG. 1

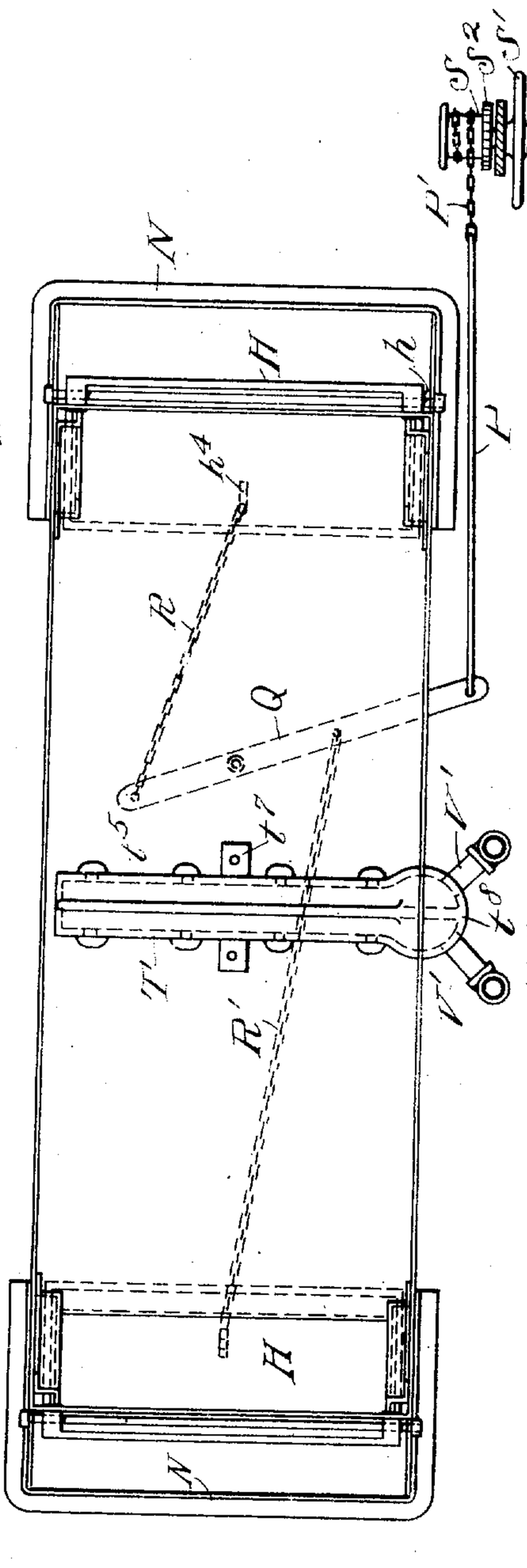

FIG. 2

WITNESSES.

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3 SHEETS—SHEET 2.

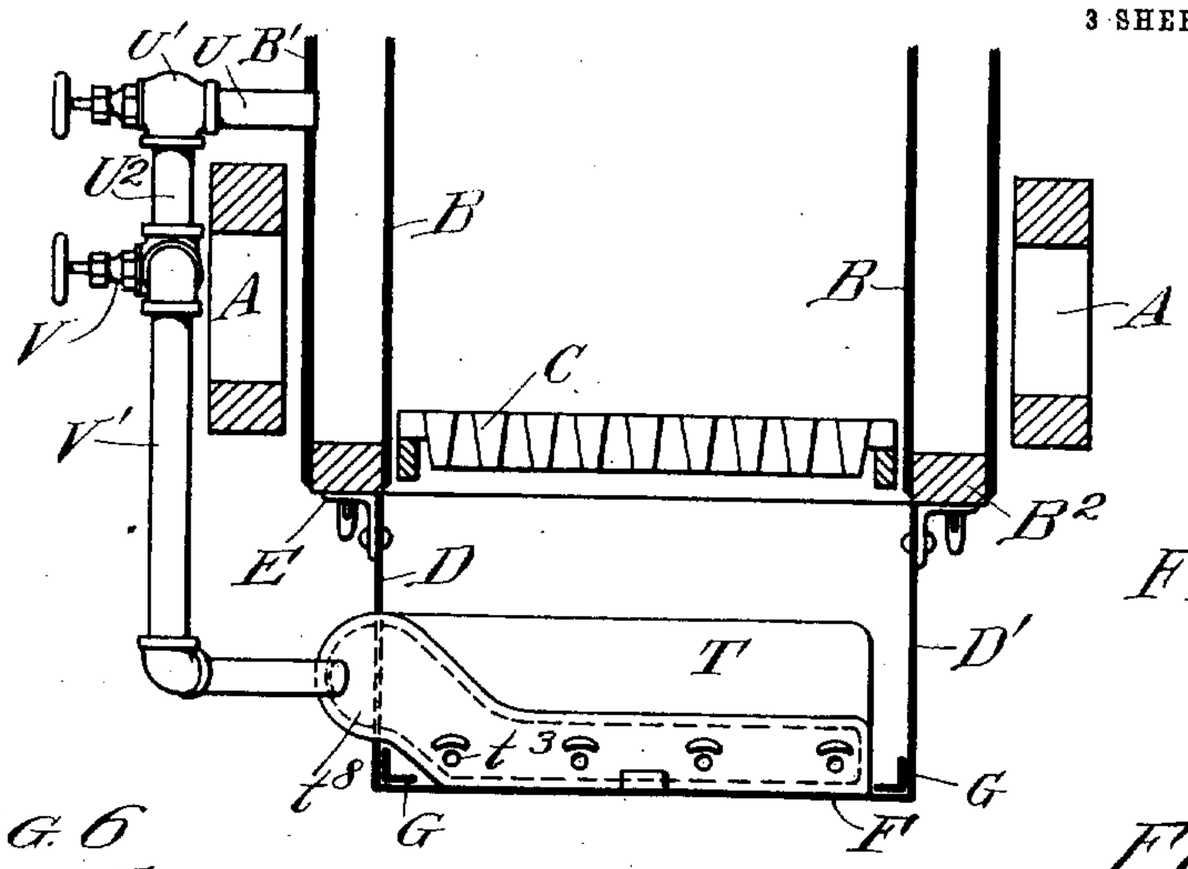


FIG. 3

FIG. 6

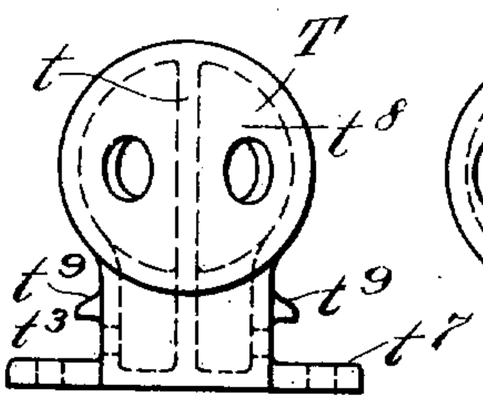


FIG. 7

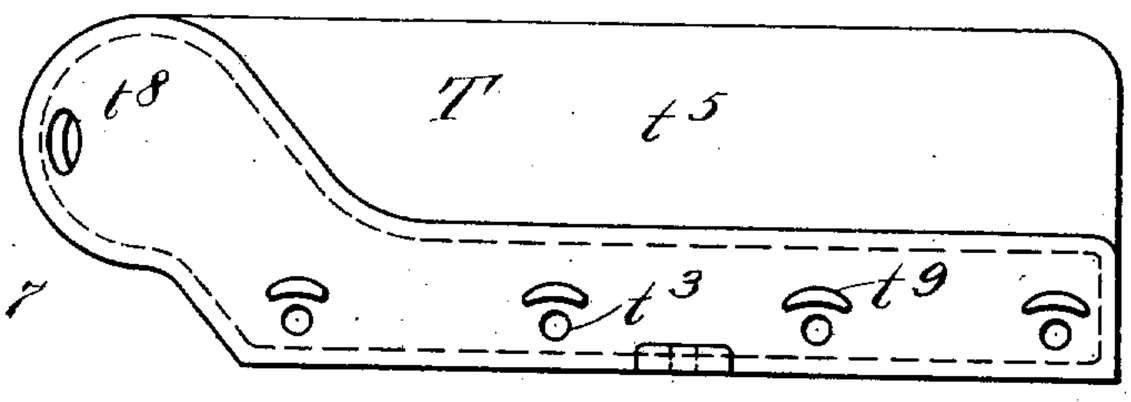


FIG. 9

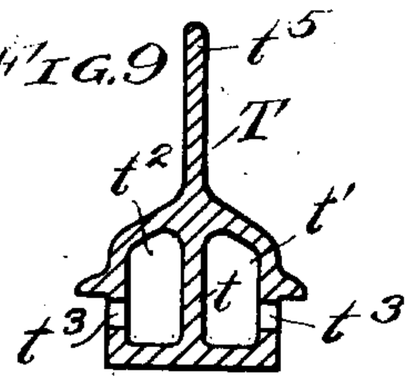


FIG. 8

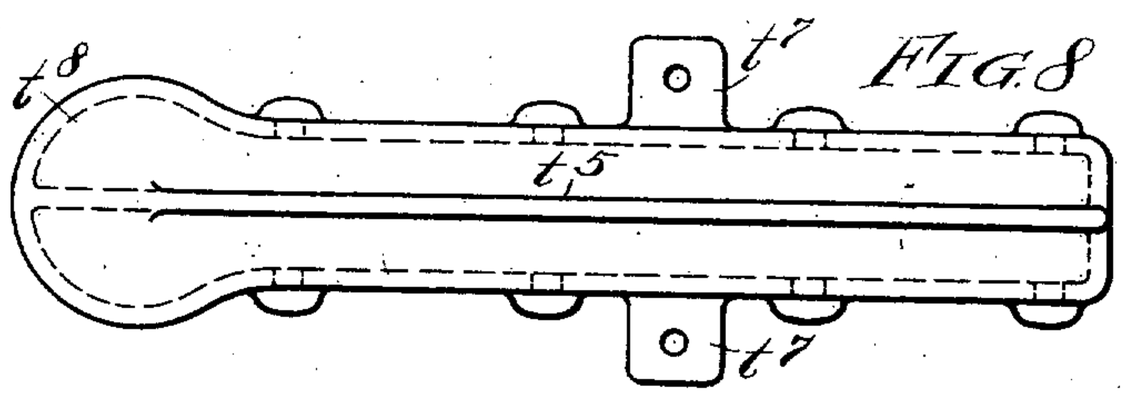
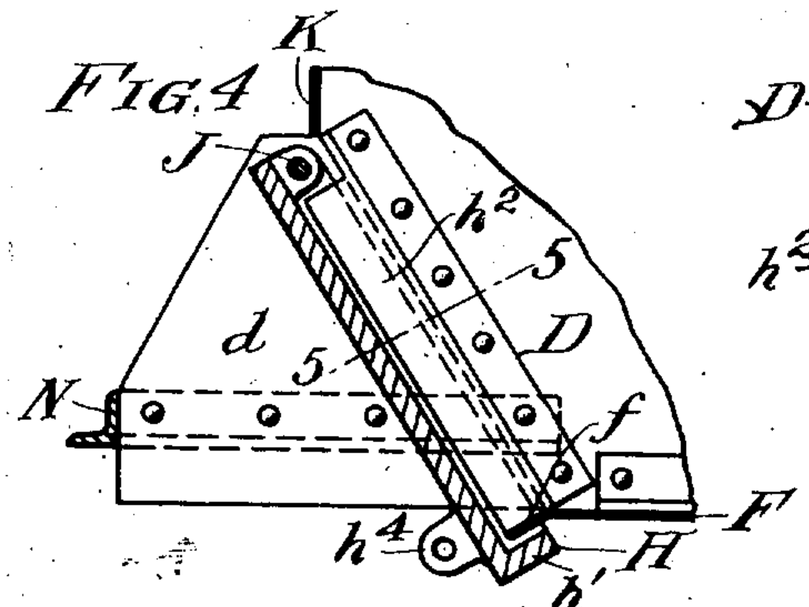


FIG. 4



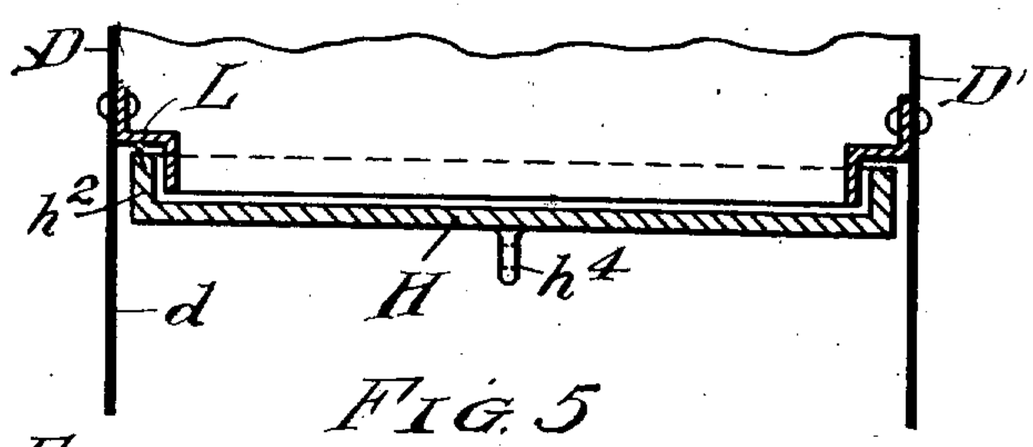


FIG. 5

WITNESSES.

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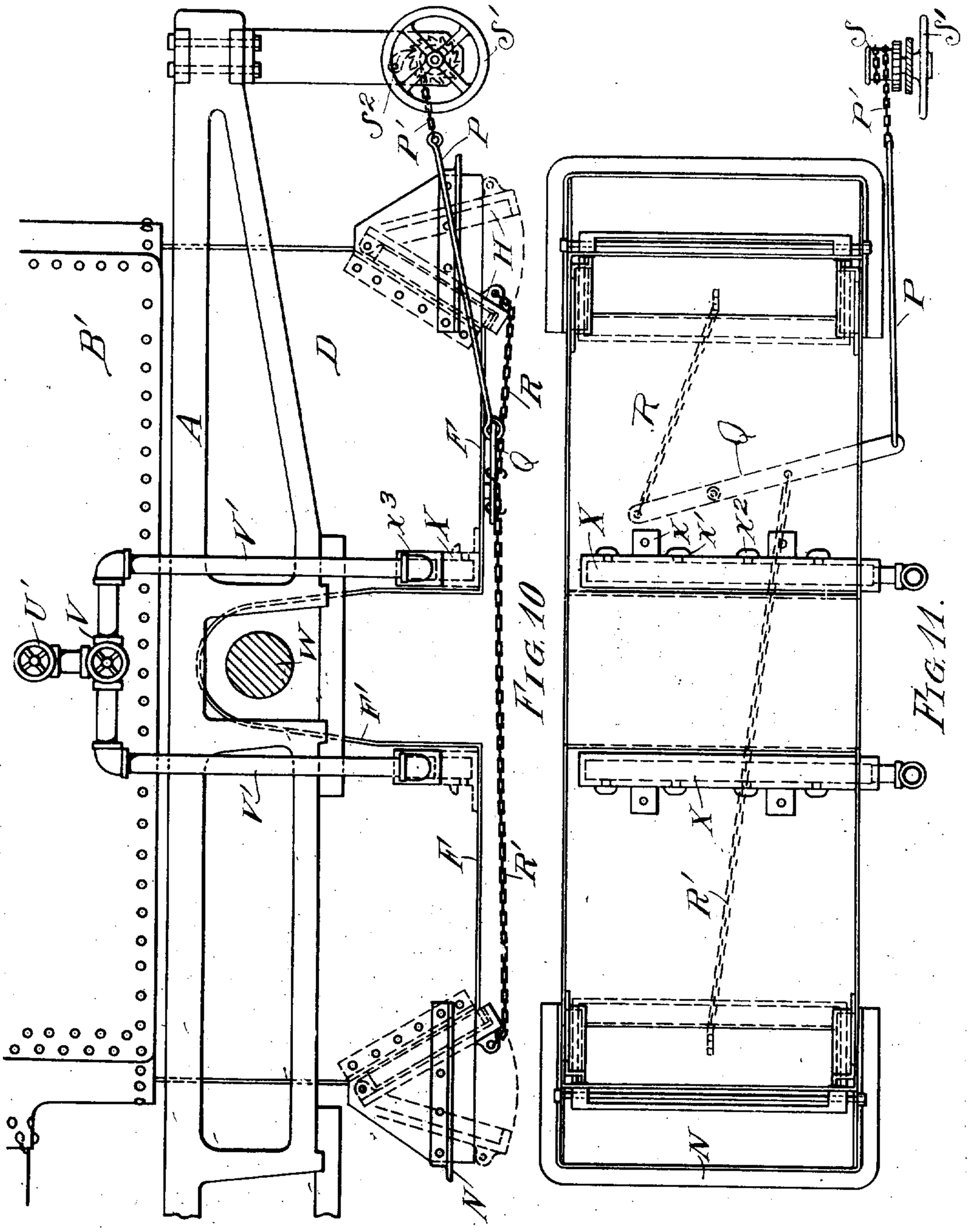
3 SHEETS—SHEET 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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LOCOMOTIVE ASH-PAN.

973,765. Specification of Letters Patent. Patented Oct. 25, 1910.

Application filed January 12, 1909. Serial No. 471,913.

To all whom it may concern:

Be it known that I, THEODORE H. CURTIS, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a certain new and useful Improvement in Locomotive Ash-Pans, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide simple and efficient means for cleaning the ashes out of a locomotive ash-pan without requiring the attendant to go under the locomotive. In accomplishing this object I provide a system of conduits and valves to enable water under pressure to be blown against the ashes, shoving them out of the pan, and I provide a pan which is particularly adapted to allow the discharge of ashes so moved. To this end a conduit is connected with the boiler and is arranged to discharge water with great force against the ashes at various points, so that the whole mass is quickly shoved along the pan. I locate the discharge members of the conduit at an intermediate position in the pan and at the ends of the pan I provide doors which normally close the pan, these doors when released serving as baffles to properly deflect the discharging ashes.

The invention includes broadly the combination of an ash-pan provided with my forcing and discharging mechanism, or either of them, as above referred to.

Other features hereinafter explained are also included in my invention, wherefore the invention is best summarized as consisting of the combination of coöperating elements hereinafter explained and set out in the claims.

The drawings clearly show my invention.

Figure 1 is a side elevation of a portion of a locomotive equipped with my ash-pan and blower; Fig. 2 is a plan of such equipment; Fig. 3 is a cross section through the fire box and grate; Fig. 4 is a vertical longitudinal section through the ash-pan door; Fig. 5 is a transverse section through the door as indicated by the line 5—5 on Fig. 4; Figs. 6 to 9 inclusive are views of the manifold which forms the discharge portion of the conduit, Fig. 6 being an end view, Fig. 7 a side elevation, Fig. 8 a plan, and Fig. 9 a cross section; Fig. 10 is a side elevation of a portion of a locomotive having a divided ash-pan equipped with my invention; and Fig. 11 is a plan of such equipment.

Referring to the drawings, A represents the usual side frames of a locomotive. Between these frames is the fire box shown in Fig. 3 as having the inner sheet B and the outer sheet B′, these sheets, together with the mud ring B^2 at the bottom providing the usual water leg. At the base of the fire box is the usual grate C. Below the grate is the ash-pan, which is shown as having side walls D and D′ supported by means of angle pieces E from the mud ring.

F represents the bottom of the ash-pan, which is connected with the side walls by angle strips G. At the ends of the pan I provide inclined doors H which are pivoted near their upper edges on cross rods J extending from one side of the pan to the other, the doors having ears *h* surrounding the rods. These rods are carried by the side walls of the pan. At its lower edge the door is adapted to close against the bottom of the pan, while above the door leading upward substantially from above the rod J is an end wall K which extends up to the mud ring and is there secured. My ash-pan accordingly has side walls and a bottom and inclined doors at the two ends, which, as will be readily understood, are adapted to swing away from the central portion of the pan to allow discharge, as indicated by dotted lines in Figs. 1 and 10.

To enable the doors to make a sufficiently tight connection with the ash-pan, I form them as shown more particularly in Figs. 4 and 5. That is, each door H has a bottom flange *h′*, and side flanges h^2. The bottom flange when the door is closed is adapted to extend beneath the downturned projecting edge *f* of the floor, while the side flanges extend over the cleats L carried by the ash-pan sides and shown as consisting of Z-bars riveted to those sides. The sides of the ash-pan extend beyond the doors, as shown at *d*, so that the door is constantly between the sides of the pan whether the door is closed or open. To brace these projecting ends of the sides and form a stop for the outward swinging of the doors, I provide the bars N which extend in a U-shape around the ends of the opening and onto two sides thereof and are riveted to the projecting portions *d* of these sides. These bars may conveniently be made of angle irons as shown.

To hold the doors normally in closed position while allowing their convenient release, I provide the following mechanism. Pivoted to the under side of the ash-pan is a lever Q which is connected on one side of its pivot with one door by a chain R and on the other side of its pivot with the other door by a chain R', these chains being connected to the ears h^4 on the under sides of the doors. This lever extends beyond the ash-pan and is there connected by a link P with a chain P' which wraps around a winding drum S. This drum is provided with a hand wheel S' by which it may be turned and with a ratchet and pawl S^2 for holding it. By this means the doors may be drawn up snugly against the ends of the ash-pan, as shown in full lines in Figs. 1 and 10, while by releasing the pawl S^2 the weight of the doors will cause them to swing downwardly away from the ends of the pan bottom.

The conduit by which water under pressure is blown into the intermediate portion of the ash-pan to force the ashes along the bottom and out through the door openings, is shown in two forms, according to whether the ash-pan is continuous or divided. I will describe first the former embodiment.

Referring to Figs. 1 to 3 and 6 to 9, there will be seen a discharging member for the water conduit, which is designated T. This member is located at an intermediate position on the bottom of the ash-pan, as shown. It extends transversely of the ash-pan and out through the side wall D thereof. It has intermediately a partition t extending from end to end and dividing it into two passageways, t' and t^2. Each passageway has a series of discharge openings t^3, t^3 through the side walls of the conduit toward the respective ends of the ash-pan. From the top of this discharge member rises a web t^5 which serves as a separator, causing the ashes falling from the grate to pass on to one side or the other of the member. This discharge member may be secured to the ash-pan bottom by lugs t^7 projecting from the opposite sides of the member. The described discharge member is preferably a casting. The end thereof which extends out through the ash-pan wall D is preferably made hemispherical, as shown at t^8, whereby it may make a close connection with that wall by fitting a round hole in the wall and without requiring an accurate placing of the casting. The chamber of the casting is bent upwardly toward the entrance end, as shown in Figs. 3 and 7, so that the rounded head may be above the angle iron G. The piping for the water leads in two branches from a suitable point to the head t^8 on opposite sides of the partition t. As shown, this piping starts from the water leg of the boiler by a short outwardly extending section U. A suitable valve U' connects this pipe section with a downwardly extending section U^2. This section leads to a suitable three-way valve V from the opposite sides of which extend the discharge pipe V' which are shown as passing longitudinally and then downwardly and then turned inwardly to connect with the two sides of the head t^8.

From the above described construction it will be seen that the three-way valve V may connect either side of the discharge casting with the pipe U^2 and that then when the valve U' is opened water under pressure is admitted directly from the boiler to the casting and discharges in large quantity toward the corresponding end of the ash-pan, passing horizontally a short distance above the bottom. By making the openings t^3 of such size that their aggregate area is substantially equal to the area of a cross section of the passageway through the pipe, I am enabled to obtain a great pressure, equally distributed. The corresponding door being open before this pressure is turned on, the result is that the whole mass of ashes is shoved by the pressure lengthwise of the pan and out through the open doorway. This mass of ashes passes against the depending door, which acts as a baffle and insures the proper discharge downwardly, the doors swinging outwardly during such discharge toward an extreme position limited by the end bar N.

It is important for the best results to have the described relation between the aggregate areas of the openings t^3 and the area of cross section of the passageway, for if the areas of the openings were materially less than that of the passageway, the pressure would be reduced so as to be inefficient, while if the combined area were greater there would be an unequal distribution, the openings t^3 nearest the entrance pipes receiving an undue portion of the passing liquid. To properly guide the water and prevent its spurting upwardly against the grate, I provide small shields t^9 formed on the side walls of the casting and projecting over the corresponding openings t^3.

The construction of discharge members as shown in Figs. 10 and 11 is modified, but the same in principle. Here the ash-pan is shown as divided, the floor F extending upwardly intermediately, as shown at F', by reason of the axle W standing beneath the fire box. With such an ash-pan I provide two discharge castings, in place of the one double casting T heretofore described. These castings X are secured on the bottom of the ash-pan adjacent to the upwardly extending intermediate wall F' thereof. Each casting X is shown as held in place by suitable lugs x. They each have discharge openings x' surmounted by shields x^2 similar to that already described. Each casting has a head passing out through the side wall

of the ash pan, the head x^3 as shown being made rectangular. Each head is connected by branch pipes V′ with the three-way valve V which, as heretofore described, may receive water under pressure under the control of the valve U′.

It will be seen that in both forms of my invention I have provided at an intermediate portion of the ash-pan oppositely facing discharge conduits. These conduits are under the control of a three-way valve and a common valve piped to the boiler, which arrangement allows the water to be forced under pressure through either conduit toward the corresponding end of the pan as desired, the discharge from the end of the pan being controlled by the depending end door. This end door, it should be noted, not only makes a close connection with the sides and bottom when the door is closed, to return the ashes, but when opened still preserves the inclosure complete except toward the track, so that the ashes and cinders will be invariably diverted to the track or pit and not allowed to blow over the machinery. The overlapping flanges and cleats make the connection tight without requiring actual engagement or such snugness as would result in trouble from expansion and contraction of the ash pan. These coöperating flanges and edges constitute a trap which is very effective in preventing leakage. Furthermore, I have braced the sides of the ash pan adjacent to the doors so that they will not be warped by heat, to either bind the door or cause leakage.

It will be understood that, while I have shown these two embodiments of my invention, the invention may be readily applied in other ways. Indeed, many changes and modifications may be made in it and I do not intend to limit myself to the particular form shown further than the prior art requires.

Having thus described my invention, what I claim is:

1. The combination, with a locomotive ash pan having an exit, of means for directing a fluid discharge therein to propel the ashes through the exit, and means including a door and guiding walls for closing said exit and for controlling the discharge of ashes therethrough and directing them downwardly while preventing their lateral spreading, whereby an effective downward discharge is insured.

2. The combination of a locomotive ash pan, means for directing a fluid discharge therein, and a controller for effecting the downward discharge of ashes and preventing their lateral spreading, said controller including a door which serves in one position to close the exit from the ash pan and in another position to form a portion of the downward guide for the discharge of ashes.

3. The combination, with a locomotive ash pan, of means for directing a fluid discharge therein, and a pivoted door which in one position coöperates with the sides and bottom of the pan to close the exit from the pan and in another position leaves an open space between the door and bottom of the pan while maintaining closed the space between the door and side walls of the pan.

4. The combination, with a locomotive ash pan, of means for directing a fluid discharge therein, and a pivoted door operating between extensions of the ash pan sides and serving to close the exit from the pan and to form a portion of a downwardly extending chute when in open position.

5. The combination, with a locomotive ash pan, of means for directing a fluid discharge therein, extensions of the side walls of the pan, a door operating between said extensions to close the pan or form a portion of a downward chute, the ends of the door being free from the side extensions, and ribs carried by said extensions and overhanging the door to make a tight closure therewith.

6. In an ash pan, the combination of side walls, a swinging end door between the side walls mounted on a rod supported by the side walls, and cleats carried by the side walls with which said door may connect when closed, the door having flanges to overlap the cleats, and the door having also a bottom flange which the bottom of the ash pan is adapted to overlap when the door is closed.

7. The combination, with an ash pan provided with oppositely arranged openings, of means for discharging liquid into it to propel the ashes through said openings, and means including a manifold within the pan, said manifold carrying an upwardly extending web adapted to form a division for the ashes, the manifold discharging both sides of the web.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

THEODORE H. CURTIS.

Witnesses:
W. A. McClure.
Ward Barnum.