

No. 703,603.

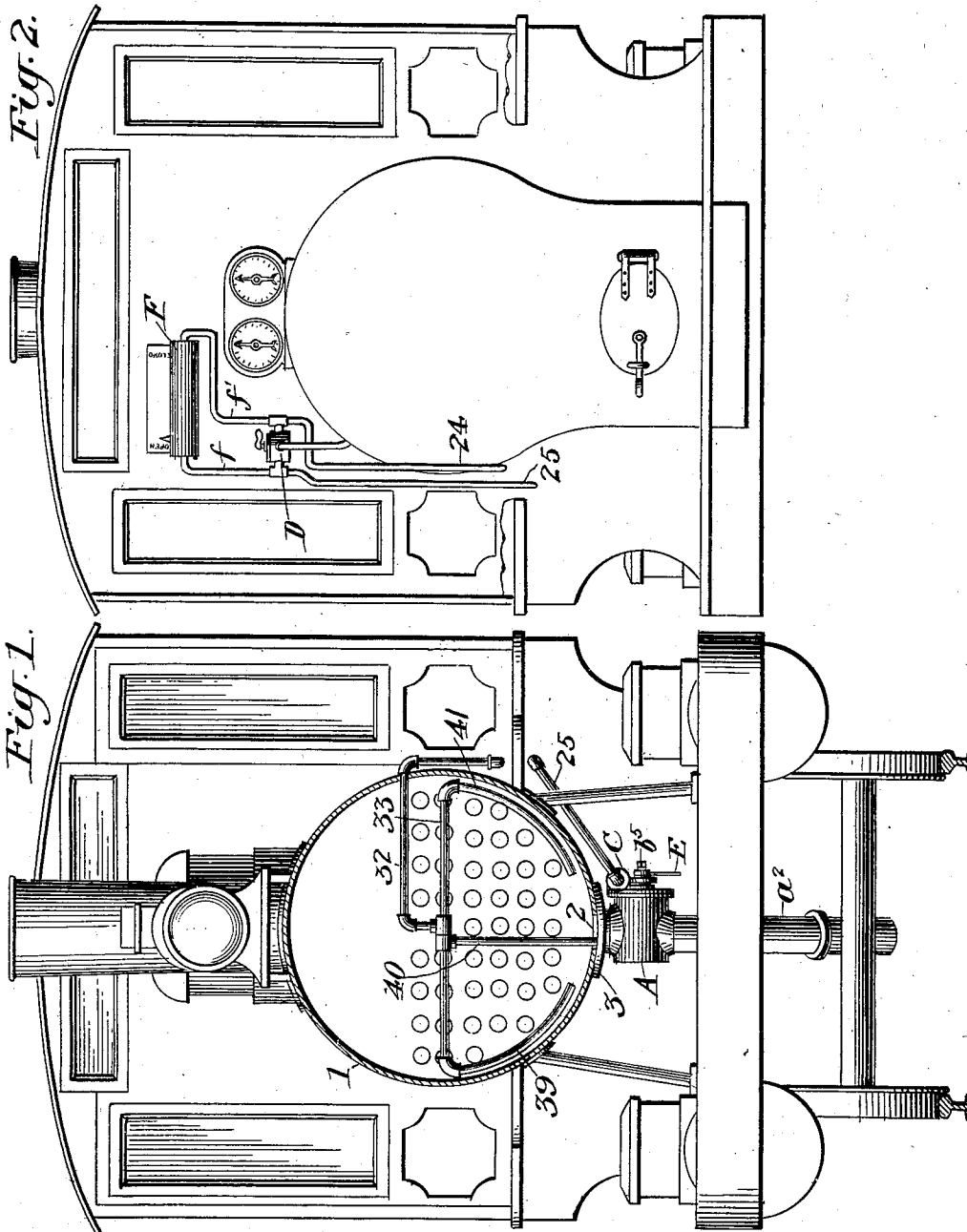
Patented July 1, 1902.

M. LAUX.
CINDER HOPPER.

(Application filed Apr. 7, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
D. W. Edlin.
A. Harney cutter.

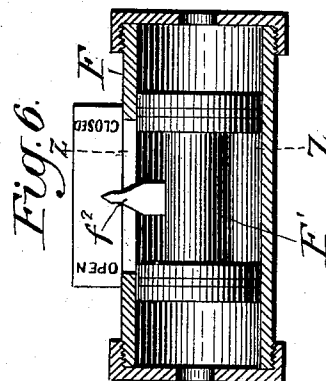
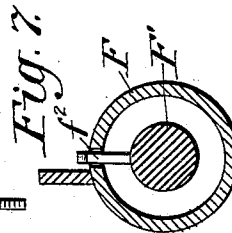
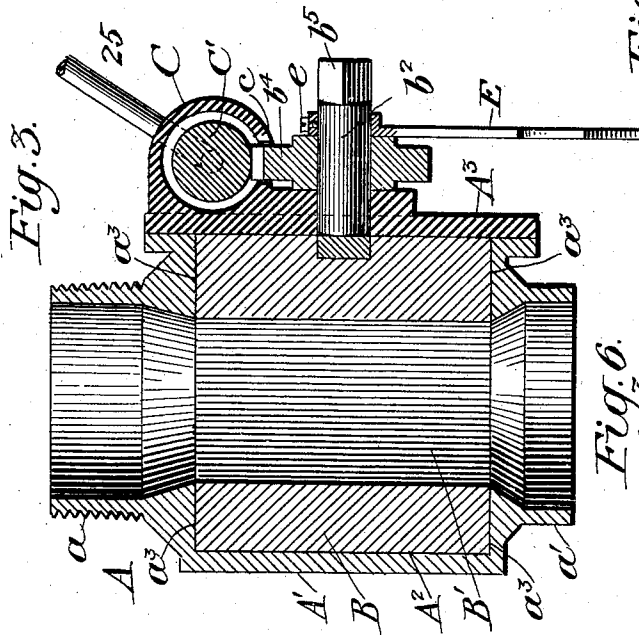
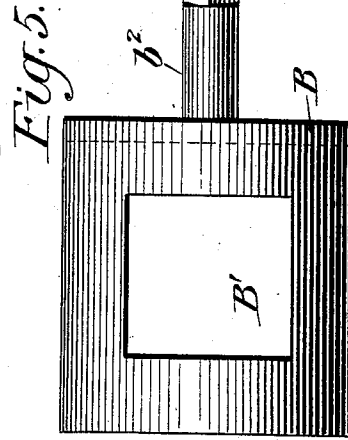
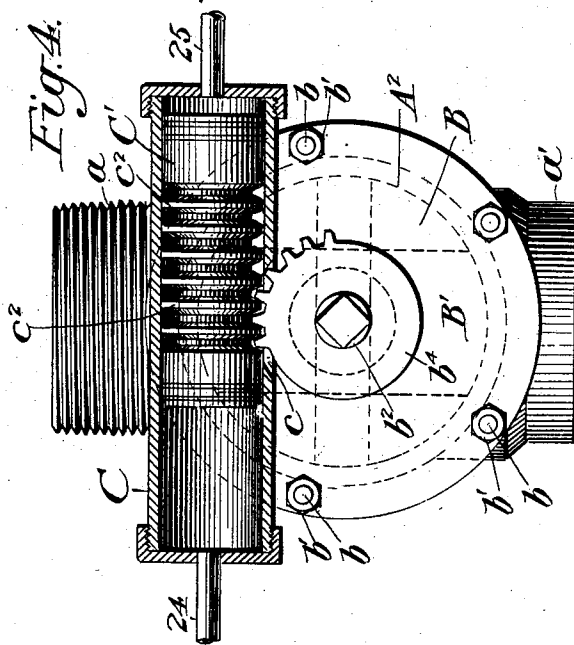
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

MATHIAS LAUX, OF LITTLE ROCK, ARKANSAS, ASSIGNOR OF TWO-THIRDS TO THOMAS E. GLYNN AND JOHN E. COATES, OF LITTLE ROCK, ARKANSAS.

CINDER-HOPPER.

SPECIFICATION forming part of Letters Patent No. 703,603, dated July 1, 1902.

Application filed April 7, 1902. Serial No. 101,702. (No model.)

to all whom it may concern:

Be it known that I, MATHIAS LAUX, a citizen of the United States, residing at Little Rock, county of Pulaski, and State of Arkansas, have invented certain new and useful improvements in Cinder-Hoppers, of which the following is a specification, reference being had to the accompanying drawings.

The invention to be hereinafter described relates to cinder-hoppers, and more particularly to the hopper-plug or cut-off and its operating means for discharging the accumulation of cinders from the extension front end of a locomotive, and is designed as an improvement over the construction set forth in Letters Patent No. 679,083, granted to me under date of July 23, 1901, to which reference may be had.

It is a well-known fact that in the ordinary type of locomotive the cinders passing through the flues of the boiler and which are not carried out of the smoke-stack accumulate in the extension front end and unless removed therefrom the draft becomes more direct and acts with increasing intensity upon the fire, tearing it up and drawing an abnormal quantity of cinders through the flues, resulting in a drop in steam, which the fireman is called upon to counteract at the expense of coal-supply. In the provision of means to overcome this difficulty attempts have been made to provide the extension front end with a form of cinder-hopper which might be operated from time to time to expel the accumulation of cinders. Such form of cinder-hoppers, however, have been constructed without due regard to simplicity in structure and operating means and the prevention of air leakage, the inevitable result of which has been that the accumulation in the front end becomes a furnace of itself, burning out the usual netting, impairing steam-pipes, warping the hopper, burning off paint, and in time cracking the shell and door of the front extension. With the object of overcoming these and other objections I have provided the extension front end with means operative either from the cab or directly by hand, whereby any accumulation of cinders may be discharged from time to time, as desired, and which shall be simple in structure, positive

in operation, and entirely overcome any air leakage into the front extension, all as will hereinafter be more fully described and definitely pointed out in the claims.

In the drawings, Figure 1 is a front elevation of a locomotive, parts being removed to better illustrate the details of my invention and their application. Fig. 2 is an end elevation of a locomotive, looking into the cab, parts being omitted. Fig. 3 is a vertical cross-section of my improved hopper-plug, its casing, and operative attachments. Fig. 4 is a section at right angles to that of Fig. 3 through the plug-operating cylinder. Fig. 5 is a detached view of the plug and its operating-stem. Fig. 6 is a section through one form of indicator or marker located in the cab to indicate the condition of the plug or valve, and Fig. 7 is a cross-section on line *z z* of Fig. 6.

Referring to the drawings, 1 indicates the barrel of a locomotive of any usual or preferred type, in the bottom of the forward portion of which is formed an opening 2, below which the cinder-hopper A is secured in any preferred manner. In the present embodiment of my invention I have shown the barrel of the locomotive provided with a plate 3, into which the casing A' of the cinder-hopper A may be secured, thus supporting the cinder-hopper in direct communication with the opening 2, through which the cinders may be discharged, as will hereinafter more fully appear, although, as will be evident, any desired means may be employed to support the cinder-hopper in operative relation with the discharge-opening.

Referring to Figs. 2 and 3, the cinder-hopper A comprises a casing A', provided with an upper screw-threaded extension *a*, by which the hopper may be supported from the barrel of the locomotive, as by being screwed into the plate 3 or otherwise, a similar extension *a'* being formed at the lower end of the casing A', by which a discharge-chute *a*² may be connected to the hopper to direct the cinders and like material in the desired direction between the tracks. Intermediate the upper and lower ends the casing is provided with a cylindrical interior portion A², in which there is accurately fitted a cylindrical plug B, having a

passage-way B', preferably rectangular in cross-section, as shown in Figs. 4 and 5, but which, as will be evident, may be of any desired form suitable to complete the connection between the upper and lower ends of the hopper for the ready passage of cinders and the like.

It is essential when the plug or valve B is turned in the hopper-casing to prevent the passage of cinders that there shall be no leakage of air through the plug or valve into the front extension, as otherwise the hot cinders, some of considerable size, falling into the front extension will continue to burn and with an intensity dependent upon the amount of leakage, thus converting the front extension into a small furnace, with the result that the fittings around the forward end of the barrel become burned and the life of the locomotive shortened accordingly. To effectually overcome this defect, it will be noted by reference to Fig. 3 that the central portion of the hopper-casing A' is enlarged to afford extended bearings at $a^3 a^3$ for the cylindrical valve or plug B, whereby the latter has at all times a close and air-tight fit between the exterior thereof and the interior cylindrical portion A² of the casing.

In order to readily assemble the hopper-casing and plug or valve and to afford a means whereby the fit of the plug or valve in the cylinder portion A² of the casing may be adjusted to an air-tight condition, I preferably form one of the walls A³ of the hopper-casing A removable and secure the same in place by means of bolts b and nuts b' or any other usual form of fastening devices, and, further, by having the wall A³ removable it will be obvious that the plug or valve B may be readily inspected from time to time and the fit of the parts maintained.

Properly secured to the plug or valve B and preferably extending through the removable wall A³ of the casing is the valve-operating stem b^2 , carrying a pinion b^4 and having a squared or flattened head b^5 , whereby when desirable the plug or valve B may be turned by a wrench or other hand-operated implement.

Carried by the removable wall A³ and shown in the present embodiment of my invention as formed integral therewith, though this is not essential, is the plug or valve operating cylinder C, preferably slotted in one side at c for the passage of the teeth of the pinion b^4 , carried by the plug-operating stem b^2 , and movable within the cylinder C is the piston C', provided intermediate its end heads with circular rods or flanges c^2 in operative engagement with the teeth of the pinion b^4 , whereby movement of the piston C' in either direction within the cylinder will cause the pinion b^4 and the connected plug or valve B to be turned. Connected to the opposite ends of the cylinder C are the pipes 24 and 25, which lead to the cab of the locomotive, where by means of a suitable cock D either compressed air, steam,

or other suitable motive power may be applied to either end of the cylinder to thereby operate the piston C, as desired, all as fully explained in my prior patent, No. 679,083, to which reference may be had.

From the construction thus far described it will be evident that the engineer in the cab may discharge the accumulation of cinders and like material from the front end, either while the locomotive is moving or standing still, and that from the construction of cinder-hopper having the plug or valve B mounted in the casing A', with a bearing between the ends and the curved exterior surface of the plug or valve B and the interior of the central portion A² of the casing, that when the plug or valve B is turned to shut off the discharge of cinders from the front end leakage of air into the front end is effectually prevented. While I have described in detail the specific construction of valve or plug B and its containing casing as constituting the cinder-hopper, it will be understood, of course, that the particular form, proportion, and character of the parts may be varied somewhat within the scope of my invention, and that the plug or valve B and its surrounding casing is suitable to other uses, and that likewise the particular disposition of the operating means may be varied within the limits of my invention.

It is desirable at all times that the position of the plug or valve B shall be always known to the engineer, either when operating the same by means of the piping connection with the cylinder C from the cab or turning the same by hand by means of a wrench, and to secure these results I have placed on the stem b^2 an indicator or marker E, the same being secured in position by means of a set-screw e , so that the marker or indicator E by its position will indicate at once to the engineer or operative the position of the plug or valve B as being either open or closed. As a further means of securing this result directly from the cab I have provided an indicator or marker F, (shown in detail in Fig. 6,) the said marker or indicator being, as shown in Fig. 2, located within the cab and connected by piping $f f'$ to the cock D. One form of such marker or indicator F consists, as shown in Figs. 6 and 7, of a cylinder within which is a piston F', having two heads and carrying a pointer f^2 , the said cylinder being connected at its ends with the pipes $f f'$, as shown in Fig. 2, whereby upon manipulation of the cock D for operating the piston C' in the cylinder C the piston F' in the marker or indicator F will be likewise operated in the same direction, as will be evident, and the position of the pointer will consequently indicate to the engineer at once whether the plug or valve B is either open or closed. I have merely illustrated the markers or indicators E F as two of the many types of such devices that might be employed without thereby desiring to limit my invention in this respect.

When an accumulation of cinders and like

material in the front end has occurred, the engineer, preferably when the locomotive is approaching a station, will manipulate the cock D and through the cylinder and piston C' and gearing connection move the plug or valve B, so as to open the same and permit the discharge of the accumulation in the front end. It will frequently happen, however, that the accumulation in the front end will not readily dislodge and fall through the opening B' in the plug or valve B, at which time it becomes necessary to dislodge the contents in the barrel of the locomotive and to break it up. This I accomplish by means of a series of pipes 32, 33, 39, 40, and 41, connected to the boiler of the locomotive and adapted to inject steam or, if desired, compressed air among the accumulation in the front end, all as fully exemplified in my prior patent, No. 679,083, or any other disposition of piping to effect this result may be employed.

I have found in practice that the dislodgment by means of steam or compressed air through the series of pipes referred to while the plug or valve is in open position will effectually secure the result sought, but produces an objectionable cloud of dust and cinders, which is liable to interfere with the working portions of the locomotive, and, therefore, I have varied the manner of discharging the accumulation in the front end by injecting the steam or compressed air into the accumulation in the front end only when the plug B is closed, then shutting off the blast of steam or compressed air, and opening the plug or valve, whereupon the loosened cinders and the like will readily fall through the passage-way B' into the chute and onto the road-bed.

Since my present invention does not relate to the piping for effecting the dislodgment of the accumulation in the front end, I have not deemed it necessary to more than refer generally to the piping as disclosed in my prior patent, which may be employed, if desired, for any other disposition of these parts.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a locomotive-barrel, a cinder-hopper secured thereto and comprising a casing having a cylindrical portion, a cylindrical plug or valve rotatably mounted within and entirely inclosed by said cylindrical portion of the casing and provided with a passage-way, the exterior walls of the plug and interior cylindrical and end walls of the casing forming an air-tight bearing on which said plug or valve may turn and a stem connected to the plug or valve and projecting to the exterior of the casing, and means connected to said stem for operating the plug.

2. The combination of a locomotive-barrel, a cinder-hopper secured thereto and comprising a casing having a cylindrical portion, a cylindrical plug or valve rotatably mounted within said cylindrical portion of the casing

and provided with a passage-way, said plug or valve being entirely inclosed by the cylindrical and end walls of the casing, the exterior walls of the plug forming an air-tight joint with the interior walls of the casing, a stem connected to the plug or valve and projecting to the exterior of the casing, operating means mounted on said stem, a cylinder and piston disposed transversely to said stem and connections between the said means and piston for operating the plug.

3. The combination of a locomotive-barrel, a cinder-hopper secured thereto and comprising a casing having a cylindrical portion, a cylindrical plug or valve rotatably mounted within said cylindrical portion of the casing and provided with a passage-way, the exterior walls of the plug forming an air-tight joint with the interior walls of the said cylindrical portion of the casing, a stem connected to the plug or valve and projecting to the exterior of the casing, operating means for said plug or valve mounted on said stem, a cylinder having a slot in the cylindrical wall thereof through which the said operating means projects, a piston movably mounted within the cylinder and connections between the said operating means and the said piston for operating the plug from said piston.

4. The combination of a locomotive-barrel, a cinder-hopper secured thereto and comprising a casing having a cylindrical portion, a cylindrical plug or valve rotatably mounted within said cylindrical portion of the casing and provided with a passage-way, the exterior walls of the plug forming an air-tight joint with the interior walls of the said cylindrical portion of the casing, a stem connected to the plug or valve and projecting to the exterior of the casing, a pinion mounted on said stem, a cylinder disposed transversely of said stem and having a slot in the cylindrical wall thereof through which the pinion projects, a piston movably mounted within the cylinder and provided with a series of circular rings or projections in engagement with the teeth of the pinion for operating the plug from said piston.

5. In combination, a casing having a cylindrical central portion and end extensions, a cylindrical plug fitted to have bearing in the said cylindrical portion of the casing, a stem projecting from one side of the cylindrical plug and provided with a pinion, a cylinder disposed transversely to the said stem and provided with an elongated slot in the cylindrical wall thereof through which the pinion projects, a double-ended piston movable within said cylinder and having a series of rings or circular projections disposed between the two heads and in engagement with the said pinion and means for introducing air or other fluid pressure to either end of the piston as desired.

6. In a locomotive, the combination of the locomotive-barrel, a casing having a cylindrical portion and end extensions, a cylindrical

- plug provided with a central opening and having its exterior surface fitted air-tight to the interior walls of said central portion of the casing, a stem projecting from one side of the cylinder-plug and provided with a pinion, a cylinder disposed transversely to said stem and having a piston movable therein, said piston being in operative engagement with said pinion, means operative from the locomotive-cab for moving the piston lengthwise of the cylinder, a marker movable with the plug to indicate the open or closed position thereof.
7. In a locomotive, the combination of the locomotive-barrel, a casing having a cylindrical central portion and end extensions, one of the side walls of said cylindrical central portion being removable, a cylindrical plug provided with a central passage-way and having its exterior surface bearing air-tight upon the interior walls of the cylindrical central portion of the casing, a stem secured to said plug and provided with an operating means for said plug, a cylinder disposed transversely

of said stem and carried by said removable side wall of the casing, a piston within said cylinder and connection between the piston and operating means.

8. In a locomotive, the combination with the barrel, a cinder-hopper secured thereto and comprising a casing having a cylindrical central portion, a cylindrical plug provided with a passage-way and having an air-tight bearing between the exterior of the plug and the interior of the cylindrical central portion of the casing, an operating-cylinder mounted on said casing, gearing connections between the cylinder and plug, and a series of pipes disposed within the locomotive-barrel to inject steam or compressed air into the accumulation of cinders to dislodge the same while the cylindrical plug is closed and enable the cinders to be discharged without dust when the plug is moved to open position.

MATHIAS LAUX.

In presence of—

S. C. BUSH,

J. F. RIEGLER.