

J. H. ELWARD.
Steam Boiler.

No. 232,249.

Patented Sept. 14, 1880.

Fig. 1.

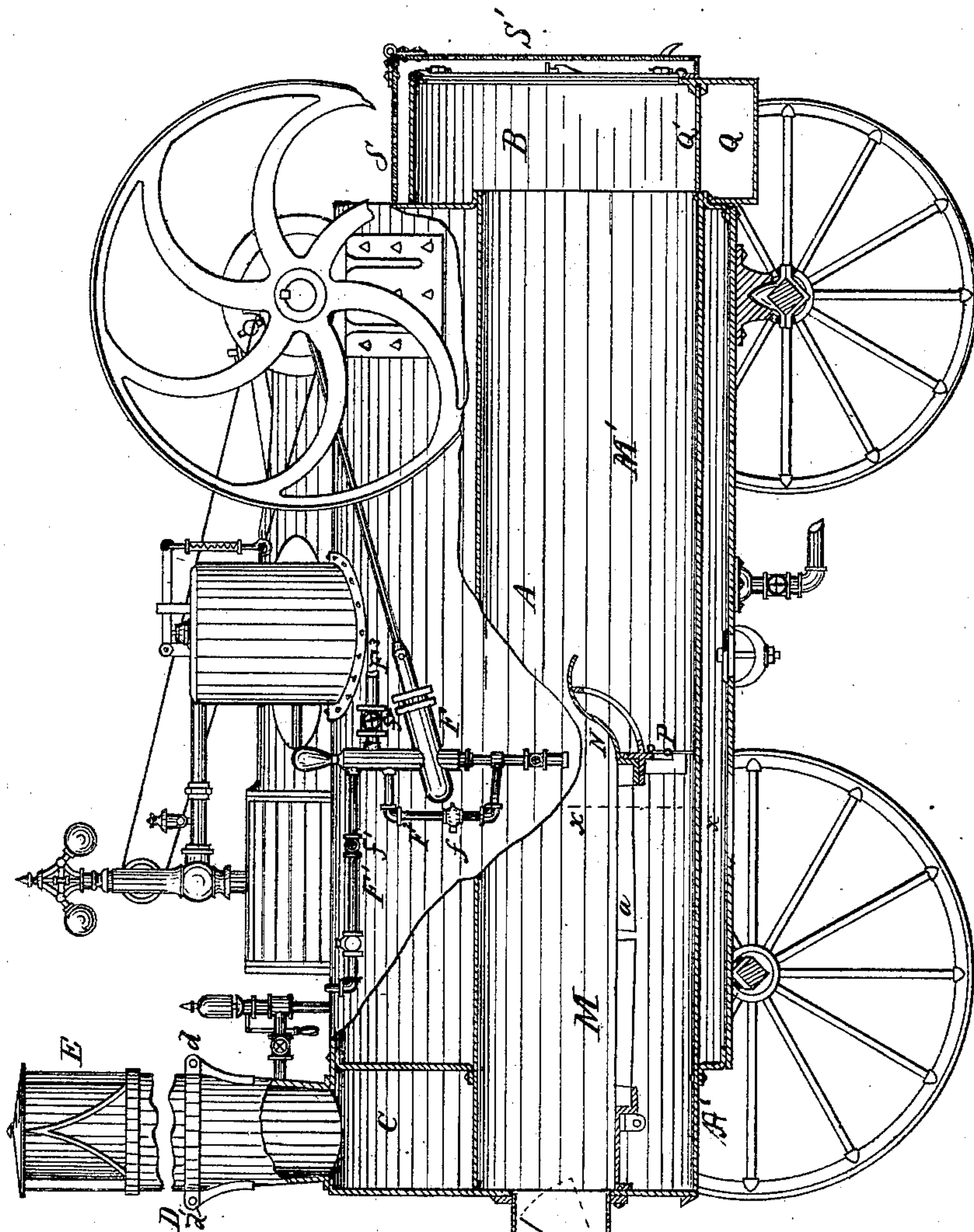
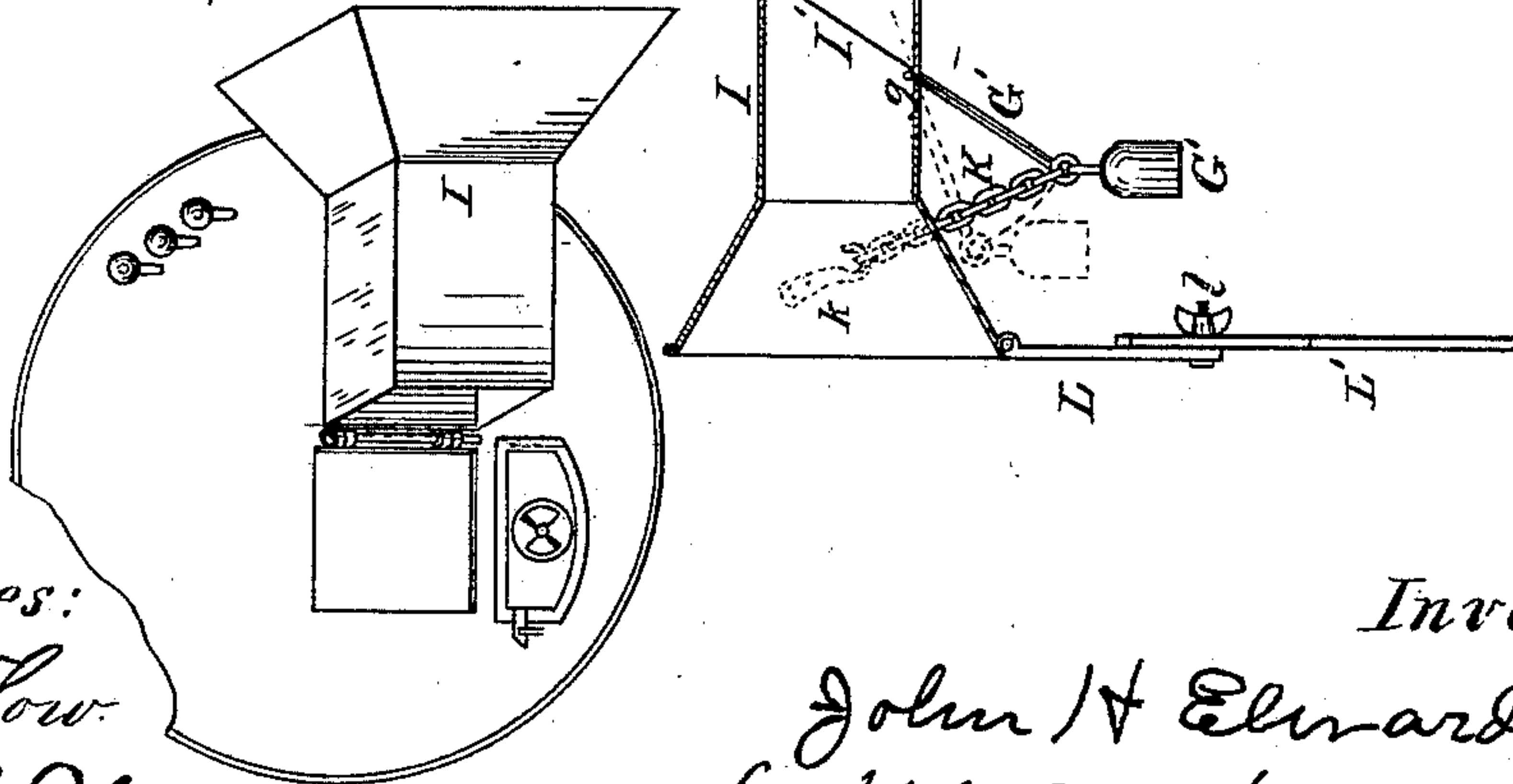


Fig. 9.



Witnesses:
H. H. Low
H. H. Bliss

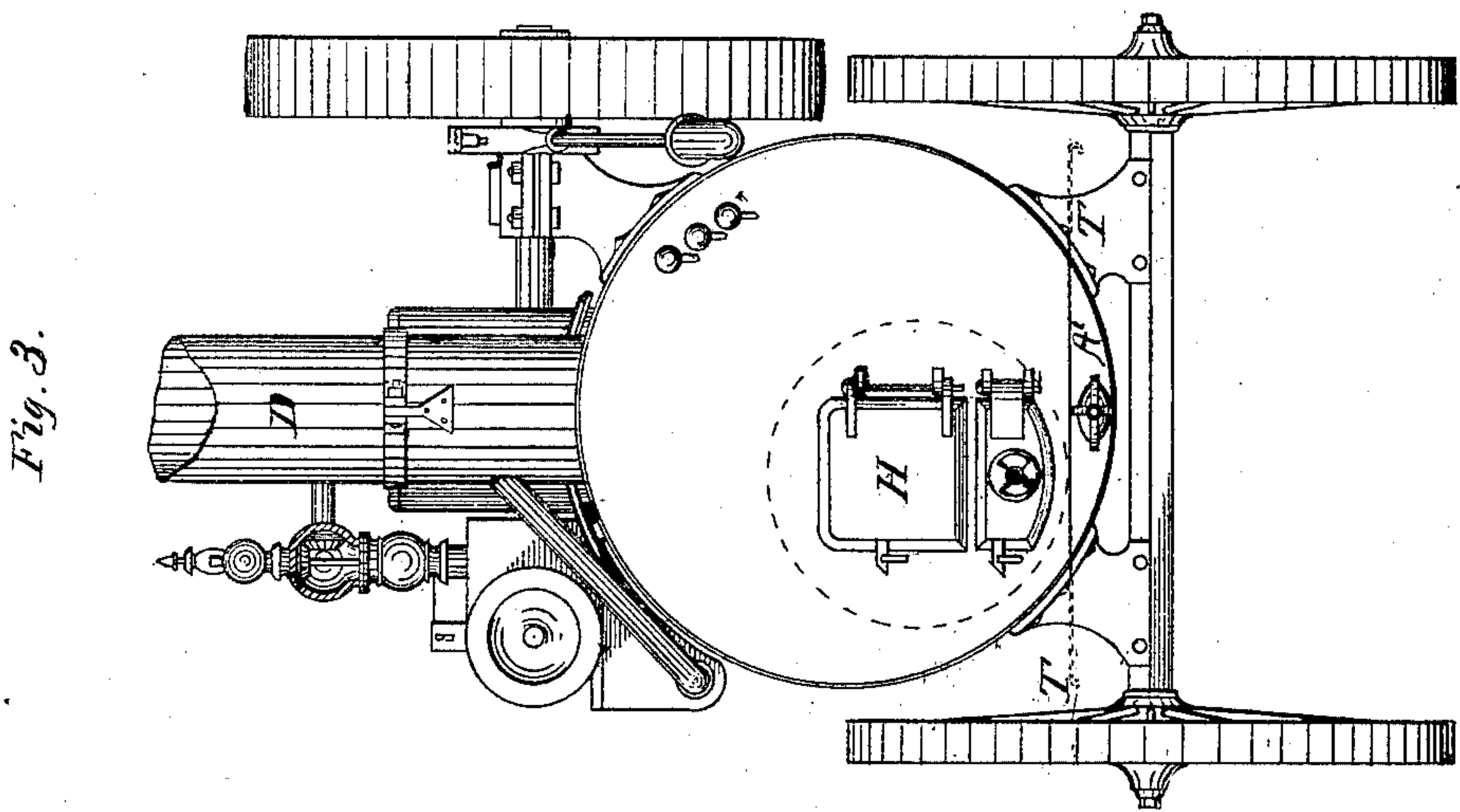
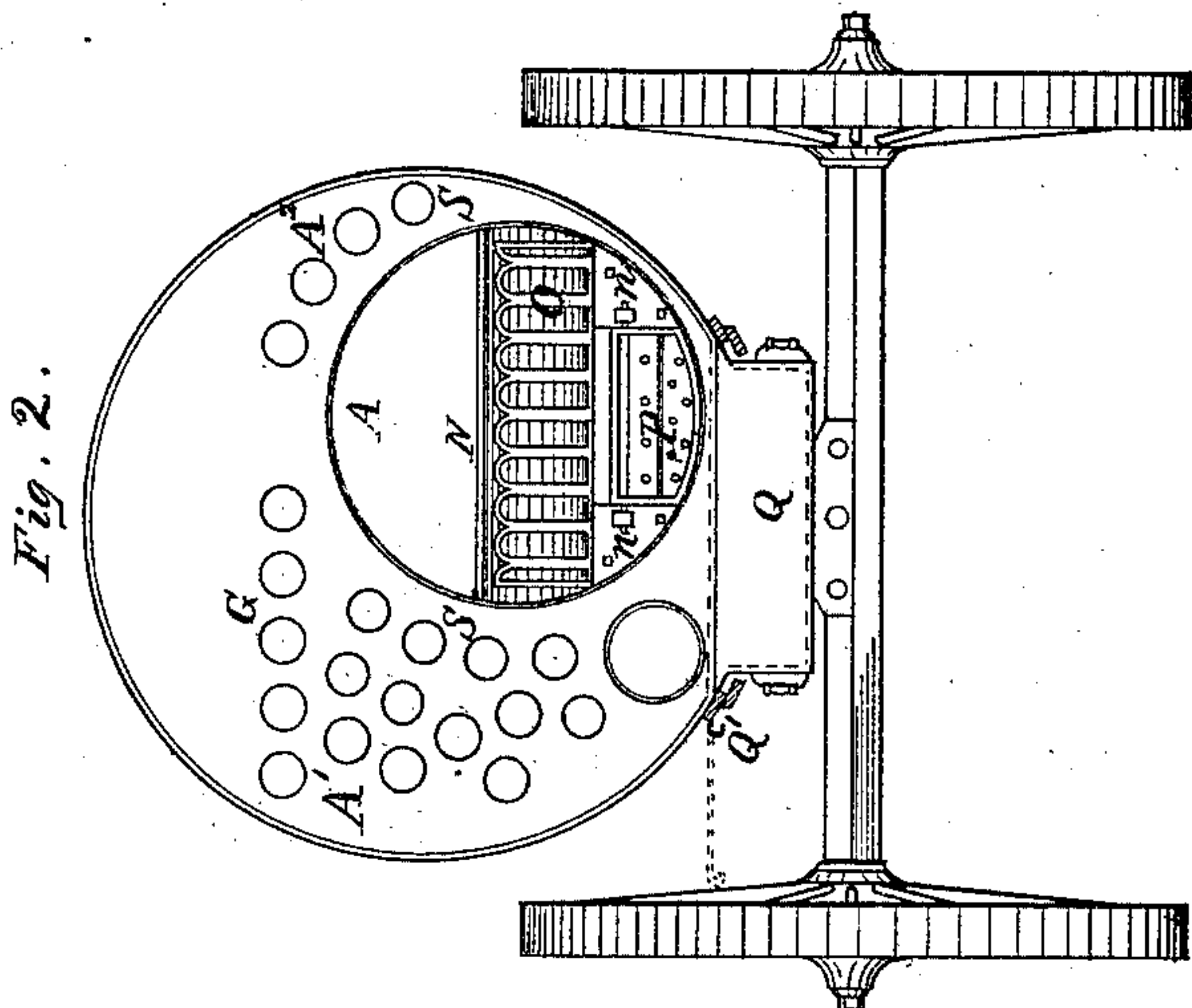
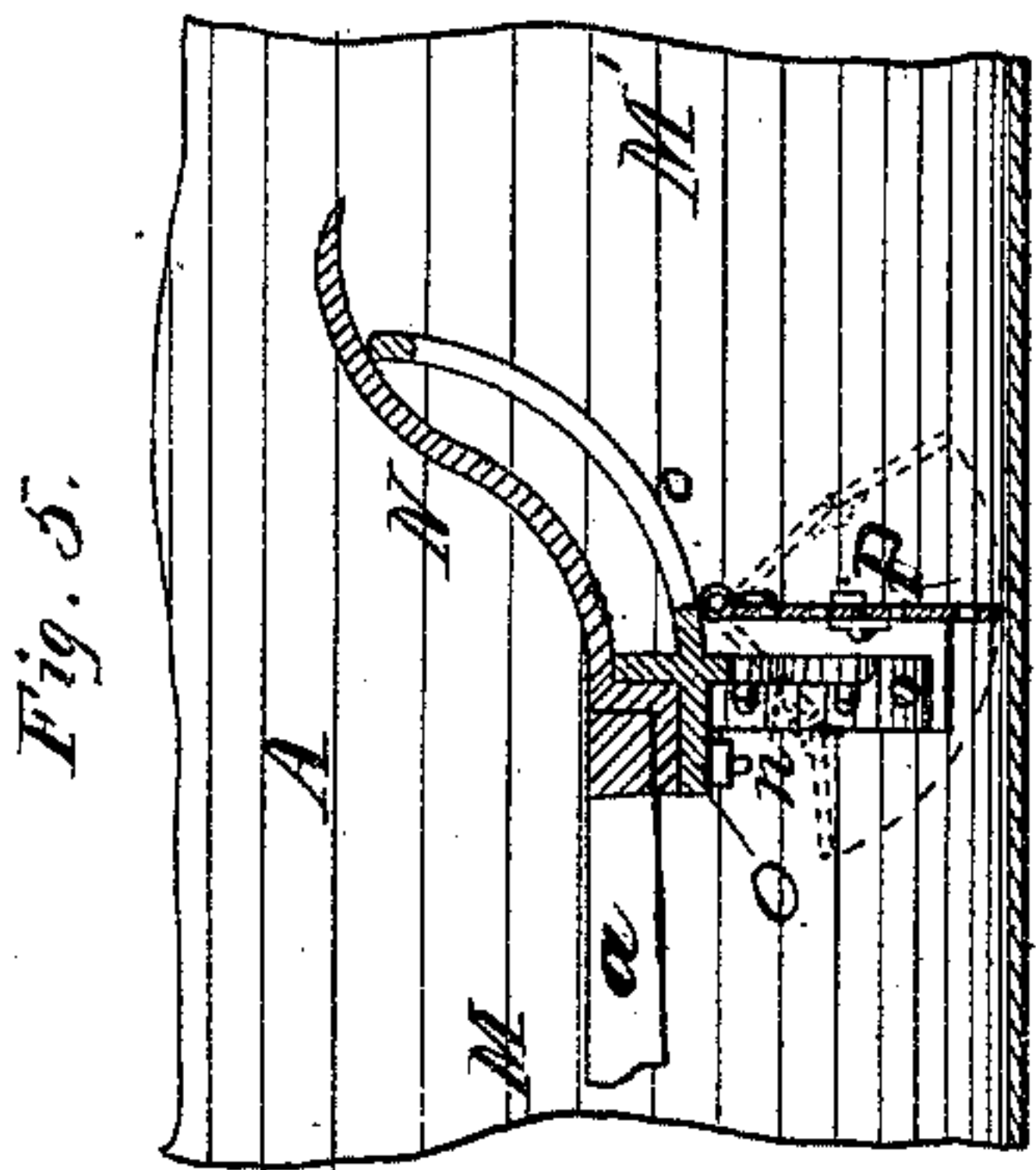
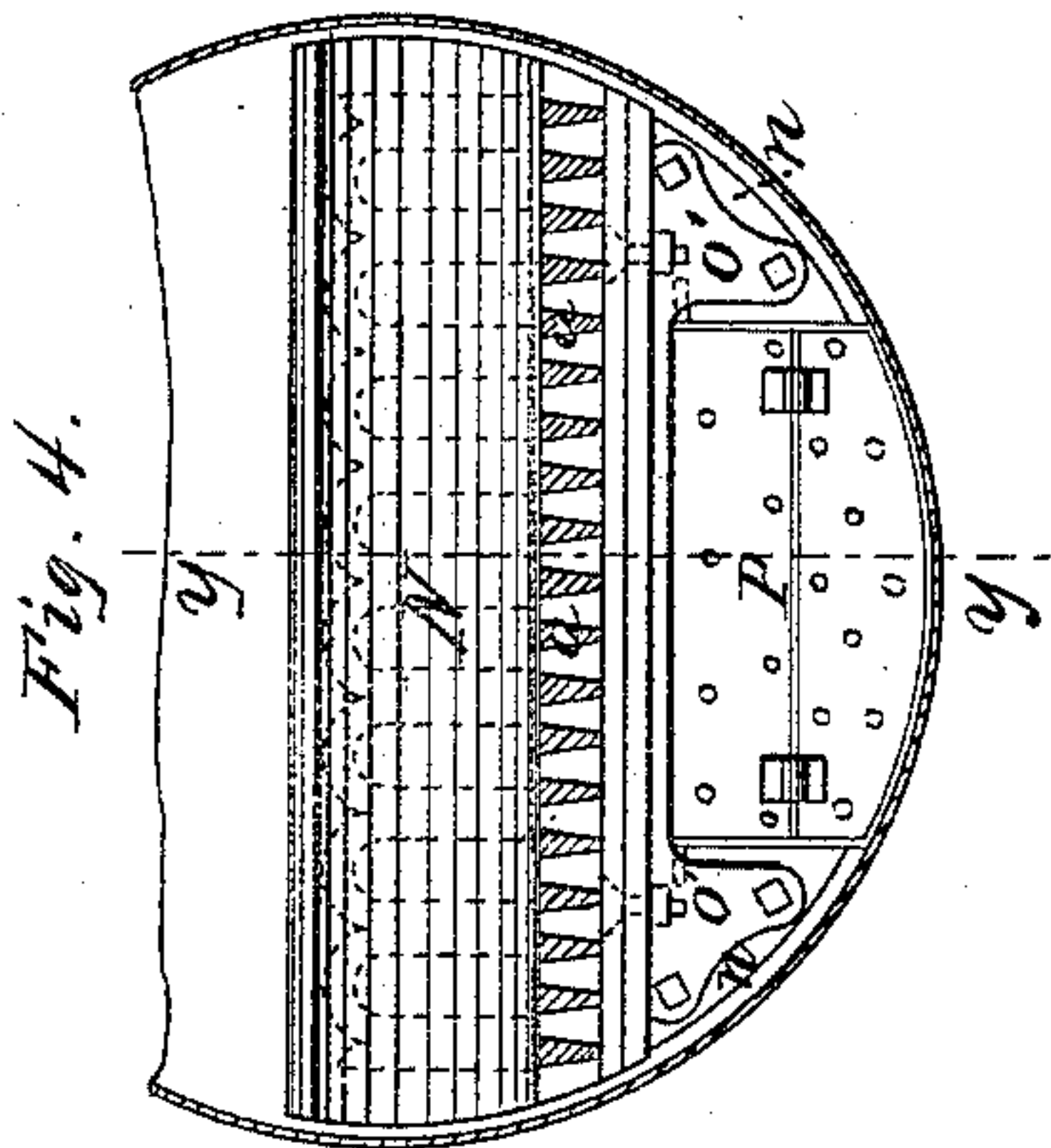
Inventor:
John H. Elward
by H. H. Doubleday atty.

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Fig. 8.

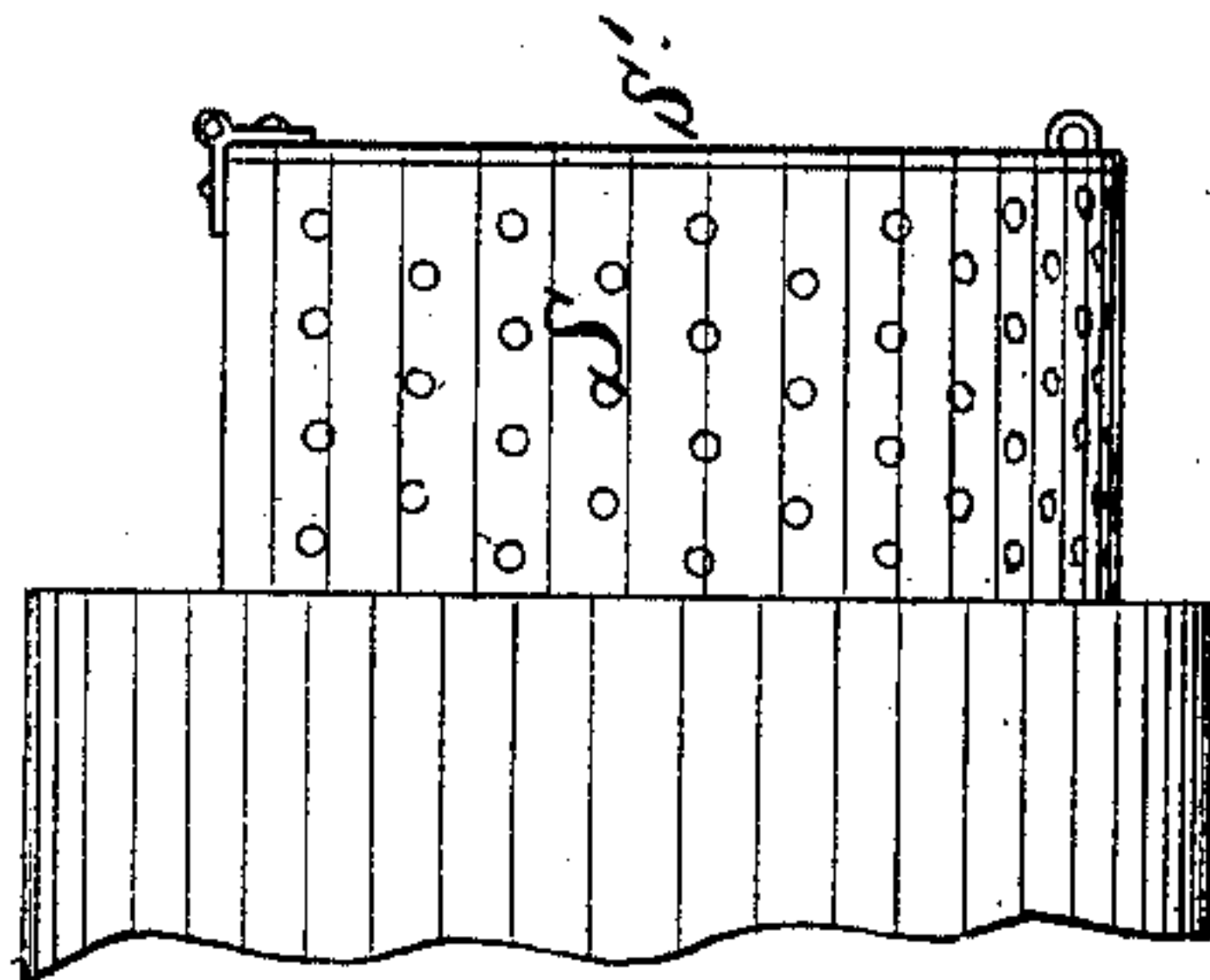


Fig. 7.

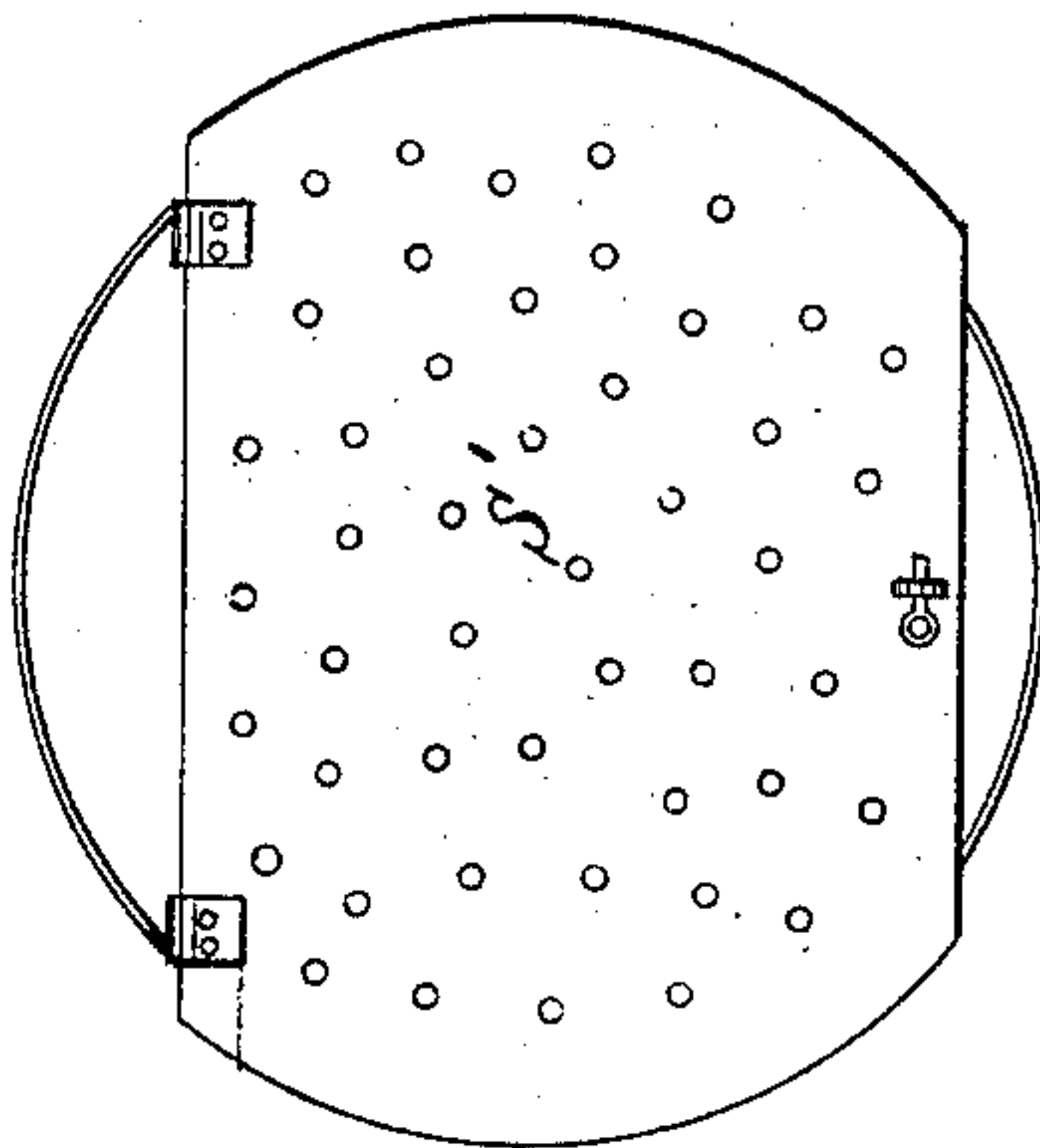
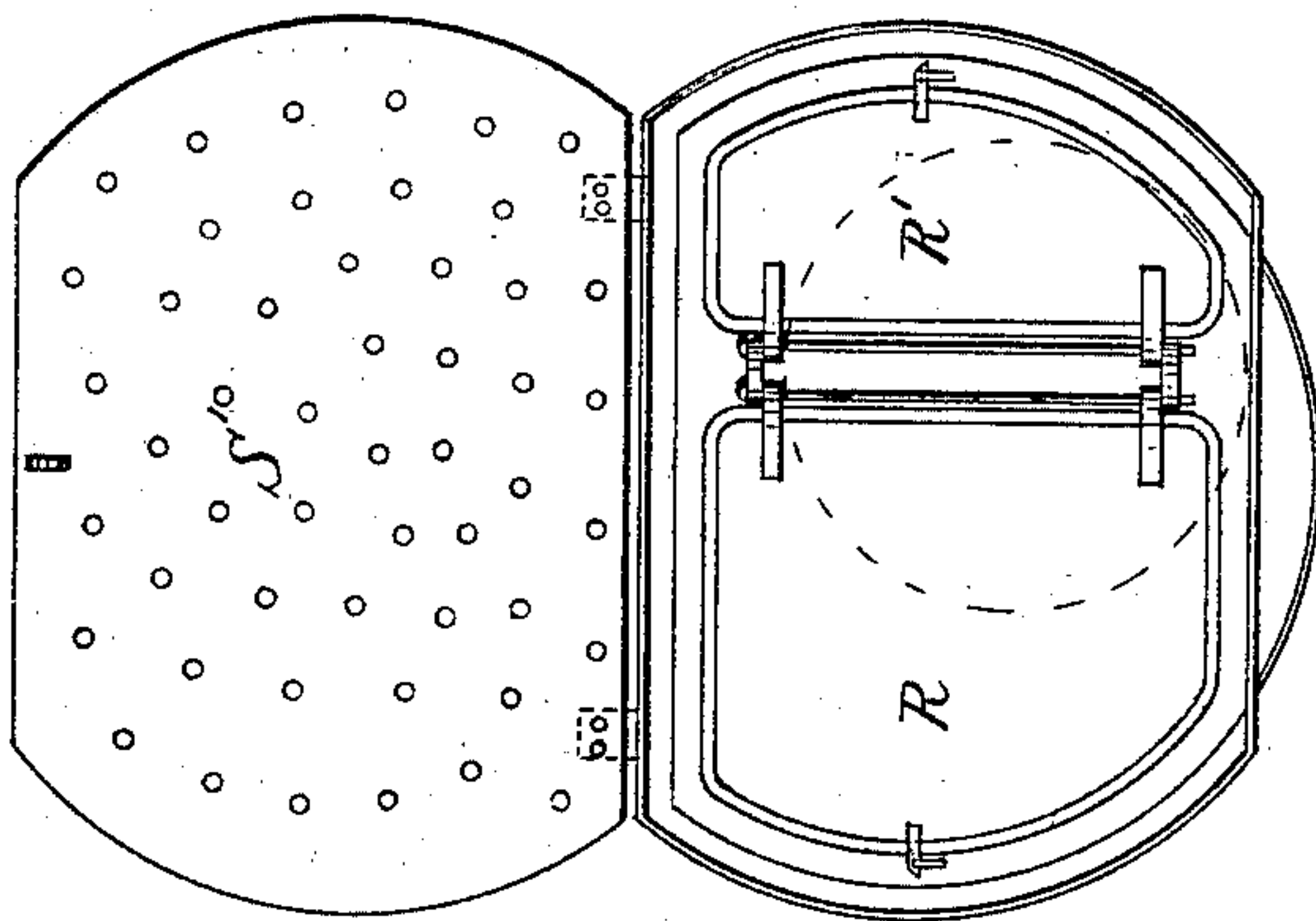


Fig. 6.



Witnesses:

H. A. Low.
H. H. Bliss

Inventor.

John H. Elward
by H. A. Doubleday
Atty

UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, OF STILLWATER, MINNESOTA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 232,249, dated September 14, 1880.

Application filed May 12, 1879.

To all whom it may concern:

Be it known that I, JOHN H. ELWARD, of the city of Stillwater, in the county of Washington and State of Minnesota, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The invention consists in an ash-box so constructed and arranged as to effectually prevent any danger from fire.

Figure 1 is a view of an engine embodying my improvements, taken partially in side elevation and partly in longitudinal section. Fig. 2 is a rear-end view of the boiler with the smoke-box detached. Fig. 3 is a front-end view of the engine. Fig. 4 is a transverse vertical section of the fire-flue on line *xx* of Fig. 1. Fig. 5 is a section of the bridge-wall on line *yy* of Fig. 4. Figs. 6 and 7 are rear-end views of the smoke-box and its guard. Fig. 8 is a side view of the guard. Fig. 9 is a perspective view of the hinged spout when open.

In the drawings, *A*³ represents the transporting-wheels, upon which the engine is mounted, if it be constructed as a portable engine.

The boiler is constructed with the part *A* adapted to be used as the fire-place, the parts *A'* *A*², in which are mounted the heating-flues, the smoke-box *B* at the rear end, the smoke-chamber *C* at the front end, the smoke-stack *D*, the cowl *E*, the pump *F*, and the other devices ordinarily employed with similar engines.

In order to secure a better circulation of water in the steam-boiler, I locate the large flue or combustion-chamber *A* (which extends the whole length of the boiler, and in which is constructed the furnace) in such position that upon one side of it there shall be a greater number of return-flues *G G* than upon the other, in order to cause an unequal division of water and heating-surface.

The engine is constructed to be heated by consuming any of the ordinary or convenient

combustible materials, as coal, wood, hay, straw, shavings, tan-bark, &c.

H represents an ordinary furnace-door, at one end of the boiler, closing the aperture through which the fuel is supplied to the furnace.

When light substances, such as straw, are to be used as fuel, a feed-trough, *I*, is attached in place of door *H*. I hinge the feed-trough to the boiler, so that it can be swung in the manner of a door, and thus enable the operator to readily obtain access to the fire above the grate when it is necessary to manipulate it (by poker or otherwise) without the trouble of detaching the trough, and without providing a supplemental door, one of which expedients is required by the constructions now in use.

I' is a flap valve or door situated within the trough, and arranged to automatically close the same. This door is hinged to the bottom of the trough, and is so arranged that when hay, straw, or other similar material is being introduced the upper end of the door will be depressed, and will guide the fuel upward, that it may be deposited upon the top of the material which is already ignited.

I prefer to hinge valve *I'* by attaching it to the horizontal arm *g* of the bent lever *G*, passing through the side of the trough.

I am aware that there have been combined with engines devices adapted to catch the ashes and cinders from the fire-place, and also devices adapted to remove cinders and at the same time close the passage from the fire-place; but I am not aware of the use of a combination of devices with a portable thrashing-engine, whereby the passage can be tightly closed and the hot cinders and ashes can be removed to a distance from the engine and the combustible material surrounding it.

Another marked advantage growing out of my construction and combination of devices for removing cinders and ashes is this: I can remove the ash box or receptacle entirely from the boiler and engine without checking the draft—a matter of considerable importance in the use of portable engines in connection with thrashers, because when the straw, stubble, and earth are very dry it is desirable that the cinders and ashes should be removed to con-

siderable distance, which consumes a considerable time, during which a weakening of the draft would seriously interfere with running the engine, because of the light and transient fire produced by straw. Hence the combination of three parts—a fire-flue having an opening for the escape of ashes and cinders, a detachable ash-box, and a movable plate or section, by which the opening in the smoke-flue or fire-flue can be closed—performs a new and useful result in this class of boilers and engines, and required invention, because it necessitated quite a modification and adaptation of parts.

G' is a weight upon the outer and vertical arm of lever G, which is intended to hold up the free end of the valve, and thus close the trough.

In Fig. 1, K represents a chain attached to the weight and to a hook, *k*, and it will be readily seen that by means of this chain the position of the weight may be so adjusted that the valve I' shall entirely close the trough I or shall leave it partly open, in which latter case air will pass through the trough to the fire, as is sometimes desirable. This end could be attained by making the hook adjustable and adapting the lever G to engage therewith, and thus support the weight at any desired point.

L L' is an apron or shield hinged or otherwise attached to the trough I, for the purpose of preventing the passage of fire to the inflammable material from the furnace draft-door or from the coals that may fall from said door. In order to be adjustable to different lengths, it is made of two or more pieces, L L', secured together by means of set-screws *l*.

The fire box or chamber M is provided with a grate, *a a*, of any ordinary or desired construction.

N is the bridge-wall, secured in position immediately in rear of the grate *a a*. This bridge-wall is constructed in such manner that the clinkers and other refuse which will not pass through the grate *a a* may be pushed over it (said wall) into the chamber M'. It is curved in such shape as to retain the fuel upon the grate when desirable to do so, but at the same time to permit the ready pushing over of the refuse, as will be seen clearly in Figs. 1 and 5.

Heretofore it has been customary to secure in place the bridge-wall of boiler fire-flues by rigidly fastening them to the sides of said flues; but this is subject to much inconvenience and loss, owing to the fact that these bridge-walls must be frequently removed and renewed.

I secure the bridge-wall in place in the following improved manner: *n n*, Figs. 2, 4, and 5, represent brackets secured by riveting to the sides of the fire-flue. O is a supporting device, having the rearwardly-projecting arms *o o* and the downwardly-projecting arms or plates *o' o'*, which are bolted to the brackets *n n*. The bridge-wall N is fitted to and rests upon this support O. An open space is left between the

support O and the bridge-wall N, in order to admit air between them, which prevents to a large extent the burning out of the bridge-wall.

It will be seen that when so constructed and attached the bridge-wall can be removed whenever it is desired without disturbing any of the fixed parts of the boiler or furnace.

P is a door situated beneath the bridge-wall N, and hinged to the brackets *n n*, as shown in Figs. 2 and 4. It is made in two parts hinged together at or near the center, so that it may fold up or swing in either direction, as shown in dotted lines, Fig. 5. The door, when thus constructed, permits the passage of a hoe or scraper from the draft-door entirely through the fire-flue when it is desired to push the ashes and clinkers from the chambers M and M'. The door P may be provided with perforations *p p*, (shown in Fig. 2,) to admit air to the chamber M', for causing a more perfect combustion.

Q represents an ash-pan situated at the rear end of the combustion-chamber, beneath the smoke-box. It is fastened in such manner as to be readily detached, and, if desired, water may be placed in it to extinguish any fire or hot material which may be pushed into it. Above the ash-pan there is a sliding door or trap, Q', in the bottom of the smoke-box, arranged to close the opening through which the ashes and other refuse fall into the ash-pan Q, so that when the pan is being removed for emptying or other reason the refuse may not escape from the combustion-chamber.

B is the smoke box or chamber at the rear end of the boiler, which receives the products of combustion from the fire-flue A and deflects them back through the return-flues G G. R R' are doors opening into the rear end of this smoke-box, by means of which access can be had to the flues when it is desired to clean them. Around the smoke-box there is placed a protector or guard, S', arranged to prevent the burning or scorching of any material that may come in contact with it. It is preferably formed of perforated sheet metal, and is provided with a door at the rear end. This protector S S' is placed above and entirely around the smoke-box. The perforations allow a ready circulation of air through the protector.

T T are doors beneath the smoke-stack, opening into the front smoke-chamber, C, which permit the removing from said chamber of any refuse that may accumulate there.

The chamber C is constructed to surround the top and sides of the furnace A, and the bottom of the chamber is formed by the doors T, the outer cylinder of the boiler being cut away, as shown at A', so as to permit the refuse to drop directly from the chamber C without in any way opening the fire-flue or ash-pit.

F is a pump for supplying the boiler with water. I provide the pump with a leakway formed by means of a return-pipe, F², which is furnished with a stop-cock, *f*.

There is a valve, *f'*, placed in the feed-pipe F'.

F³ is a branch pipe communicating with the feed-pipe F', adapted to have a hose attached, and provided with a stop-cock at f².

By closing valve f' and stop-cock f and opening stop-cock f² the whole force of the pump may be used for throwing water through hose attached to pipe F³ to extinguish fire or for other purposes.

The smoke-stack D is made in two parts, which are hinged together at d, there being a clutch or pin, d', arranged to hold the parts together when they are not intentionally disengaged. The upper part of the smoke-stack can thus be laid down upon the engine while it is being transported. The cowl E prevents the wind from interfering with the proper operations of the currents that pass up the smoke-stack.

I do not in this case claim anything relating to the arrangement of the fire-flue upon one side of the center of the boiler and return-flues upon the other side of its center, as I prefer to claim any patentable feature which may be shown in such arrangement in another application which I am now preparing to file.

What I claim is—

1. In combination with the fire-place M and grate a of a boiler-furnace, the horizontal feeding-trough I, having an automatically-closing door hinged to the bottom of the trough to serve as a guide for the fuel, substantially as and for the purposes set forth.

2. In combination with the furnace and the extended feed-trough, the extensible apron

composed of the plates L and L', attached to the outer end of the trough, substantially as and for the purposes set forth.

3. In combination with the boiler-furnace A and the grate, the brackets n, secured to the furnace-wall, and the bridge-wall N, supported loosely upon said brackets, substantially as and for the purposes set forth.

4. In combination with the boiler-furnace, the grate, and the bridge-wall, the supports o, substantially as set forth.

5. In combination with the boiler-furnace and the bridge-wall, the door P, composed of two or more parts hinged together, as and for the purposes set forth.

6. In a straw-burning engine, the combination, substantially as herein set forth, of the following elements, viz: the furnace A, the smoke-box B, arranged to receive the products of combustion and carry them upward to the return-flues, the tight ash-vessel constructed to permanently hold a body of water beneath the smoke-box for quenching the cinders and adapted to be removed entirely from the boiler, and the sliding door Q', arranged to close entirely the opening left by withdrawing said box.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN H. ELWARD.

Witnesses:

W. F. BARSTOW,
H. C. PRESCOTT.