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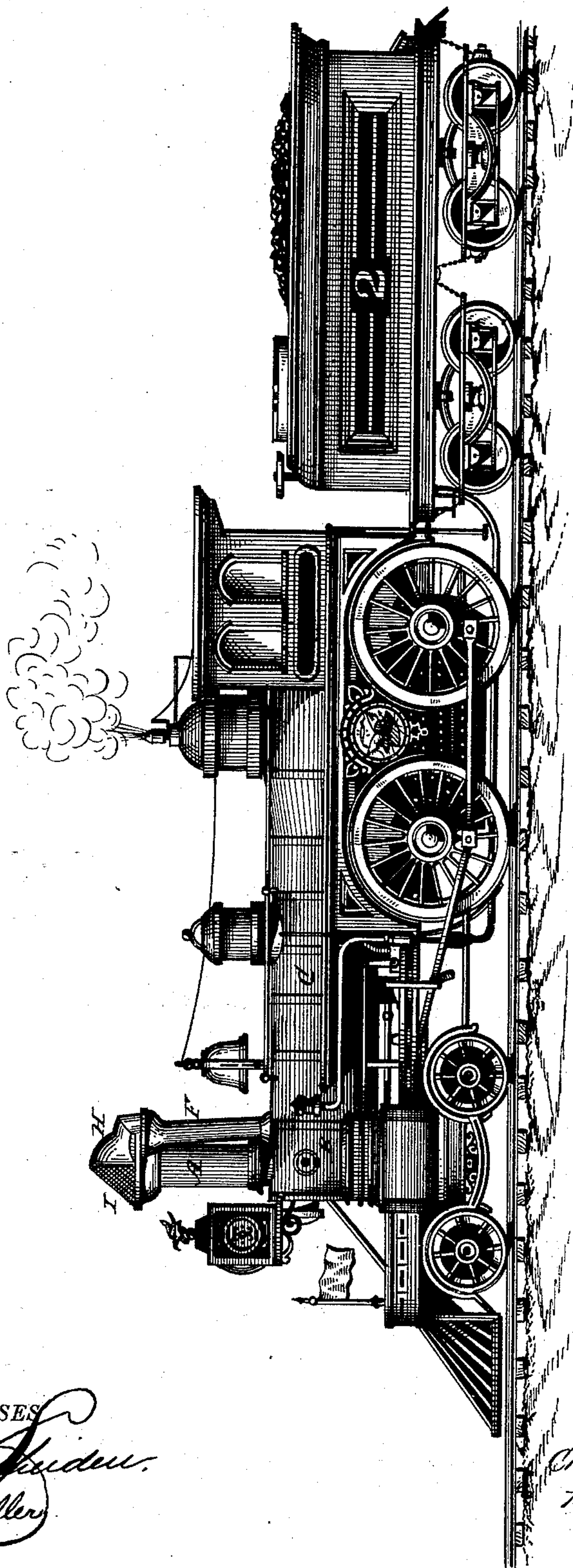
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C. B. LOVELESS.

SPARK ARRESTER AND CONSUMER.

No. 314,697.

Patented Mar. 31, 1885.



WITNESSES
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L. L. Miller

INVENTOR
Charles B. Loveless.
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(No Model.)

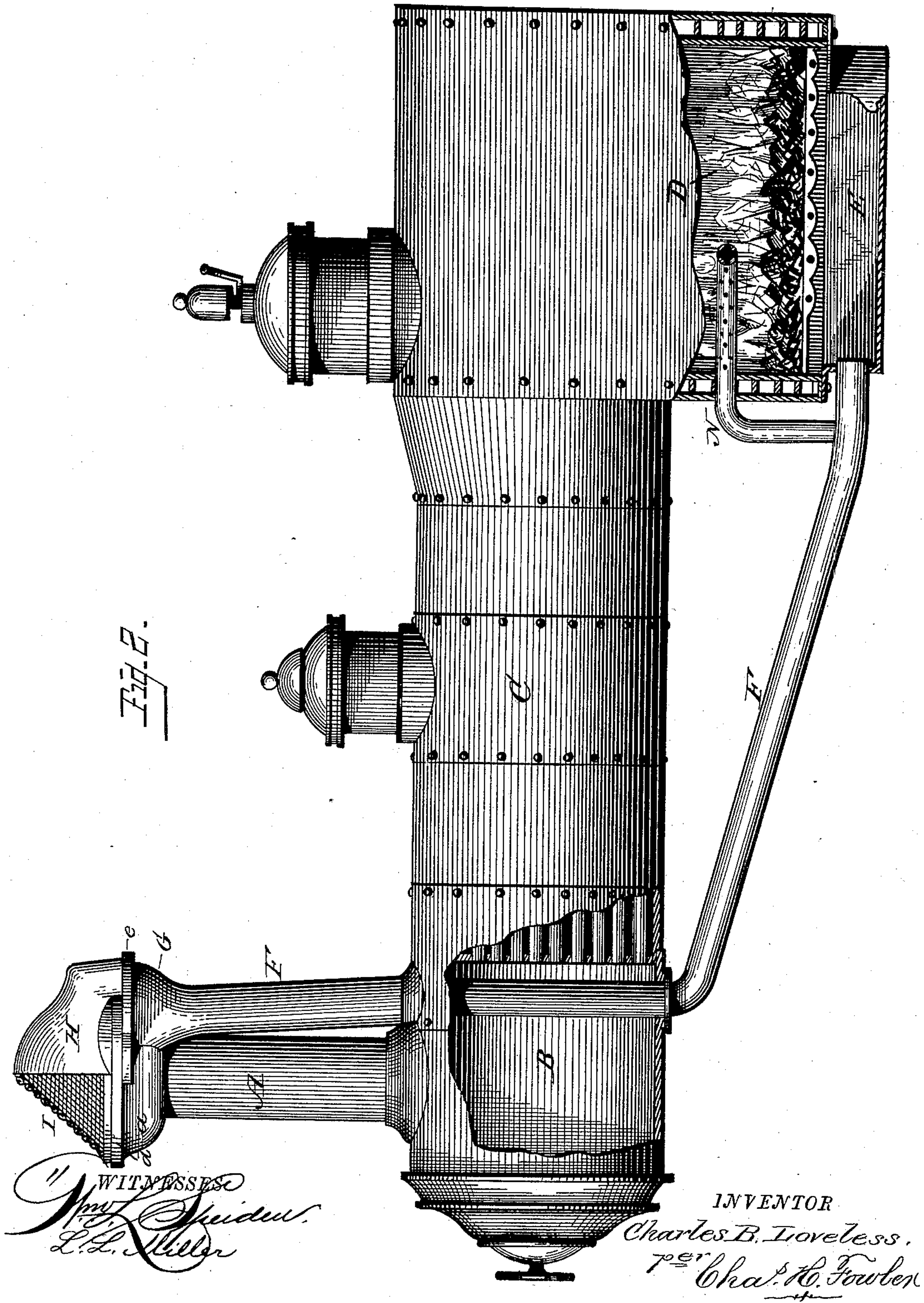
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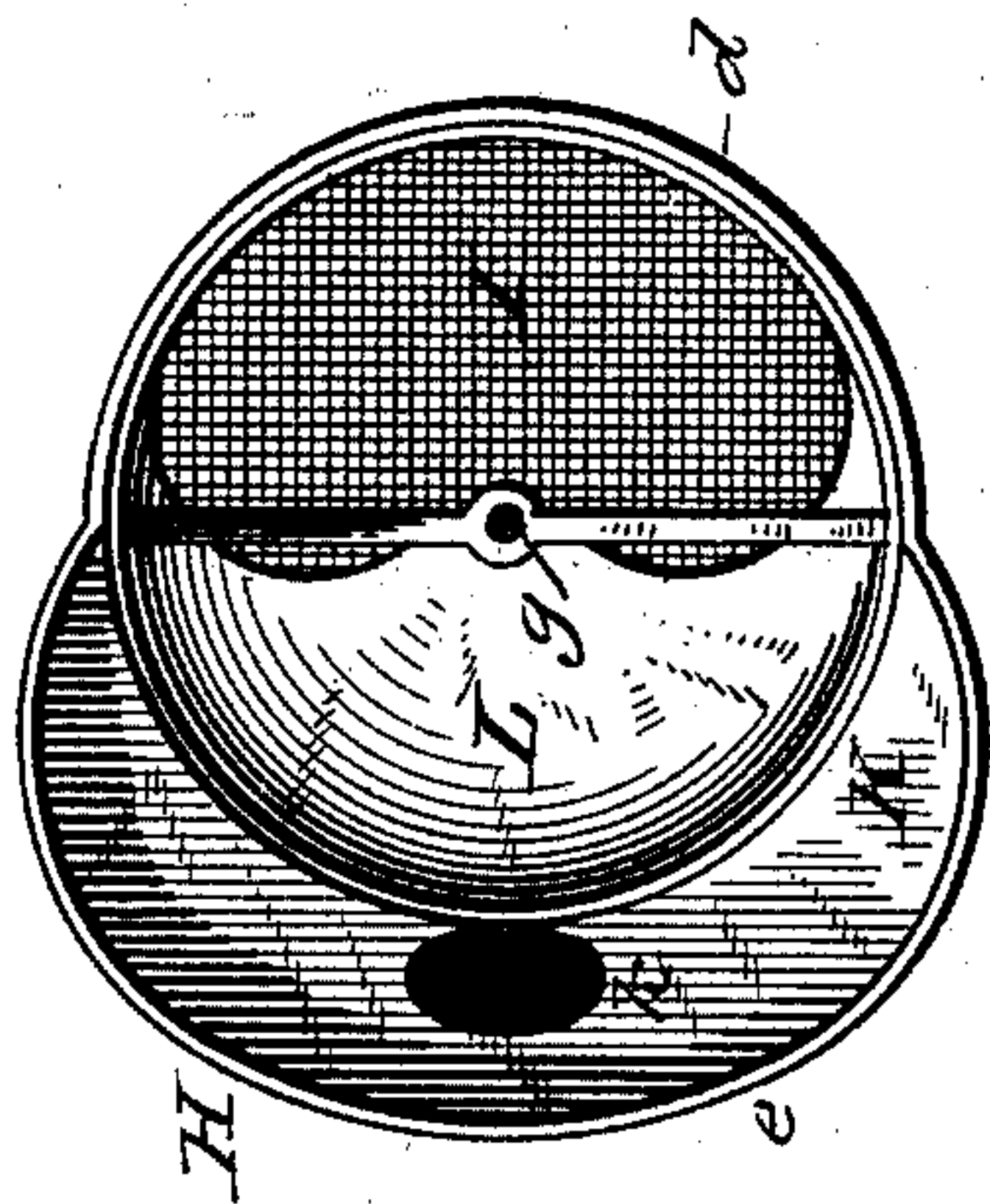


Fig. 4.

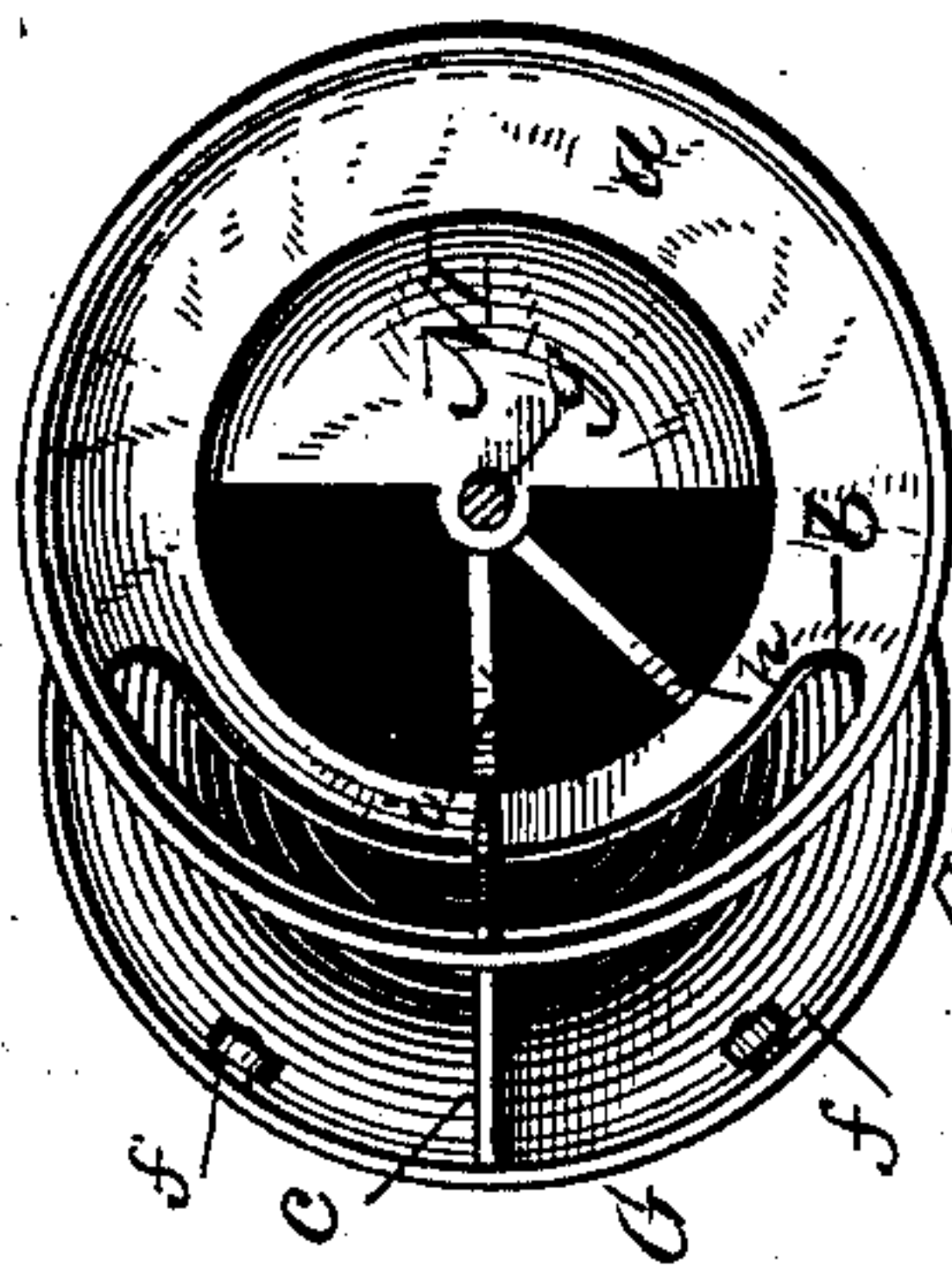


Fig. 5.

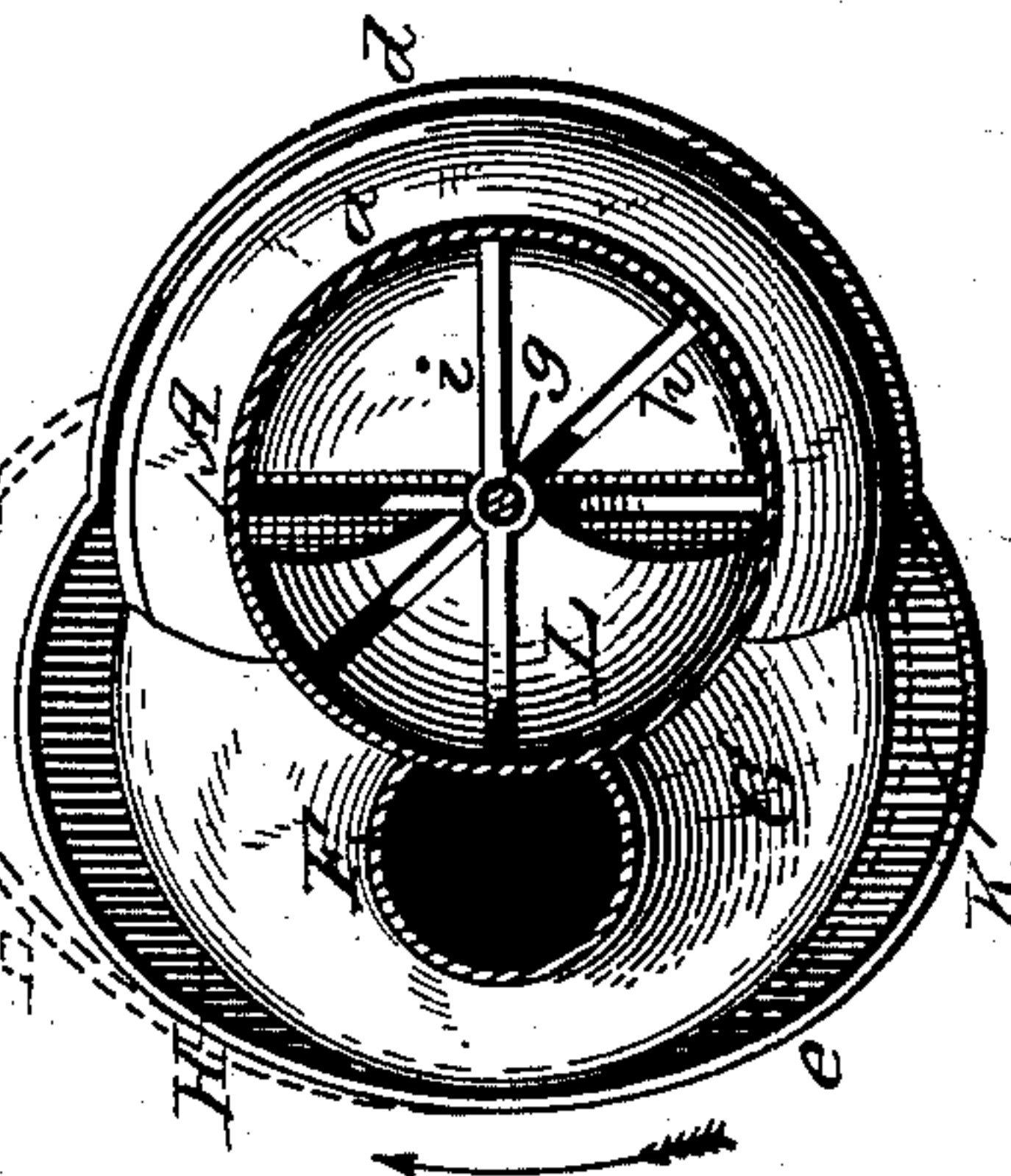


Fig. 6.

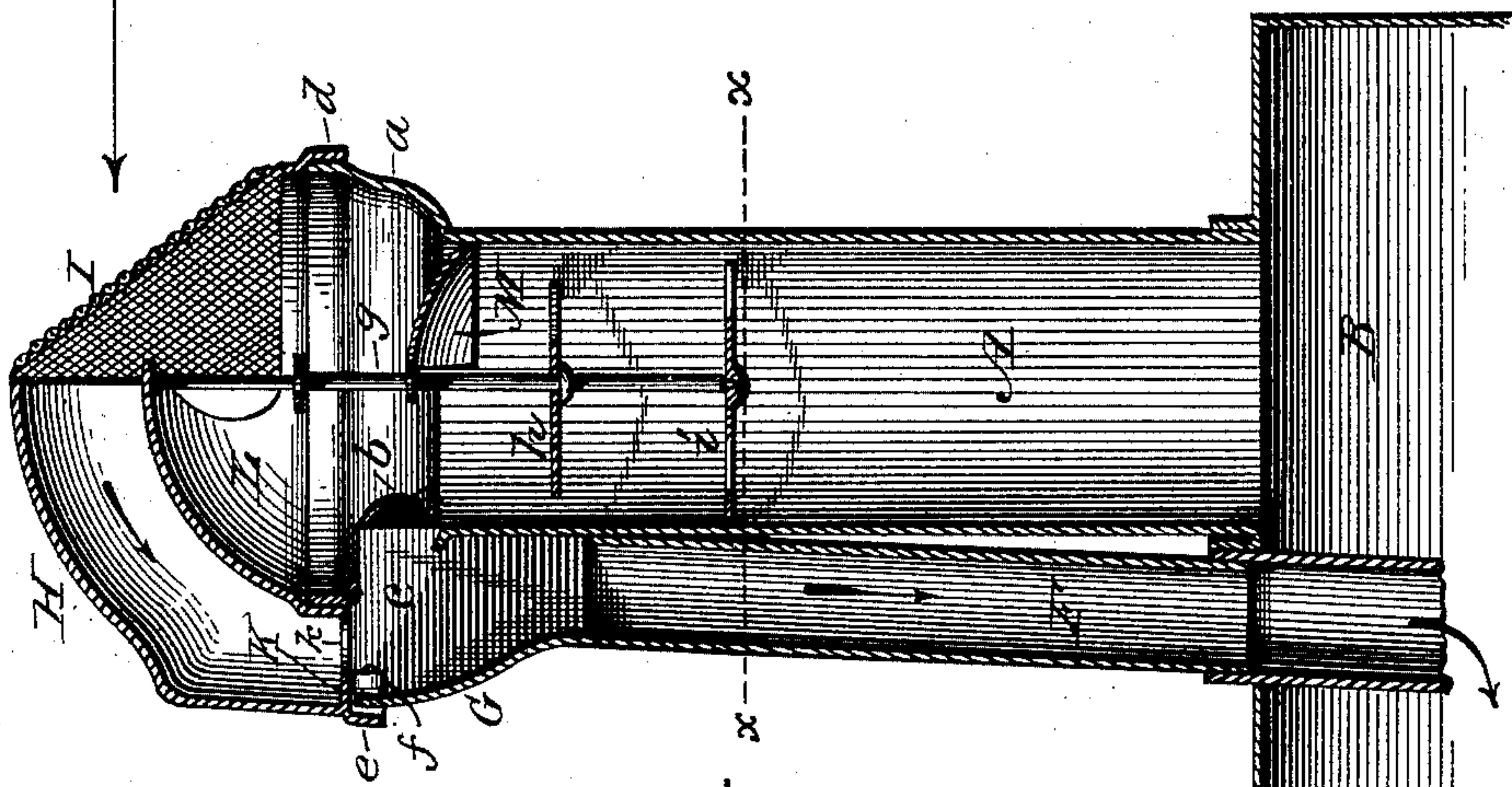


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES B. LOVELESS, OF WORTHINGTON, MINNESOTA.

SPARK ARRESTER AND CONSUMER.

SPECIFICATION forming part of Letters Patent No. 314,697, dated March 31, 1885.

Application filed November 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. LOVELESS, a citizen of the United States, residing at Worthington, in the county of Nobles and State of Minnesota, have invented certain new and useful Improvements in Spark Arresters and Consumers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a side elevation of a locomotive with my smoke-stack connected thereto; Fig. 2, a similar view on an enlarged scale of a locomotive-boiler and fire-box partly broken away to show the conducting-pipe communicating therewith and with the smoke-stack; Fig. 3, a sectional elevation of the smoke-stack and conducting-pipe, showing it connecting with the smoke-box at the front end of the boiler; Fig. 4, an under plan view of the hood which forms the top of the smoke-stack; Fig. 5, a top plan view of the upper end of the smoke-stack with the hood removed; and Fig. 6, an under plan sectional view taken on line *x x* of Fig. 3.

The object of the present invention is to provide simple and effective means whereby the gas, smoke, sparks, or cinders from a locomotive are conducted back to the fire-box thereof and consumed, thus preventing the sparks setting fire to prairies or brush-wood along the line of the road, also preventing the smoke and cinders passing into the cars.

The invention consists in the peculiar construction of the smoke-stack, also providing it with an independent conducting-pipe communicating therewith and with the fire-box of the boiler, substantially as shown in the drawings, and hereinafter described and claimed.

In the accompanying drawings, A represents my improved smoke-stack communicating with the smoke-box B of the usual boiler, C. This boiler is of the kind ordinarily used in a locomotive-engine, and is provided at its rear end with a fire-box, D.

Immediately under the grate of the fire-box D is a chamber, E, with which communicates

a conducting-pipe, F, of any suitable size and diameter, said pipe passing up through the smoke-box and alongside the stack A, communicating therewith at its upper end. The upper end of the conducting-pipe F terminates in a funnel-shaped head, G, which is secured to the rim *a* of the smoke-stack A.

At the rear of the rim *a* is an elongated opening, *b*, located directly opposite the funnel-shaped head G, and divided into two independent openings by a vertical partition, *c*, which also divides the funnel-shaped head, as shown in Figs. 3 and 5.

Upon the smoke-stack A is suitably supported a hood, H, provided with a perforated sheet-metal or wire-gauze screen, I. This hood H is so connected to the stack A as will allow of its moving horizontally thereon in the arc of a circle to bring it in the direction of the wind.

The means which I consider the most convenient for supporting and connecting the hood H so that it will be self-adjusting for the purpose above described are as follows: The hood H is formed with a depending flange, *d*, which fits over the edge of the rim *a*, and also a similar flange, *e*, fitting over the edge of the funnel-shaped head G, which is provided with two or more friction-rollers, *f*. A horizontal plate, K, of the hood H bears upon the rollers *f*, thus enabling it to turn with comparatively little friction. The hood H is provided with a central rod or spindle, *g*, which turns with it, and is supported by diametrical braces *h i*, connected to the interior sides of the stack A, the lower one, as shown at *i*, forming a step for the reduced end of the rod or spindle *g* to turn on. The hood H is provided with a concavo-convex deflecting-plate, L, the concave or dished form thereof more effectually catching the smoke, sparks, or cinders as they pass up the stack and throwing them through the opening *b* into pipe F. The smoke, sparks, or cinders come in contact with a second deflecting-plate, M, arranged below the plate L, and rigidly secured to the rod or spindle *g*, so that it will revolve with it and give the sparks or cinders a chute laterally and into the opening *b* as they pass up the stack from the smoke-box.

B. The plate or partition *c* divides the funnel-shaped head *G* into two separate conduits, each leading into the conducting-pipe *F*, as shown in Fig. 5, communication being had therewith through the opening *b* and opening *k* in the plate *K*. By this division of the head *G* to form two conduits the wind will strike against the partition *c* and be driven down through the pipe *F*, thus preventing its interference with the smoke, cinders, or sparks as it passes down the other conduit or on the opposite side of the partition, this being especially important when the wind is blowing in a direction at right angles to the direction in which the train is moving. The wind as it passes through the meshes of the screen *I* into the hood *H* catches the smoke, sparks, or cinders as they are thrown back by the plate *M*, and thus conveyed through the opening *k* into the pipe *F*, from whence they are conducted to the chamber *E* under the fire-box *B*, and there consumed. It will be seen that the entire volume of smoke, gas, cinders, or sparks is thrown into the rear part of the hood of the smoke-stack, the wind being drawn in at the front thereof through the meshes of the screen, and not only carries the smoke, gas, cinders, or sparks through the conducting-pipe to the chamber under the fire-box at the rear of the boiler, but supplies the necessary oxygen to keep up the combustion, a suction being thus created under the fire-box at one end of the conducting-pipe, while at the opposite end the smoke, sparks, or cinders are being forced through it by the action of the wind. It should be understood that the speed or motion of the engine or locomotive forces the wind into the hood of the smoke-stack, which conveys the sparks thrown by the exhaust-steam against the screen back against the rear portion of the hood and into the conducting-pipe leading to the fire-box, the sparks being thrown by each exhaust of the steam against the interior surface of the screen, the suction created in the pipe drawing everything through it to the fire-box.

To more effectually consume the escaping products of combustion, I provide the conducting-pipe *F* with a branch pipe, *N*, communicating therewith, and entering the fire-box *D* some distance above the fuel, as shown in Fig. 2. The portion of the pipe *N* entering the fire-box may terminate in a T-branch, a spiral coil, or in any other suitable form found most desirable, and is closed at its end or ends, and provided with perforations, the object thereof being to more effectually distribute the escaping air mixed with gas and smoke which is unconsumed throughout the area of the fire-box above the flame, in order to ignite and burn up the products of combustion before entering the flues, in addition to that which escapes from the conducting-pipe into the chamber *E*.

The operation of the device is very simple as well as effective in consuming all products

of combustion that would otherwise pass out of the smoke-stack through the meshes of the screen, the gas, smoke, cinders, or sparks as they pass up the stack *A* being deflected against the plate *L* by means of the lower plate, *M*, the greater body of air which enters the cap or hood *H* above the plate *L* or upon the outside thereof, as indicated by the arrow, passing down the conducting-pipe *F*, and by so doing creating a suction, which draws the products of combustion through the opening *b*, and carries them with it to the point of discharge, as hereinbefore described.

The products not drawn through the opening *b* and which pass above and over the plate *L* are carried by the incoming current of air down the pipe *F*, thus making provision for a complete conduction of the gases, smoke, cinders, or sparks, as they pass up the smoke-stack to a point where they are consumed.

When the engine is not in motion, the draft and smoke may pass out at the top of the smoke-stack through the screen, provision being made under the fire-box to take in air to supply it when the engine is running backward or remaining stationary.

My invention, although especially designed as an attachment to locomotive-engines, may be applied to all classes of moving engines.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A smoke-stack provided with a movable or revolving hood having a screen at its front, and a conducting-pipe communicating therewith and with the fire-box of a boiler, substantially as and for the purpose set forth.

2. A smoke-stack provided with a conducting-pipe communicating therewith and with the fire-box of the boiler below the grate, and a perforated branch pipe communicating with the conducting-pipe and entering the fire-box above the grate, substantially as and for the purpose specified.

3. A smoke-stack provided with a revolving hood having a screen, and a conducting-pipe communicating therewith and with a chamber arranged under the fire-box of the boiler, whereby a suction is created to draw the products of combustion through said pipe to the fire-box, substantially as and for the purpose described.

4. A smoke-stack provided with a revolving hood having a screen front, a conducting-pipe communicating with the fire-box of the boiler, and terminating at its opposite or outer end in a funnel-shaped head divided into two separate conduits by a vertical partition, each communicating with the hood, substantially as and for the purpose specified.

5. A smoke-stack provided with a revolving hood and deflecting-plates, and a conducting-pipe communicating with the fire-box of the boiler and with the hood, substantially as and for the purpose set forth.

6. A smoke-stack provided with a revol-

ing hood and deflecting-plates, and a conducting-pipe communicating with the hood, and divided into two separate conduits by a suitable partition, said conducting-pipe communicating with the fire-box of the boiler under the grate thereof, and above it by a branch pipe, substantially as and for the purpose described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

CHARLES B. LOVELESS.

Witnesses:

M. P. MANN,
E. F. BUCHAN.