No. 842,448. PATENTED JAN. 29, 1907.

M. F. COX.

THROTTLE VALVE.

APPLICATION FILED APR. 16, 1906.

2 SHEETS—SHEET 1.

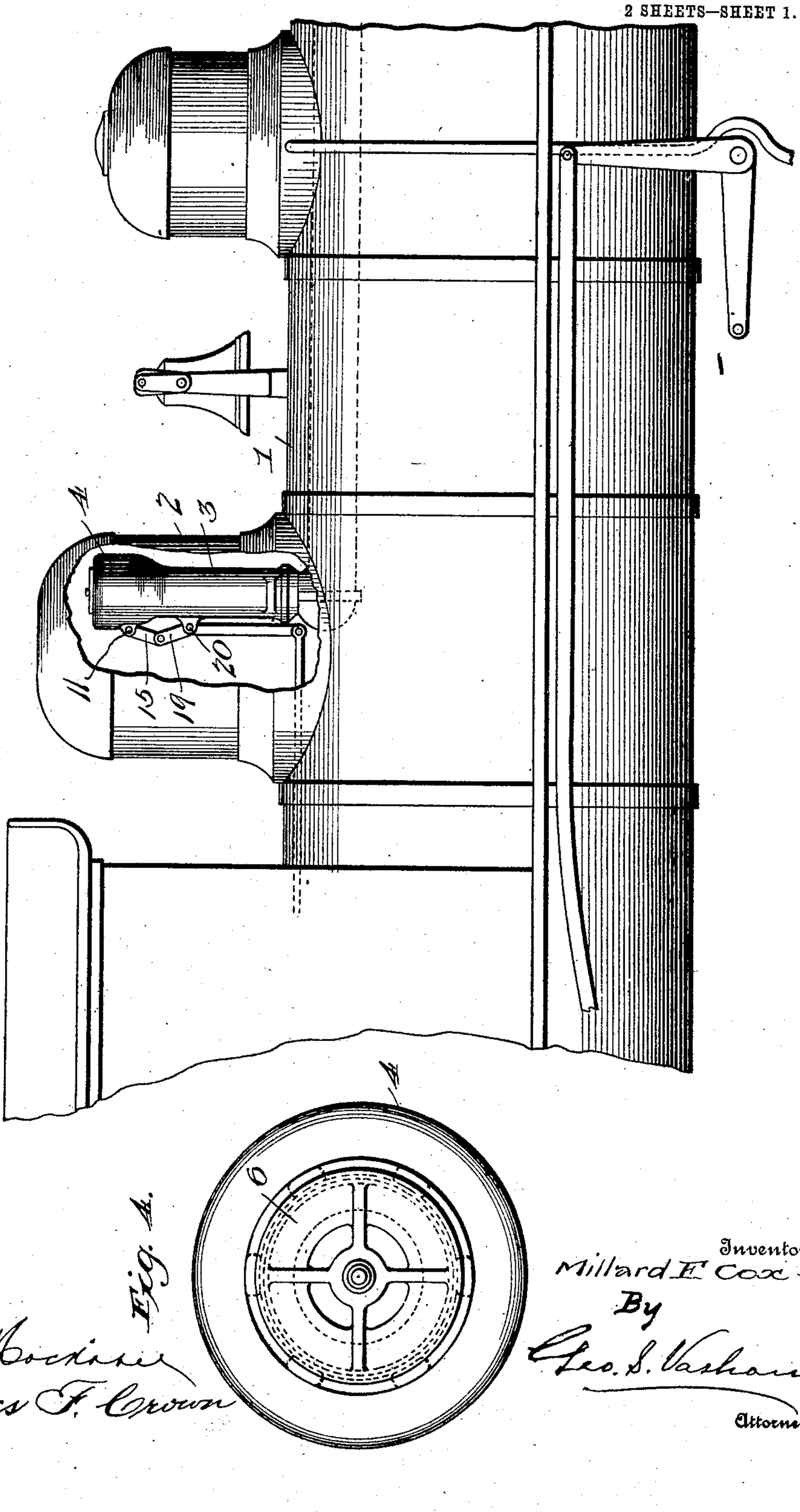


Fig. 1.

Fig. 4.

Witnesses

T. L. Mackaye

James F. Crown

Inventor

Millard F. Cox

By

Geo. S. Graham

Attorney.

No. 842,448. PATENTED JAN. 29, 1907.

M. F. COX.

THROTTLE VALVE.

APPLICATION FILED APR. 16, 1906.

2 SHEETS—SHEET 2.

Fig. 2.

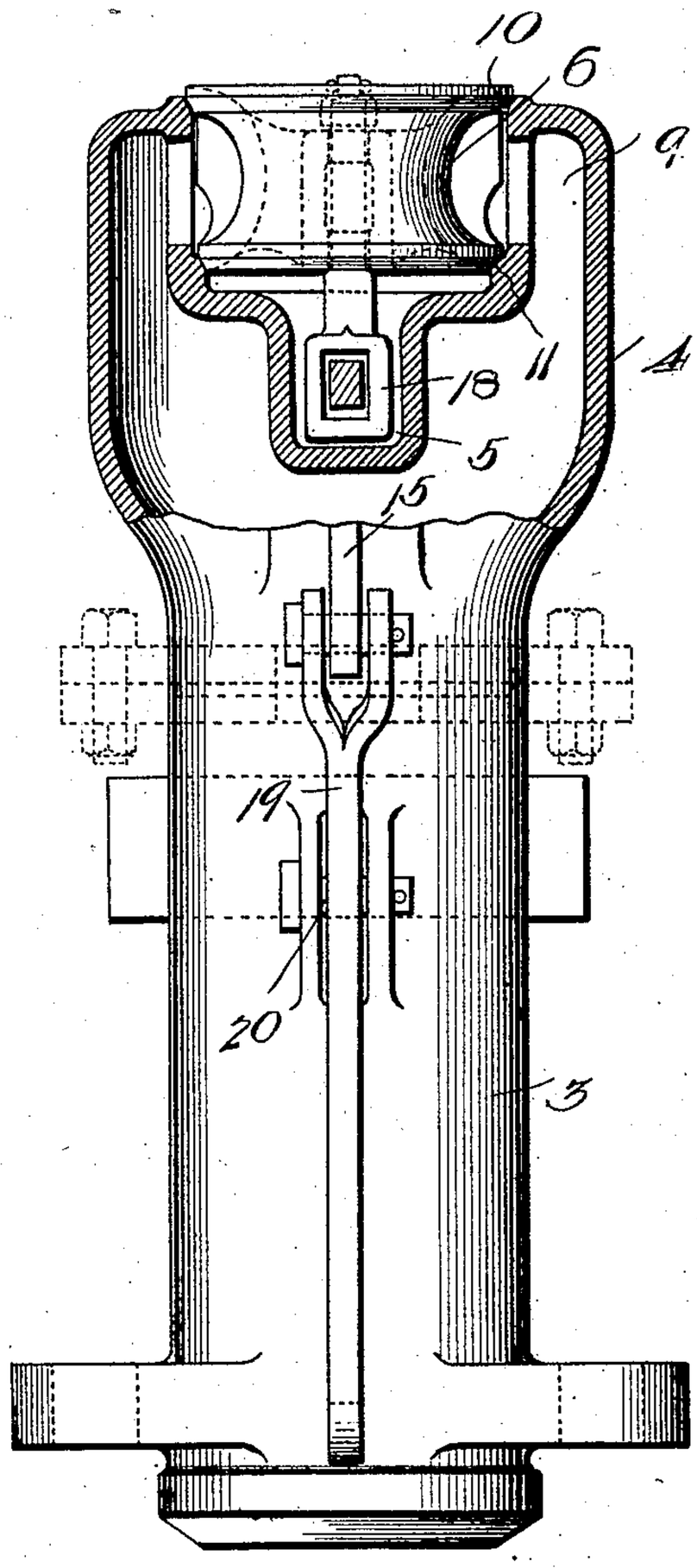
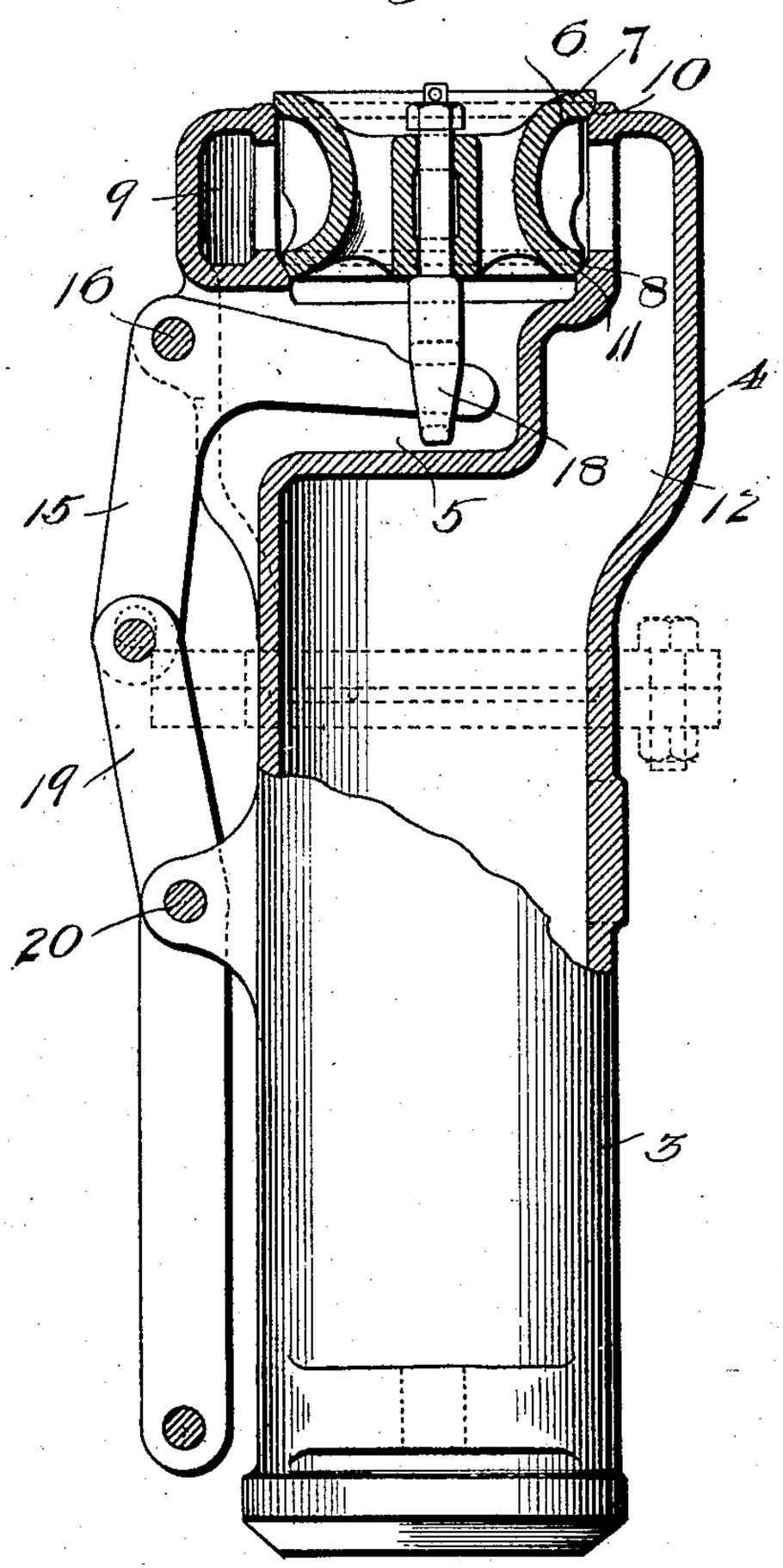


Fig. 5.



Witnesses
T. L. Morsman
James F. Crown

Inventor
Millard F. Cox
By Geo. S. Vashon
Attorney

UNITED STATES PATENT OFFICE.

MILLARD F. COX, OF RICHMOND, VIRGINIA.

THROTTLE-VALVE.

No. 842,448. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed April 16, 1906. Serial No. 311,959.

To all whom it may concern:

Be it known that I, MILLARD F. COX, a citizen of the United States, residing at the city of Richmond, in the county of Henrico and State of Virginia, have invented new and useful Improvements in Throttle-Valves, of which the following is a specification.

This invention relates to throttle-valves such as are intended particularly for use in connection with locomotives and the like, although the valve of the present invention can be used for other purposes, if desired.

Heretofore, so far as I am aware, throttle-valves of the double-end variety—that is, valves of tubular construction having an annular flange at each end adapted to coöperate with a valve-seat—have been used in connection with a so-called "elbow-pipe," which communicates with one side of the annular valve-chamber at a point intermediate the ends of the valve. In its opening and closing operations the valve moves laterally with respect to the end of the elbow-pipe. Valves which require an elbow-pipe, as above mentioned, are open to several serious objections. For example, the elbow-pipe occupies considerable space, and consequently obstructs to a certain extent the free entrance of steam to the dome of the locomotive in which the valve is placed. The elbow-pipe also renders it difficult to inspect or repair the valve when the boiler is cold. Furthermore, the bulk or size of the elbow-pipe and valve-casing frequently makes it impossible to dispose the throttle-valve as high up in the locomotive-dome as is desirable in order to secure the greatest efficiency and dryness of the steam. Last, but not least, the elbow-pipe, which must be of large diameter in order to permit the passage of sufficient steam to the cylinders of the locomotive, usually requires that the throttle-valve shall be of a length equal to or exceeding the diameter of the end of the elbow-pipe. For this reason, on account of its length, the throttle-valve is liable to and frequently does expand to a sufficient extent to cause serious and annoying leakage of steam.

The object of my invention is to improve the construction of throttle-valves in such manner as to dispense with the use of the elbow-pipe, whereby the whole valve structure can be decreased in size to such an extent that it can be disposed high up in the dome, and thus secure steam under the most favorable and efficient conditions without obstructing the entrance to the dome. Furthermore, the decreased size which I secure by dispensing with the elbow-pipe practically obviates the disadvantage of leakage caused by expansion.

I attain the foregoing object by mounting the throttle-valve in the end of the steam-supply pipe in such manner that it moves longitudinally with respect to said pipe in its opening and closing movements, it being remembered that the necessity of forming an elbow on the end of the steam-supply has arisen heretofore from the fact that in prior constructions the throttle-valve in opening and closing has moved laterally with respect to the end of the steam-supply pipe.

In order that my invention may be more clearly understood, I will describe the same with particular reference to the accompanying drawings, in which—

Figure 1 represents a portion of a locomotive the dome of which is shown in section with my improved valve disposed therein. Fig. 2 is a longitudinal section, partly in elevation, of the valve proper. Fig. 3 is a view taken at a right angle to Fig. 2. Fig. 4 is a top plan view of the steam-supply pipe embodying the features of the invention.

Like reference-numerals indicate corresponding parts in the different figures of the drawings.

The numeral 1 indicates the boiler of a locomotive, which may be of any desired form and construction. The numeral 2 indicates the dome in which is disposed my improved valve.

The numeral 3 indicates the straight upwardly-extending end of the steam-supply pipe by which steam is conducted from the upper portion of the dome to the cylinders. The upper end of the straight pipe 3 is preferably enlarged, as indicated at 4, and is formed with a lateral chamber 5, which is open at one side of the pipe and also extends longitudinally upward to the end 4 of the pipe 3. Mounted in the upper end 4 of the pipe 3 is a small throttle-valve 6, preferably of tubular form and having flared ends, as shown in the drawings—that is to say, a section through one side of the valve would show that it is substantially crescent-shaped, so as to form the end flanges 7 and 8.

The advantage which is secured by using a flared or crescent-shaped valve instead of a

valve comprising a tube of uniform diameter having annular end flanges is that the flared valve does not expand to so great an extent as the straight or tubular valve. In other words, the valve 6 is diametrically reduced at its intermediate portion and the contact-surface thereof is proportionately minimized.

The end 4 of the pipe 3 is formed with a concentric steam-chamber 9, which is provided with annular valve-seats 10 11 and is in communication with the pipe 3 around the chamber 5, as shown at 12—that is to say, the concentric steam-chamber 9 opens at its lower end into the pipe 3. The concentric steam-chamber 9 also communicates with the space formed between the inner wall of said chamber and the valve 6, owing to the intermediate diametric reduction of the latter, as clearly shown by Fig. 3.

The valve 6 is adapted to be moved longitudinally upward to open and permit the entrance of steam to the pipe 3. While any suitable mechanism may be employed for moving the valve 6 longitudinally of the pipe 3 in opening and closing the same, still I prefer to employ for this purpose the mechanism shown in the drawings, which comprises a bell-crank lever 15, which is fulcrumed upon the end 4 of the pipe 3, as shown at 16. The upper arm 17 of the lever 15 projects into the lateral chamber 5 and passes through a suitable slot formed in a rod 18, which depends from the valve 6, as shown. The bell-crank lever 15 is rocked or moved to open or close the valve 6 by means of a lever 19, fulcrumed at 20 and operated in any old and well-known manner by the engineer.

As previously intimated, I conceive that the principal difference between my construction and prior devices of a similar nature is that I have provided a construction which will permit the valve to move longitudinally with respect to the end of the steam-supply pipe and which thus enables me to dispense with the bulky elbow which has been necessary in prior constructions on account of the fact that the valve moves laterally or transversely with respect to the end or elbow portion of the pipe.

The many advantages which I secure by my construction, such as decreased size, which permits the valve to be located in the top of the dome, so as to secure dry steam at its highest efficiency without blocking the entrance to the dome or preventing the valve from being readily repaired or inspected from inside the boiler and which reduces expansion to the minimum, have been fully set forth in the beginning of this specification.

Changes in the precise embodiment of invention illustrated and described may be made within the scope of the following claims without departing from the spirit of the invention or sacrificing any of the advantages thereof.

What I claim is—

1. In a throttle-valve construction the combination of a supply-pipe having a concentric steam-chamber at one end thereof and an open-ended chamber also extending thereinto and a double-ended throttle-valve located within said chamber and adapted to be moved longitudinally of the end of the pipe in its opening and closing operations, the end of the pipe being straight.

2. In a throttle-valve construction the combination of a supply-pipe having a straight end and a concentric steam-chamber communicating therewith, a throttle-valve located within said steam-chamber and adapted to open and close the latter, the valve being reduced at its intermediate portion, and means for moving said valve longitudinally of the end of the pipe.

3. In a throttle-valve construction, the combination of a supply-pipe having a concentric steam-chamber at one end thereof, an open-ended chamber extending into said pipe adjacent to said steam-chamber, a throttle-valve disposed in said steam-chamber, and means extending into said open-ended chamber for moving said valve longitudinally of the end of the supply-pipe.

4. In a throttle-valve construction, the combination of a supply-pipe having an enlarged end, a concentric steam-chamber in said enlarged end, an open-ended lateral chamber extending into said enlarged end, a flared valve coöperating with said steam-chamber, and a bell-crank lever having one arm projecting into said open-ended chamber for opening and closing said valve.

5. In a throttle-valve construction, the combination of a supply-pipe having a concentric steam-chamber at one end communicating therewith, and a double-ended throttle-valve disposed in the said steam-chamber and diametrically reduced at its intermediate portion, said valve being adapted to be moved longitudinally of the end of the pipe in its opening and closing operations.

6. In a throttle-valve construction, the combination of a supply-pipe having a concentric steam-chamber at one end communicating therewith and providing also a valve-chamber, and a double-ended throttle-valve disposed in said steam-chamber and having the intermediate portion thereof diametrically reduced, the valve being movable longitudinally of the end of the pipe and the inner wall of the steam-chamber being open to permit steam to pass into the space formed between said wall and the intermediately-reduced portion of the valve.

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

MILLARD F. COX.

Witnesses:
JNO. T. SEDDIR, JR.,
RICHARD W. JONES.