

E. W. SMITH.
WATER-PIPE.

No. 171,440.

Patented Dec. 21, 1875.

Fig:1.

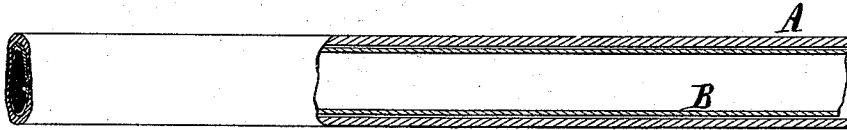


Fig:2.

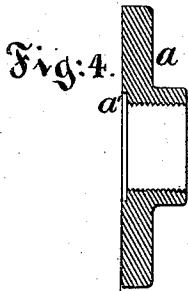
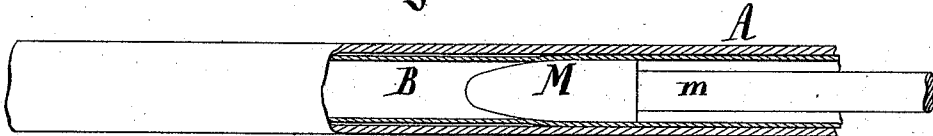


Fig:3.

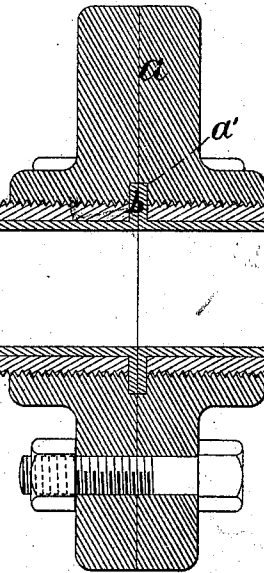


Fig:5.

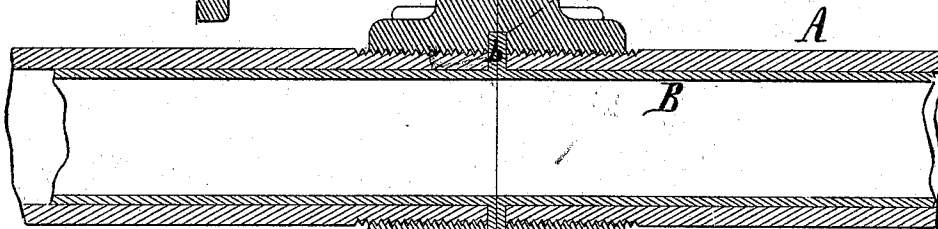
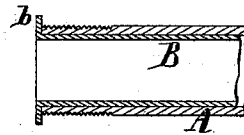


Fig:6.

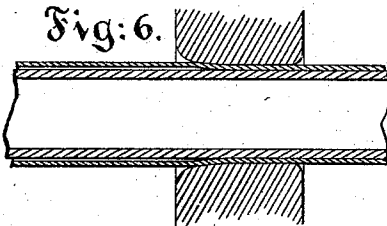
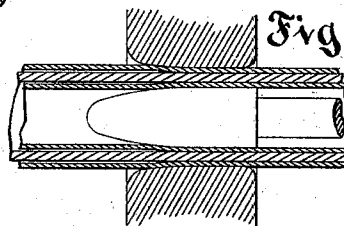


Fig:7.



Witnesses:

Inventor:

M. A. Van Name
M. A. Van Name

E. W. Smith
his attorney
Thomas S. Sutton

UNITED STATES PATENT OFFICE

ERASTUS W. SMITH, OF NEW YORK, N. Y.

IMPROVEMENT IN WATER-PIPES.

Specification forming part of Letters Patent No. **171,440**, dated December 21, 1875; application filed May 1, 1875.

To all whom it may concern:

Be it known that I, ERASTUS W. SMITH, of New York city, in the State of New York, have invented certain Improvements relating to Water-Pipes, of which the following is a specification:

Experience as constructing engineer for several lines of steamers running on salt-water has developed great difficulty in obtaining a pipe which is in all respects suitable to serve as a feed-pipe between the pumps and the boilers. There has been no means heretofore known to me of producing suitable pipe at a moderate cost. I have devised a method of constructing a compound pipe, which can be cheaply operated, and with, I believe, highly beneficial results.

I take ordinary iron pipe, and introduce within it a pipe formed of a peculiar alloy of soft metal. I have determined by experiment that a composition of one part tin and nine parts lead can be worked in a lead-pipe machine of sufficient strength, and possesses the desired qualities of being unaffected by the salt-water, and of avoiding any galvanic action on the water, so as to injure the boiler. I introduce such a pipe within the iron pipe, and then expand it therein by forcing through the interior an expanding-plug, which drives the soft metal outward into intimate contact with the iron. The ends of the soft-metal pipe should extend out a little beyond the ends of the iron pipe, and be turned outward in the manner of a flange. Then, the iron pipe being equipped with flanges suitable for bolting together, as usual, on applying the lengths of the compound pipe together, the soft-metal flanges come in contact with each other, and a continuous pipe is formed, possessing all the strength necessary for the action of the most powerful pumps.

The accompanying drawing forms a part of this specification.

Figure 1 is an elevation, partly in section, showing the pipes applied together, but not expanded. Fig. 2 is a corresponding view, with the inner pipe in the act of being expanded. Fig. 3 represents, on a larger scale, the abutting ends of two sections of the completed pipe. Fig. 4 is a section through the

recessed iron flange alone, and Fig. 5 is a section through the iron pipe and the internal soft pipe and its flange alone.

Similar letters of reference indicate like parts in all the figures.

A is a lap-welded wrought-iron pipe, and *a* is a cast-iron flange lapped thereon, and provided with a recess, *a'*, in its face to receive the flange of the soft-metal pipe. D is the main body, and *b* the turned-out end or flange, of the soft-metal pipe, which is tightly set within the iron pipe. M is a tapering plug of hard wood or other suitable material, mounted on the rod *m*, and operated by suitable machinery (not represented) to expand the soft-metal pipe.

If the interior of the wrought-iron pipe is tinned previous to the introduction of the soft-metal pipe, and after the operation is completed in other respects, the whole is exposed and slowly turned for a little time in a just sufficiently-high temperature, the pipes may be sweated together; but this operation adds obviously to the expense, and I do not esteem it ordinarily necessary. The intimacy of the contact induced by the passage of the plug M through the inner pipe is sufficient for all ordinary uses.

The lining-pipe made of my peculiar alloy is useful for some purposes alone without the iron support.

For some uses, and especially for use in surface-condensers, where the salt-water comes to the outside of the pipes, and the steam traverses the interior, I propose to reverse the arrangement of the soft metal relatively to the iron by putting the soft-metal pipe on the exterior of the iron, and forcing it into intimate contact with the iron by compressing-dies, or equivalent means, applied on the exterior.

For some purposes it may be desirable to apply a thin soft-metal pipe on the inside, and another on the outside of the iron pipe. I propose to use steel or semi-steel in some cases in place of the iron.

Fig. 6 shows the soft metal being forced into contact on the outside of the iron.

Fig. 7 shows the soft metal being forced into contact both on the outside and inside.

I claim as my invention—

1. The lining-pipe composed of tin and lead, in the proportions specified, in combination with an inclosing-pipe, A, forming a compound pipe, having the qualities herein set forth.

2. The soft-metal pipe composed of an alloy of tin and lead, in the proportions indicated, for the purposes set forth.

3. The recessed flange-piece *a* on the iron pipe A, in combination with a soft-metal lin-

ing-pipe, B, with its turned-out flange *b*, as and for the purposes specified.

In testimony whereof I have hereunto set my hand this 27th day of April, 1875, in the presence of two subscribing witnesses.

ERASTUS W. SMITH.

Witnesses:

WM. C. DEY,

M. A. VAN NAMEE.