2 Sheets—Sheet 1.

E. H. AUSTIN.
Mains and Pipes.

No. 209,104. Patented Oct. 22, 1878.

Fig.4.

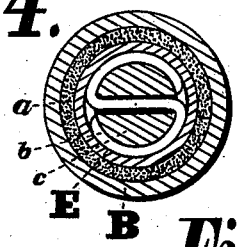


Fig.5.

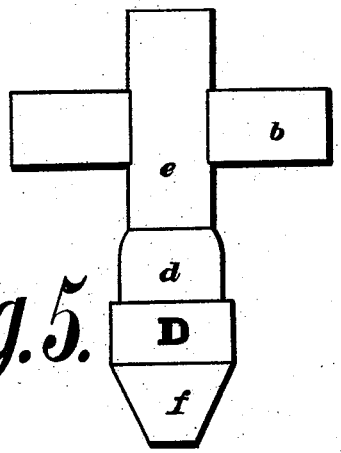


Fig.1.

Fig.2.

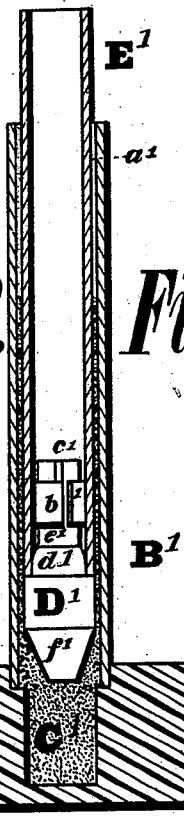
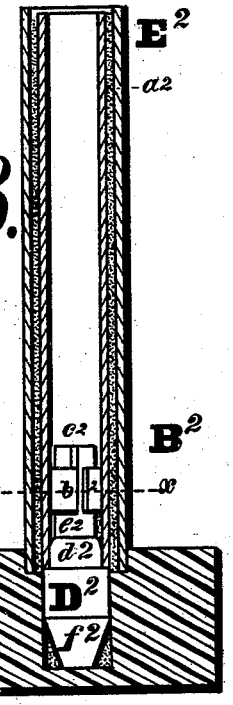


Fig.3.



WITNESSES

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INVENTOR

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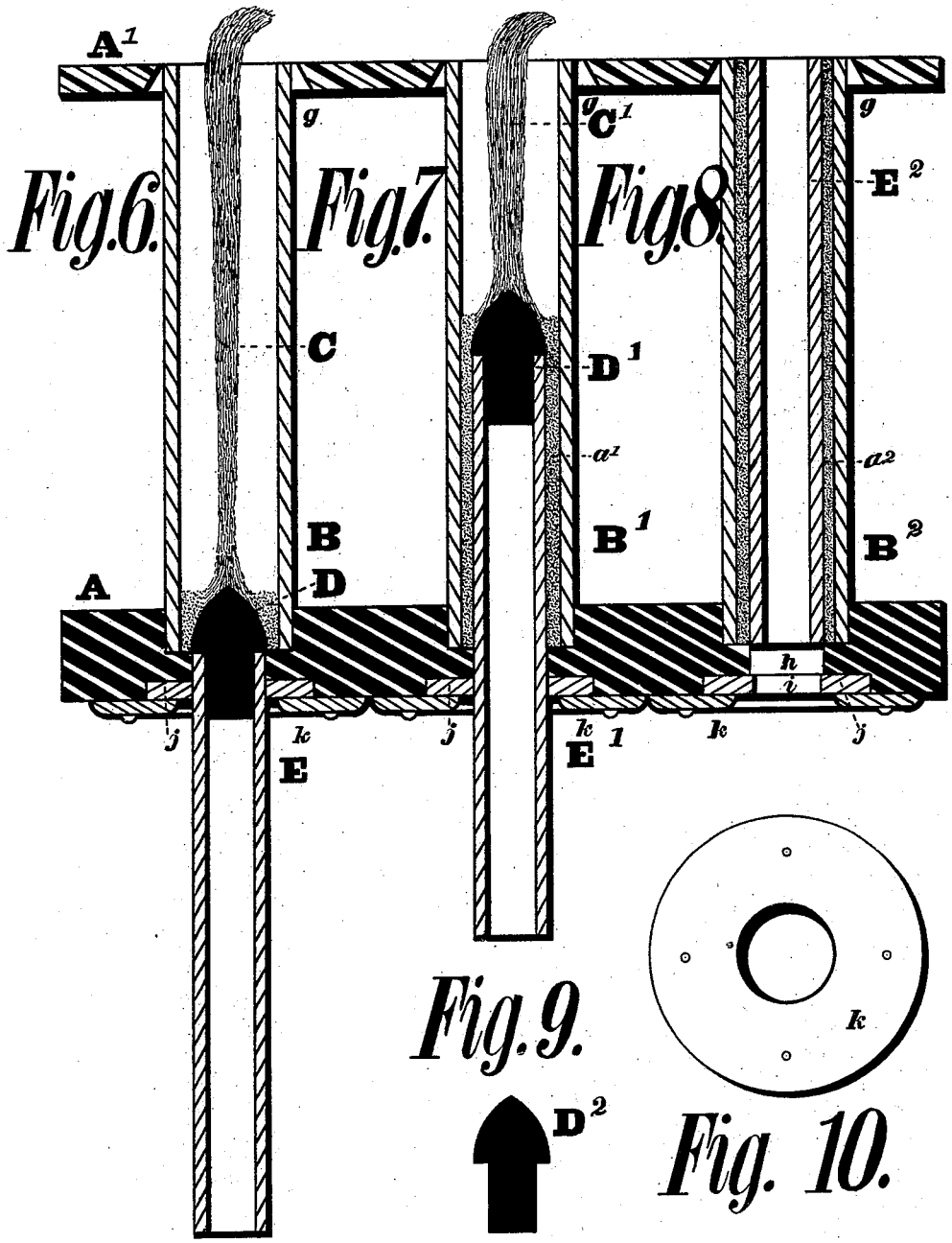

WITNESSES

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UNITED STATES PATENT OFFICE.

ELIJAH H. AUSTIN, OF NEW YORK, N. Y.

IMPROVEMENT IN MAINS AND PIPES.

Specification forming part of Letters Patent No. **209,104**, dated October 22, 1878; application filed June 12, 1878.

To all whom it may concern:

Be it known that I, ELIJAH H. AUSTIN, of the city, county, and State of New York, have invented a new and useful improvement in the process of filling a space formed between external and internal pipes; and I do hereby declare the following specification to be a clear, full, and exact description of the same, reference being had to the accompanying drawings.

The object of this invention is to obtain a practical method of filling the space formed between the exterior of an inclosed pipe and the interior of an inclosing pipe when said space is of sufficient capacity to admit of a substance for filling the same.

Figure 1 represents a vertical section of my invention with an internal pipe projecting from an external pipe, while the lower end of the external pipe is filled with a fluid or plastic substance. Fig. 2 is a vertical section of Fig. 1, showing the internal pipe as being forced down into the fluid or plastic substance, while said substance has advanced upward between the outer and inner pipe. Fig. 3 is a vertical section of the preceding views, showing the internal pipe within the external pipe and the space between the pipes filled with some plastic or fluid substance. Fig. 4 is a cross-section of Fig. 3, cutting through on the dotted line. Fig. 5 is an enlarged view of a combined stopper and plunger to be inserted into the end of the internal pipe for the purpose of keeping the filling material from entering therein and for dividing said material on its passage through the same. Figs. 6, 7, 8, 9, and 10 are views showing how the space between the internal and external pipe can be filled with an elastic, plastic, granular, or fluid substance, by forcing the internal pipe upward through the embedding material.

Like letters designate corresponding parts in all of the figures.

In Figs. 1, 2, and 3, B B^1 B^2 represent three pipes standing in a base-block, A. C C′ represent the substance to be forced into the space *a* a^1, between the internal pipe E and external pipe B. D D^1 D^2 is a stopper within pipe E, *d* being the part which fits closely to said pipe, while *e* is enough smaller to receive an elastic band, which forms a tight joint between said stopper and pipe E, *c* being a slot within said stopper to receive said band.

In Figs. 6, 7, and 8, A represents a base, on which the pipe B rests, while A′ is a guide for holding the upper end of said pipe in position while the process of filling is being conducted. C C′ represent a stream of the space-filling material being poured into the external pipes, through which the internal pipes E E^1 are being forced upward.

In Fig. 8, pipe E^2 is represented as forced into its proper position, and the space a^2 filled with suitable materials for the purpose for which a combination-pipe may be employed.

j is an elastic packing-ring, with its internal diameter less than the outer diameter of the internal pipe, E, as shown at *i* in Fig. 8. This packing is for the purpose of fitting tightly to the internal pipe, whereby a tight joint is formed.

K is a ring or collar secured to base A, and with an internal diameter less than the external diameter of the packing-ring, whereby said packing-ring is kept securely in its place, Fig. 10 being a plan view of said ring.

In Fig. 9, D^2 represents a stopper and plunger to be inserted into the ends of the internal pipes, whereby the space-filling material is excluded from the pipe and is caused to be compacted tightly in the space formed between the outer and inner pipes, as shown in Fig. 8.

The arrangements of the parts to carry out my process should be substantially as follows:

I provide a block of suitable material and form recesses or other suitably-formed hole or holes therein. Said recesses should correspond respectively to the external diameters of the two pipes B and E. The recess equal to the diameter of pipe E extends beyond the recess which is equal to the diameter B. I then place the external pipe in its recess and keep it in a perpendicular position by a suitable device. I now place stopper D in the pipe E, and then prepare the fluid or plastic substance to be employed.

If calcined gypsum is the material to be used, I mix it as thick as can be poured, and then fill pipe B about two-fifths full, after which the pipe E is inserted, plunger end D

downward, and forced toward the bottom until its top end is even with or about one-sixteenth of an inch below the upper end of the outer pipe, after which the upper end of the tube or pipe E is adjusted centrally within the external pipe, and kept in said position until the filling substance hardens, thereby obtaining a uniform filling in space *a*. The pipe is now removed from block A and the plunger taken out, and enough of the filling removed from the ends of the pipe to form a space to admit of water-proof packing. The pipe is now placed where the moisture can be evaporated from the filling, after which the said space between the pipes at the ends thereof is ready to be packed with hydraulic cement, paraffine, or any other suitable material.

The holes in block A should pass through said block, and be closed by a removable plug, which can be removed for the purpose of cleaning off the material which will adhere to the sides of the hole.

The stopper and plunger may be made of wood and in the form shown in the figures, *f* being the conical plunger end formed on the cylinder D, while the diameter of said cylinder should be equal to the outer diameter of the internal pipe, while *d* should fit within the interior of said pipe or tube, thus forming a shoulder on said plunger, and against which the internal pipe is forced in its downward passage.

The upper end of the stopper *e* is of less diameter than *d*, for the purpose of allowing an elastic band or other suitable material to be interposed between said stopper and pipe or tube. The device shown in the drawings consists of an elastic band, preferably of rubber. Said band is inserted in slot *c* in said stopper, and is of sufficient length to inclose the circumference of the same, so that when said stopper and elastic is inserted into the end of pipe E a tight joint is formed, which prevents the filling material from rising in the tube while said tube is being forced downward. This stoppered plunger may also be made of an elastic substance, and in one piece, as shown in Fig. 9, although if the end which comes in contact with the substance through which it is forced should be found to yield too much to the pressure, a plunger made from a hard material, such as wood, can be employed, and the stopper end thereof can be made small enough to admit a section of rubber tube thereon, while the diameter of said rubber tube should fit closely to the interior of the internal pipe.

A plunger of the nature above described should always be used whenever the internal pipe is composed of a substance liable to break; but whenever said pipe is composed of a substance which is not liable to break, said stoppered plunger can be made of a more unyielding material, as circumstances dictate.

In sectional view, Fig. 1, the external pipe is shown to be partly filled with filling material and the conical plunger resting thereon and ready to be forced down by a pressure applied to the internal tube, E. Now, as this pipe descends, a displacement of the material occurs, and it is caused to rise and fill space *a*, as will be seen in Figs. 2 and 3. When said space is filled by the process herein specified, a more compact filling is obtained than is possible by any other method within so limited a space as circumstances require in the manufacture and use of a metallic, vitreous, mineral, or other lined pipe for hydraulic, fluid, pneumatic, chemical, electrical, or other purposes.

One advantage derived from my process of filling the space is that no air can get mixed with the material and form air-holes therein, as occurs when the space is filled by pouring the filling in between the outer and inner pipes. When the filling is composed of calcined plaster, it is not absolutely necessary that the tube E should be employed while filling space *a*, for a smooth rod, well oiled, the size of the internal pipe, can be used as a substitute while filling said space, and when said filling is set said rod can be withdrawn and tube E subsequently inserted. Also, the withdrawing of the rod allows the moisture of the filling to evaporate with greater rapidity, on account of the enlarged area exposed to the air, than can be done from the area of the filling on each end of the pipe.

What I claim, and desire to secure by Letters Patent, is—

1. The process of filling a space formed by and between an internal and external pipe, by partly filling the external pipe with a substance for filling said space and then forcing said substance into said space by means of an internal pipe or rod, for the purpose specified.

2. The conical plunger and stopper D and its packing *b*, in combination with tube E, filling C, and pipe B, for the purpose specified.

ELIJAH H. AUSTIN.

Witnesses:
LOUIS E. G. RADDE,
F. W. BLECKWENN.