R. G. HATFIELD.

Speaking Tube.

No. 21,071. Patented Aug. 3, 1858.

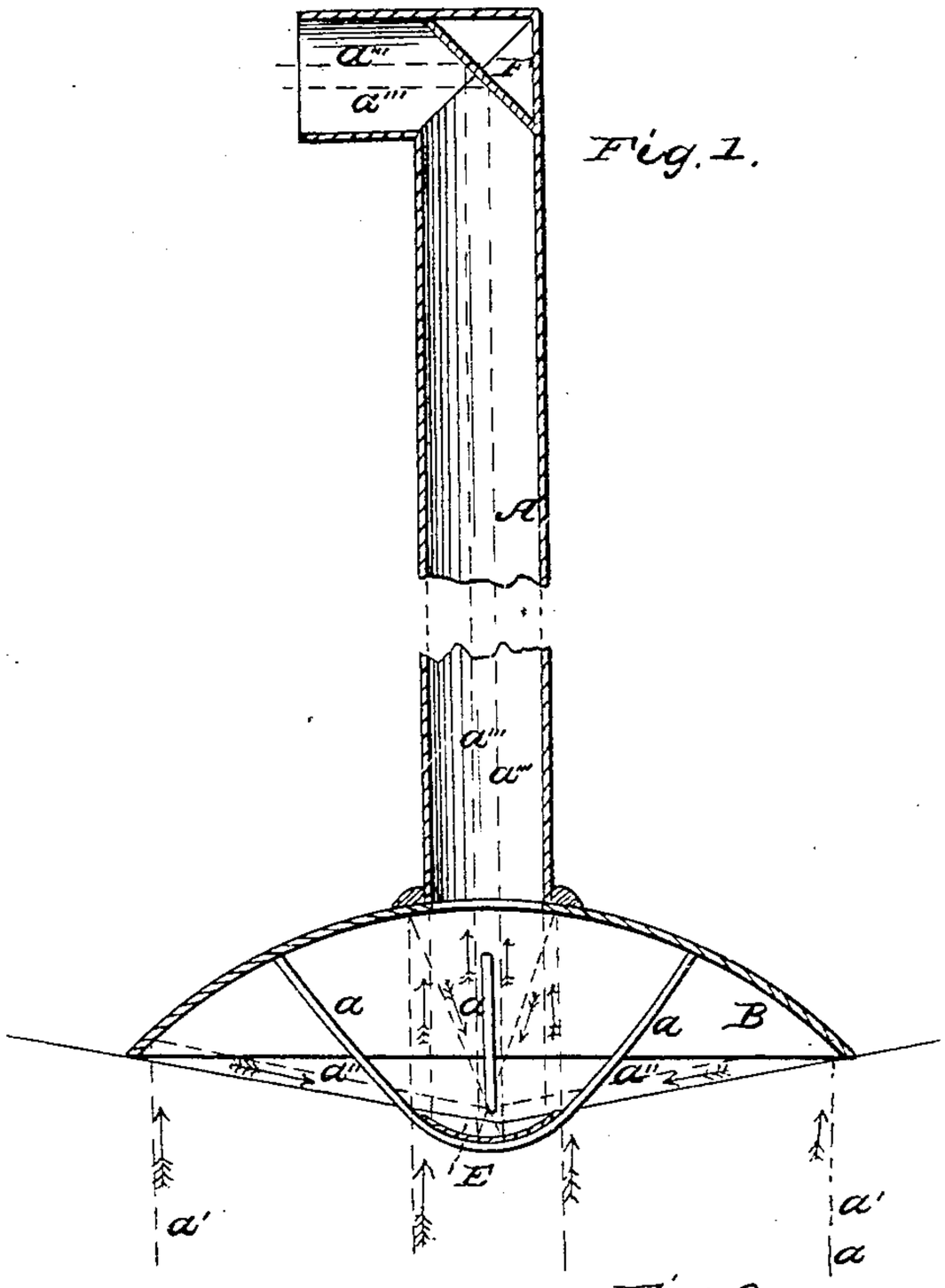
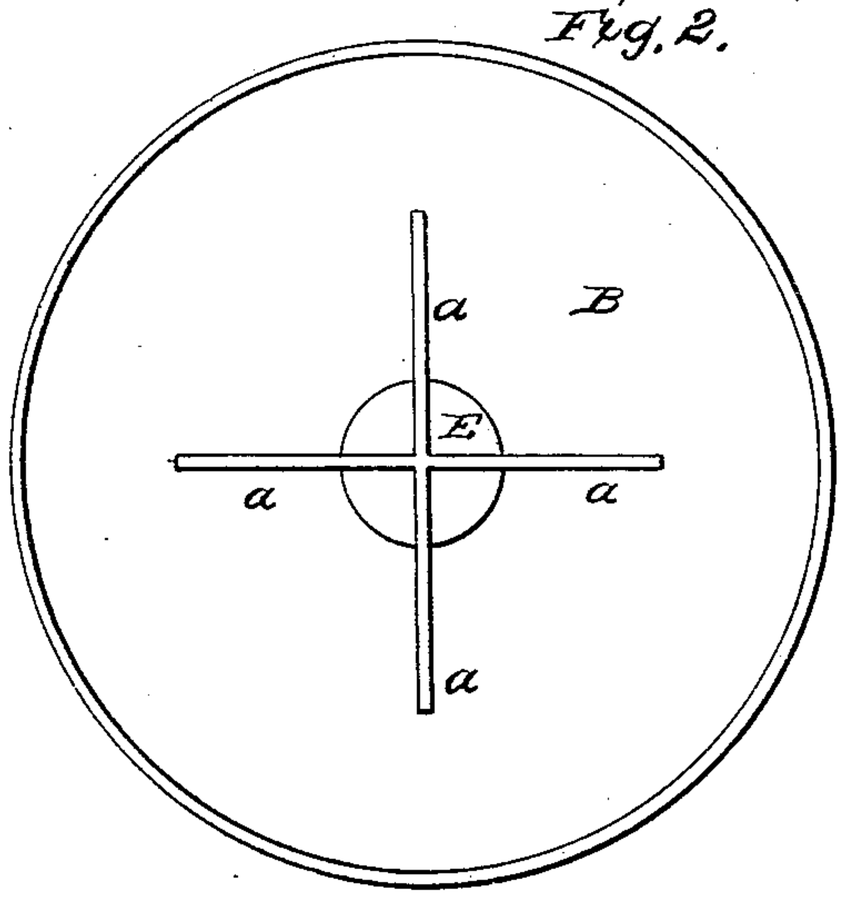


Fig. 1.

Fig. 2.



UNITED STATES PATENT OFFICE.

R. G. HATFIELD, OF MOUNT VERNON, NEW YORK.

TUBE FOR CONVEYANCE OF SOUND.

Specification of Letters Patent No. 21,071, dated August 3, 1858.

To all whom it may concern:

Be it known that I, R. G. HATFIELD, architect, of Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Tubes for Conveying Sound; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal section of a tube constructed according to my invention. Fig. 2 is a face view of the mouth of the tube.

Similar letters of reference denote like parts in both figures.

The object of this invention is to collect an adequate volume of sound at distances from a tube and reflect the same through the tube in parallel lines of vibration, provision being made for properly reflecting the sound at the angles of the tube should any be required. This object being attained, sound may be transmitted through tubes much more audibly than by those of usual construction, as the lines of vibration are not as heretofore arrested in their progress and neutralized by reflection in consequence of their zig-zag passage through the tube.

The invention consists in the peculiar means employed for attaining the object aforesaid as hereinafter fully shown and described.

To enable others skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents a tube which may be constructed of sheet metal or any other suitable material, and of any proper dimensions.

B is the mouth of the tube which is of very flaring shape and of any suitable diameter; this mouth may be paraboloidal or an approximate form, so as to collect or receive an adequate volume of sound; and reflect the same against a concave surface E, which may be termed an auxiliary reflector. The reflector E may correspond in form to the mouth B, but is quite small in diameter compared with the mouth; the former not much exceeding the diameter of the tube A.

In Fig. 1, the mouth B, and reflector E, are paraboloids; the reflector E being in line with the tube A, at or near the focus of the mouth B, and supported by rods *a*, which are attached to the mouth.

Sound, which is shown in Fig. 1 by parallel lines of vibration passing in the direction indicated by the arrows, will, as it strikes the concave surface of the mouth B, be reflected therefrom against the reflector E, which in turn reflects the lines of vibration directly into the tube. This reflection of the sound is due to the form of the mouth and reflector, it being a feature peculiar to the paraboloid, of reflecting sounds, heat and light emanating at its focus in parallel rays or lines; and consequently, in my improvement this law or peculiarity is taken advantage of, in being used inversely by collecting a volume of sound by the mouth B, and throwing the same from the focus by an auxiliary reflector E into the tube A.

From the above description it will be seen that the sound is projected in parallel lines through the tube, and consequently will be transmitted in the most audible manner, as the several vibratory lines, being projected parallelly, do not conflict with each other are not absorbed, nor neutralized in consequence of being reflected from side to side of the tube, as has hitherto been the case, in consequence of tubes receiving the sound in all directions.

In case the tube A requires to be bent and elbows *b*, provided, a plate F is inserted in each elbow in such position as to reflect the lines of sound parallelly along the tube.

I would remark that this improvement although applicable to all tubes for conveying sound, is more especially designed for speaking tubes for dwellings and public buildings, and also for conveying sound from one apartment to another in cases where the mouth is not directly applied to the end of the tube. It will prove valuable for jails; as sound may be transmitted from the cells or rather from the compartment in which the cells are built to the keeper's room, and in case of any effort being made on the part of a prisoner, in the way of filing, sawing, etc., to effect his escape, the sound would be at once conveyed to the keeper's room.

The ellipsoidal form for the mouth B, would be preferable in some cases, as in speaking tubes for buildings, where the mouth of the person speaking is required to be near the pipe. In this latter case the mouth of the person would be at one focus of the ellipsoid, while the supplemental reflector E must have its focus coincident with the other focus.

I am aware that implements such as speaking trumpets and musical wind instruments have been provided with flaring mouths or ends for the purpose of projecting the vibratory lines of sound parallelly and the paraboloid and approximate forms have been given the mouths of such implements. I therefore do not claim, separately, the mouth B, for that has been previously used. But

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

1. The mouth B, in combination with the reflector E, the mouth and reflector being of paraboloidal or approximate form, and arranged relatively with each other so as to operate substantially as and for the purpose set forth.

2. I further claim the plate F, placed in the elbow *b*, as described, for the purpose specified, and also the combination of the mouth B, reflector E, and plate F, when arranged to act conjointly as described for the purpose set forth.

R. G. HATFIELD.

Witnesses:
W. Tusch,
W. Hauff.