(No Model.)

W. L. MERRIN.

ORGAN PIPE.

No. 347,363. Patented Aug. 17, 1886.

Fig: 1.

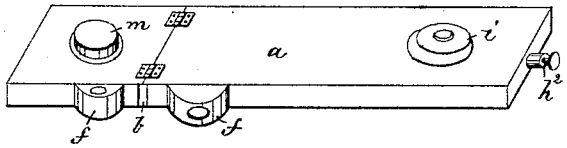


Fig: 2.

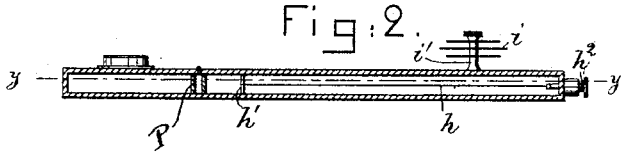


Fig: 3.

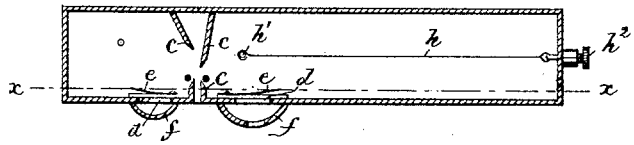
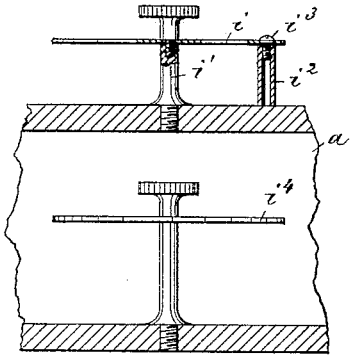


Fig: 4.



Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM L. MERRIN, OF FREDERICKTOWN, OHIO.

ORGAN-PIPE.

SPECIFICATION forming part of Letters Patent No. 347,363, dated August 17, 1886.

Application filed September 3, 1883. Serial No. 105,420. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. MERRIN, of Fredericktown, county of Knox, State of Ohio, have invented an Improvement in Musical Instruments, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relating to musical instruments is shown embodied in an organ-pipe resembling in general construction the one described in Letters Patent No. 265,973, granted to me October 17, 1882. In the said patent an organ-pipe or wind-instrument was shown consisting of a chamber having broad flat sides which were themselves thrown into vibration by the inclosed mass of air, they operating somewhat like the sounding-board of a stringed instrument to re-enforce the sound produced by the said vibrating mass of air. The air-current entered at one edge and passed out at the opposite edge of the chamber. The present invention has for its object to modify the sound produced by a musical instrument, in some instances re-enforcing or strengthening the sound, and in other cases modifying its quality by re-enforcing or weakening some of the over-tones upon which the quality of the main sound or fundamental tone depends.

The invention consists partly in a novel construction of the prime sound-producing instrument or organ-pipe, and also in the combination of the primary sound-producing instrument or vibrator, with a sound-modifying device itself set in vibration by the main or primary instrument and operating to modify the sound produced thereby.

The main or primary sound-producing device consists in this instance of a wind-instrument composed, mainly, of a chamber having two sides of large area and provided with internal lips and posts for producing the vibration and modifying the tone, as described in my former patent, and the secondary or modifying vibrators consist of diaphragms, plates, and strings, all of which may be combined in a single instrument to produce the particular pitch, volume, and quality of sound desired.

Figure 1 is a perspective view of a musical or sound-producing instrument embodying this invention; Fig. 2, a longitudinal vertical section thereof on line x x, Fig. 3; Fig. 3, a longitudinal horizontal section thereof on line y y, Fig. 2, and Fig. 4 an enlarged detail thereof.

The main or primary sound-producing instrument consists in this instance of a chamber, a, having thin sides of considerable area adapted to be set in vibration by the inclosed mass of air, substantially as described in my former patent referred to.

In the present invention the current of air by which the vibrations are produced enters the opening or mouth b in the edge of the chamber, and is acted upon by the internal lips, c, but instead of passing directly across the chamber and issuing at the opposite edge it escapes through one or more openings, d, in the same edge through which it entered, the said openings being shown as provided with reeds e, and the air-current escaping through pouches or small external chambers, f, which modify the character of the sound. The said primary sound-producing instrument is provided with one or more secondary vibrators, one of which is shown as a string, h, having one end attached to a post, h', connecting the sides of the chamber a, and the other end connected with a suitable straining device, h^2, by which it may be given the desired tension.

Another secondary vibrator consists of one or more thin plates, i, (shown in Fig. 2 as three in number,) they being connected with the chamber a by a suitable standard, i', so that the vibrations are transmitted to them positively from the walls of the said chamber. The effect of the said plate or plates i may be modified by a stop or damper preventing one point from vibrating, such a stop being shown in Fig. 4 as consisting of a tubular post, i^2, interposed between the plate i and the vibrating wall of the chamber a, the said post being moved about until the desired effect is produced on the plate, when it may be fastened by a screw, i^3, as shown in Fig. 4, where the apparatus is also shown as provided with a plate, i^4, contained within the chamber a. The chamber a is also provided with a diaphragm, m, intended to vibrate secondarily, so as to modify the resulting sound.

The chamber a is provided with posts p, connecting its opposite walls just at either side of the entering jet or current of air where they

produce a peculiar effect. The air or wind in passing through the inlet is formed into a jet or thin elastic strip of air, which is a true air-reed, and the object of the bars or posts is to modify the vibrating condition of this air-reed in such a way as to produce a clear and even tone. The jet of air as it leaves the aperture has considerable velocity, while farther off the motion becomes slower. A portion of air adjacent to this moving stream or jet is carried off by friction and consequently the surrounding air sets in to replace that portion which is being removed, flowing most strongly toward that part of the air-jet which has the greatest velocity. The bars or posts *p p*, if placed on either side of the jet and near it, will intercept and direct the inflowing air in such a way as to influence both the direct and the oscillatory movement of the jet, keeping its motion even and steady. The result is a clear smooth tone of lower pitch, when the jet-bars are properly placed.

As is well known, an ordinary musical sound is composed of a fundamental note having some definite rate of vibration and other secondary tones having other rates of vibration, and the quality or timbre of the sound depends on the secondary or over-tones. As a consequence, the quality may be varied by the secondary vibrators herein described, which may be properly tuned or conditioned to produce certain over-tones wanting in the sound produced by the primary vibrator, or to strengthen or oppose those that already exist in the primarily produced sound, thus giving it the desired quality.

In some cases all and in other cases only a portion of the various kinds of sound-modifiers or secondary vibrators will be required to produce the desired sound.

Musical instruments have been made containing, besides the main or primary vibrators, additional vibrators that are intended to strengthen the sound. Such additional vibrators are called into operation indirectly by the vibration of the air produced by the primary vibrator and respond but feebly to only a few tones.

In the present invention the secondary vibrator is connected directly with the primary vibrator, but not in such a manner as to interfere with or restrain the vibration of the latter, and when the primary vibrator is set in operation it positively operates upon the secondary vibrator, setting it also in vibration, whether the tones of the latter are or are not such as would be called into operation through the air vibrations on account of the proximity of the primary vibrators. By thus positively connecting the main with the secondary vibrator the latter may be caused to produce any desired tone or tones, which, in conjunction with the tones of the primary vibrator, will produce the quality of sound desired.

I claim—

1. A wind-instrument or organ-pipe composed of a flat chamber having inlet and outlet openings in one edge thereof, and provided with lips contained wholly within the said chamber, actuated by the current of air passing therethrough, substantially as described.

2. A wind-instrument composed of a chamber provided with internal lips, and having inlet and outlet openings for an air-current, combined with external chambers or pouches surrounding a portion of said openings, substantially as described.

3. A wind-instrument composed of a flat chamber with inlet and outlet openings and internal lips, combined with posts *p*, between the walls of the said chamber, located at either side of the inlet for the jet or current of air entering the chamber, substantially as described.

4. In a musical instrument, the combination, with an organ-pipe constituting a primary vibrator, of a secondary vibrator having a definite vibratory movement independent of that of the primary vibrator, and a support for the secondary vibrator connected with the primary vibrator without restraining the vibrating portion of the secondary vibrator, which is set in vibration by the primary vibrator without having the character of its vibration determined thereby, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM L. MERRIN.

Witnesses:
ZONA MERRIN,
PETER MENGERT.