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C. COOPER

WHISTLE

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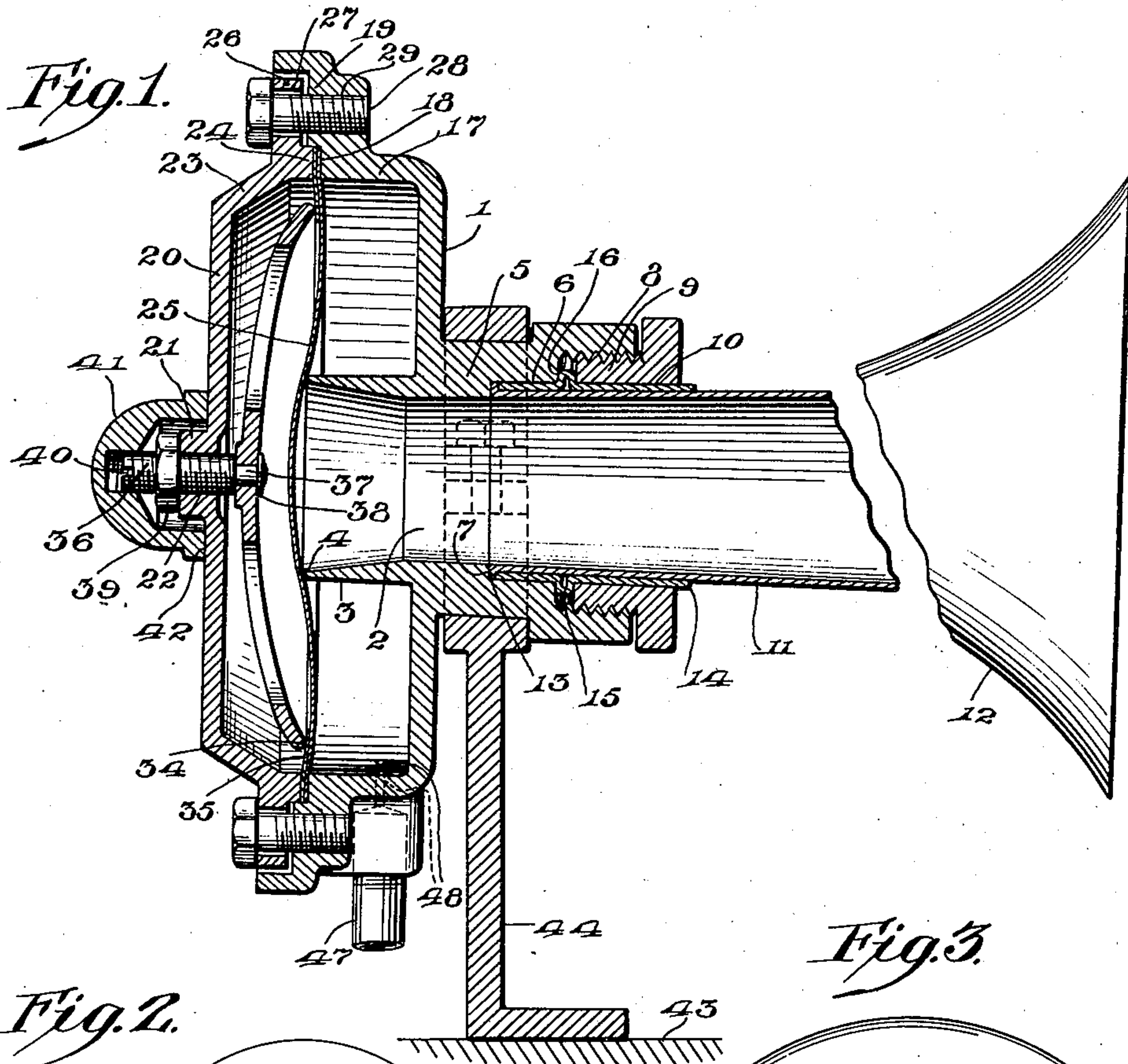


Fig. 2.

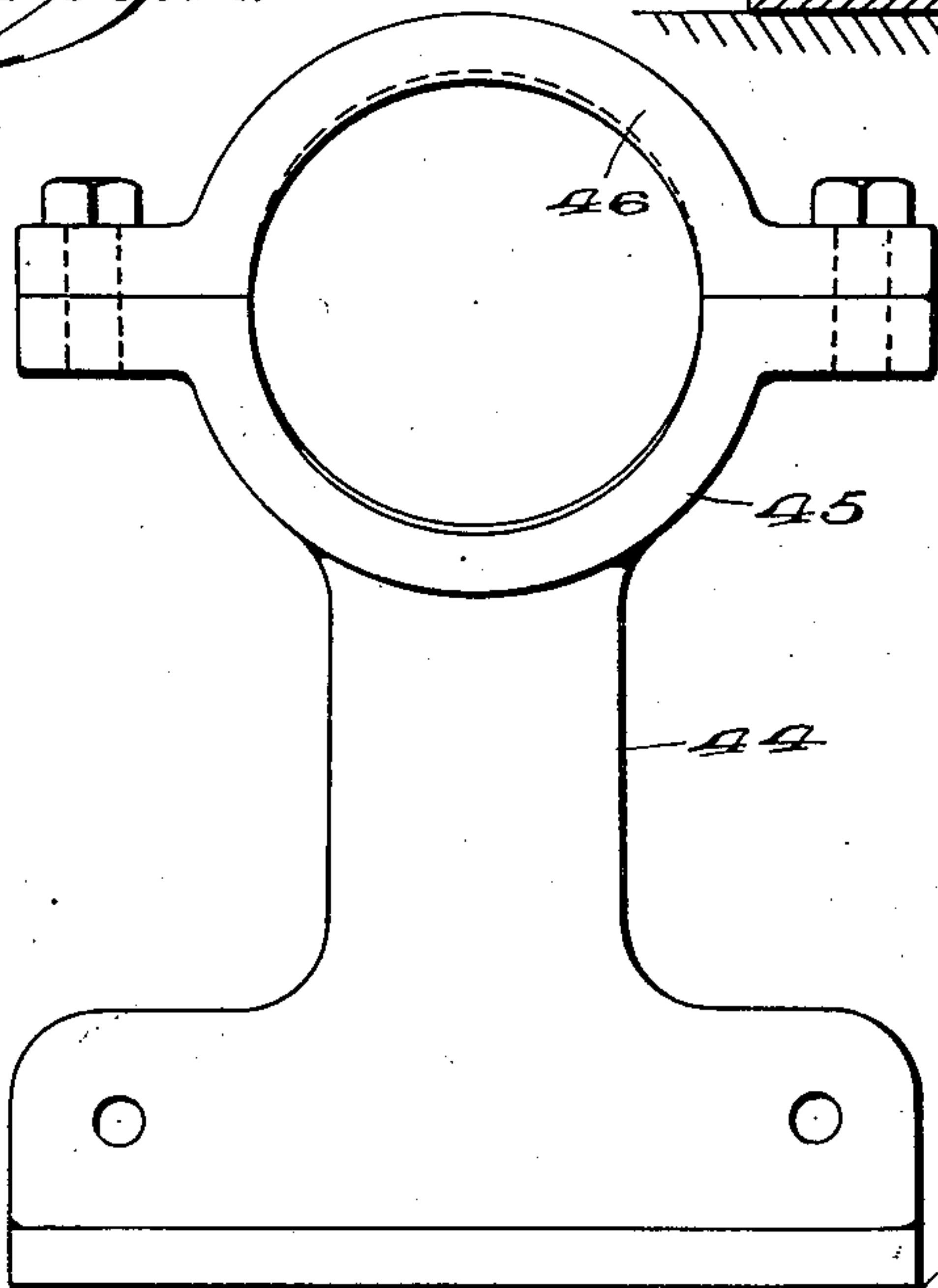
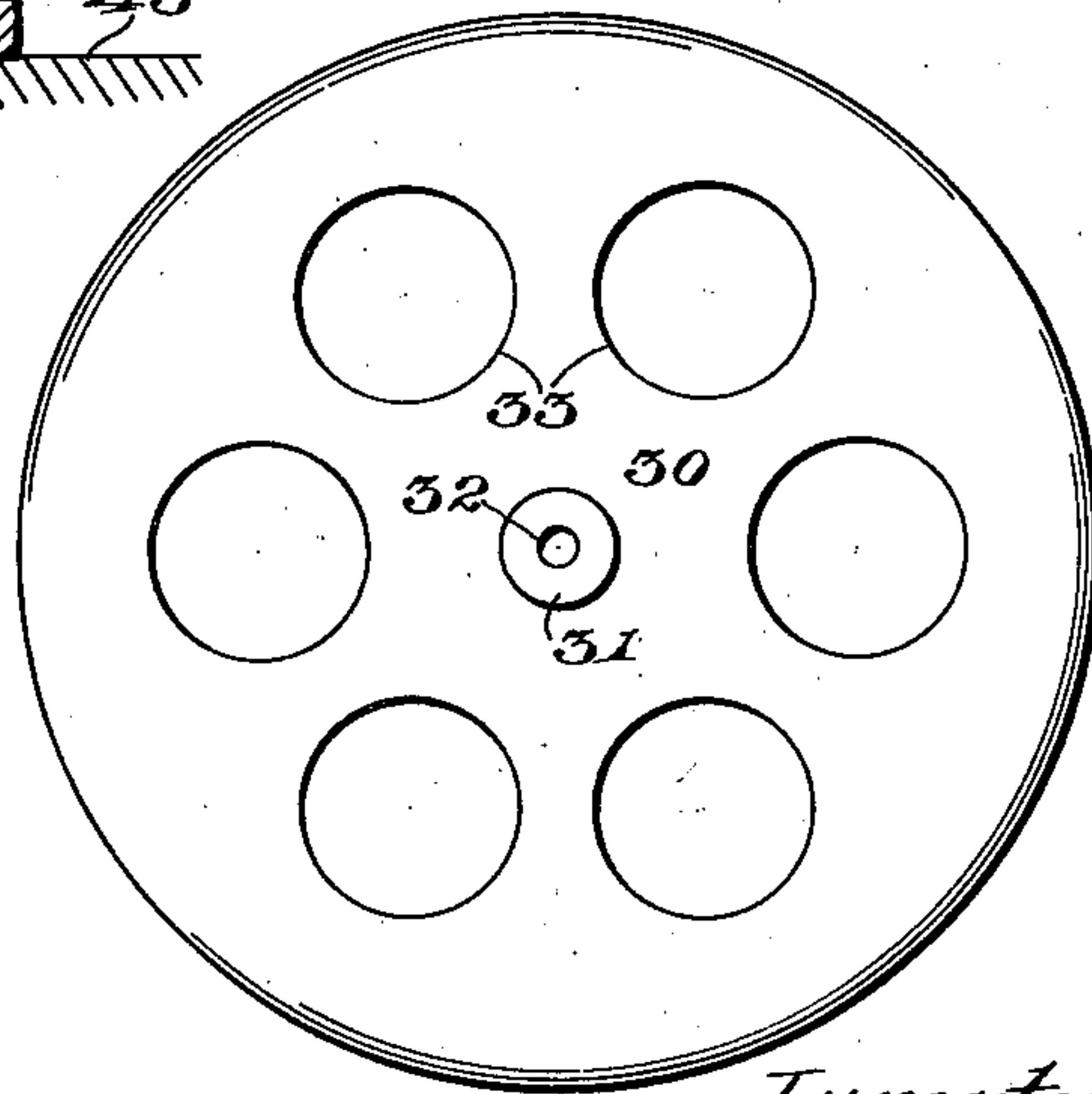


Fig. 3.



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WHISTLE.

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The object of the invention is to provide improvements in whistles, and particularly in pneumatically actuated whistles adapted for use upon railroad vehicles, steam and Diesel driven ships, boats, industrial plants, etc., where they are subjected to hard wear and tear through all sorts of weather conditions, from the sub-zero of winter to the intense heat of summer on the plains and across the deserts, and in service may be used substantially continuously for a long period or may be out of use for an equally long time, but regardless of what the demands upon it may be, it is essential that the whistle shall function uniformly wherever and whenever called upon to sound its particular note.

Another object therefore is to provide an improvement in the supporting of the vibratory diaphragm together with a more positive and permanent means for adjusting the tension upon said diaphragm than has heretofore been possible.

A further object is to combine these features in combination with a more perfect air-tight joint between the sound amplifying portions of the device.

Still another object has been to provide means in the form of a gasket or the like, adapted to minimize if not entirely prevent wear between the diaphragm-tensioning means and the diaphragm itself, and at the same time to advantageously effect the resulting sound by separating the diaphragm from metallic contact with its tensioning means, so that the characteristic sound of the whistle depends practically entirely upon the characteristics of the diaphragm uninfluenced by neighboring parts of the device, whereas if in metallic contact therewith would tend to impart their own characteristics to those of the diaphragm with detrimental tonal results.

And a still further object is to provide an arrangement comprising the improved whistle in combination with a bracket for supporting said whistle, and which maintains the latter in such a position that the accumulation of rain, snow and sleet therein is minimized, and is assisted in more freely flowing therefrom, than would be the case with the whistle and its horn or amplifier positioned horizontally as has been the custom.

With these objects in view the present in-

vention comprises further details of construction and operation which are fully brought out in the following description when read in conjunction with the accompanying drawings, in which Fig. 1 is a vertical diametrical section of one embodiment of the invention and having a horn or amplifying member operatively connected thereto and supported by a bracket; Fig. 2 is an elevational view of the bracket indicated in Fig. 1; and Fig. 3 is a plan view of the plate employed to impress upon the diaphragm a predetermined tension.

Referring to the drawings, a casing is provided, one portion of which comprises a plane wall 1, having a central outlet aperture 2, surrounded by a cylindrical flange 3 which extends into said casing and terminates in a relatively narrow edge 4, while in the opposite direction said aperture is surrounded by a cylindrical flange 5, provided with an enlarged bore 6, terminating inwardly in a shoulder 7, said enlarged bore in turn being still further enlarged and internally threaded at 8 and adapted to receive therein the externally threaded plug 9, which has an axial bore 10 of substantially the same diameter as the enlarged bore 6.

A horn or sound-amplifying member, preferably of metal, is shown as comprising a substantially tubular portion 11, terminating outwardly in a bell-shaped section 12 and inwardly terminating in an annular flange 13, while surrounding said tubular portion, adjacent to said last-named flange there is a sleeve 14, preferably sweated or otherwise unitarily secured to said horn, and provided intermediate of its ends with a transversely U-shaped, circumferentially extending flange 15, adapted to be squeezed tightly between the inner end of the plug 9 and the adjacent shoulder 16 formed at the intersection of the enlargement 6 of the bore of the flange 5, with the greater enlargement 8 of said flange.

This construction provides a most positive air-tight, non-vibratory joint or union between the horn and the casing.

The casing section 1 is provided radially outwardly with a cylindrical flange 17, providing a shoulder 18, surrounded by a further longitudinally extending flange 19. A second casing section comprises a substantially plane wall 20 provided centrally with a boss 21, having a threaded bore 22 pro-

vided radially outwardly with a conical flange 23 which terminates in a cylindrical flange 24, normally cooperating with the shoulder 18 to firmly position between them the marginal portion of a relatively thin, preferably metallic diaphragm 25 and also provided with a radially extending flange 26, provided with enlarged apertures 27 through which extend, loosely, bolts 28, which at their smaller ends are in threaded engagement with corresponding apertures 29 in the flange 19 of the first section of said casing.

Within the last-named casing section is a plate, shown in detail in Fig. 3, and which preferably comprises a central concavo-convex central portion 30, having a central boss 31 provided with an aperture 32, and said section being provided with any desired number of spaced apertures 33 and terminating radially outwardly in a circular edge portion 34, preferably rounded in cross section, and adapted to cooperate with said diaphragm between its peripheral support and the outlet flange 4 through the medium of a preferably fibrous gasket 35, which is secured with the marginal edge portion of said diaphragm between the adjacent portions of said casing sections. A threaded pin 36 extends adjustably through the correspondingly threaded bore 32 in the boss 31 of the second casing section and is provided with a reduced portion 37 which extends through the aperture 32 in the center of the plate 30 and in turn is provided with a washer 38 or other suitable means to maintain a permanent union between said pin and said plate. Upon its outer end, said pin is provided with a lock nut 39 and may also have a screwdriver-engaging slot 40, while removably secured to the outer free end portion of said pin is a protective cap 41 of any suitable shape, but at its inner end 42 cooperating uniformly with the outer surface of the second casing section in order to provide a housing for said adjusting pin and lock nut.

It will also be noted that in order to operatively mount this device upon a vehicle (represented by the base line 43), a bracket is provided which comprises a standard 44, having a bifurcated head 45, adapted to receive the central portion of the flange 5 of said first casing section which is secured in position by means of a yoke 46, attached to said bifurcated head, the receptacle provided by said head and yoke in combination being cylindrical and having an axis disposed at less than a right angle with the standard 44 of said bracket or in any other way which results in said axis slanting at an angle with the horizon for the purpose of minimizing the amount of snow, rain and sleet which will enter the horn 11—12 and particularly for facilitating the rapidity

with which water therein will be drained therefrom without removing the device from the vehicle.

In the operation of this device, the parts are assembled substantially as shown in Fig. 1 with the central portion of the diaphragm 25 bearing uniformly against the edge portion of the flange 3 through the circumferential extent of the latter. The cap 41 being removed from threaded engagement with the outer free end of the pin 36 and the lock nut 39 loosened, said pin is rotated in any suitable manner, as for instance by engagement with a screwdriver or the like in the slot 40, until the circumferential edge portion of the plate 30 bears indirectly against the diaphragm through the medium of the interposed annular gasket 35, and thereby places upon said diaphragm the proper tension to cause the same to produce the desired tone or musical note when air under pressure is forced into said casing through a suitable pipe connection 47 by way of a greatly decreased channel and aperture 48, air entering through said aperture increasing the pressure within said first casing section until the central portion of the diaphragm is raised from its seat and permits the excess air pressure to pass thereby and outwardly through the horn 11, after which the sound is amplified by the bell portion 12 of said horn.

The tension upon the diaphragm obviously causes the latter to become receded immediately upon the excess pressure in the casing being expended, but as the pressure thereupon immediately builds up again, the diaphragm is raised from its seat and a second pulsation forced outwardly through the horn. The rapidity of vibration of the diaphragm measuring vibrations per second increases in proportion to the tension placed upon the diaphragm by the rigid plate 30 adjustably positioned by means of the pin 36.

The proper adjustment is maintained by again tightening the lock nut 39 after which the cap 41 may be restored to its normal position as shown, and it is to be noted that by providing the plate 30 with a series of apertures 33 the vibration of the diaphragm is not retarded or damped to the extent that it would be were an imperforate plate employed, since the compression of the air to the left of the diaphragm as viewed in Fig. 1 is equally distributed throughout the entire area of the second casing section 20—21, instead of merely between the diaphragm and tensioning plate as would otherwise be the case.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. A whistle, comprising a casing, a diaphragm supported at its periphery by said

casing, a concave member normally bearing against said diaphragm adjacent to said periphery, an adjusting pin rotatably connected to said member, and means adjustably connecting said pin to said casing to positively adjust the position of said member with respect to said casing, to maintain a predetermined tension upon said diaphragm.

2. A whistle, comprising a casing, a diaphragm supported at its periphery by said casing, a concave member normally bearing against said diaphragm adjacent to said periphery, an adjusting pin rotatably connected to said member, means adjustably connecting said pin to said casing to positively adjust the position of said member with respect to said casing, to maintain a predetermined tension upon said diaphragm, and a gasket so positioned and operative to prevent direct contact between said diaphragm and said tensioning member.

3. A whistle, comprising a casing, a diaphragm supported at its periphery by said casing, a concave member normally bearing against said diaphragm adjacent to said periphery, an adjusting pin rotatably connected to said member, means adjustably connecting said pin to said casing to positively adjust the position of said member with respect to said casing, to maintain a predetermined tension upon said diaphragm, and a gasket so positioned and operative to prevent direct contact between said diaphragm and said tensioning member, said gasket being secured at its marginal portion between said diaphragm and said casing.

4. A whistle, comprising a two-piece casing, one of which has an annular shoulder surrounded by a flange and the other of which has an annular flange in uniform relation with said shoulder within said first flange, a diaphragm having its periphery supported between said shoulder and cooperating second flange, said casing having an outlet surrounded by a flange normally bearing against the central region of said diaphragm, and a plate having air-equalizing passageways and cooperating in such manner with said diaphragm between the margin and the central region of the latter to press

said diaphragm positively against said outlet flange.

5. A whistle, comprising a two-piece casing, one of which has an annular shoulder surrounded by a flange and the other of which has an annular flange in uniform relation with said shoulder within said first flange, a diaphragm having its periphery supported between said shoulder and cooperating second flange, said casing having an outlet surrounded by a flange normally bearing against the central region of said diaphragm, a plate having air-equalizing passageways and cooperating in such manner with said diaphragm between the margin and the central region of the latter to press said diaphragm positively against said outlet flange, and a gasket secured at its outer margin between said diaphragm and second flange and extending radially inwardly between and separating said diaphragm from direct contact with said plate.

6. A whistle, comprising a two-piece casing, one of which has an annular shoulder surrounded by a flange and the other of which has an annular flange in uniform relation with said shoulder within said first flange, a diaphragm having its periphery supported between said shoulder and cooperating second flange, said casing having an outlet surrounded by a flange normally bearing against the central region of said diaphragm, a plate having air-equalizing passageways and cooperating in such manner with said diaphragm between the margin and the central region of the latter to press said diaphragm positively against said outlet flange, a gasket secured at its outer margin between said diaphragm and second flange and extending radially inwardly between and separating said diaphragm from direct contact with said plate, and a threaded pin rotatably secured to said plate and adjustable with respect to said casing to provide an adjustable positive tension upon said diaphragm.

In testimony whereof I have affixed my signature.

CLARK COOPER.