

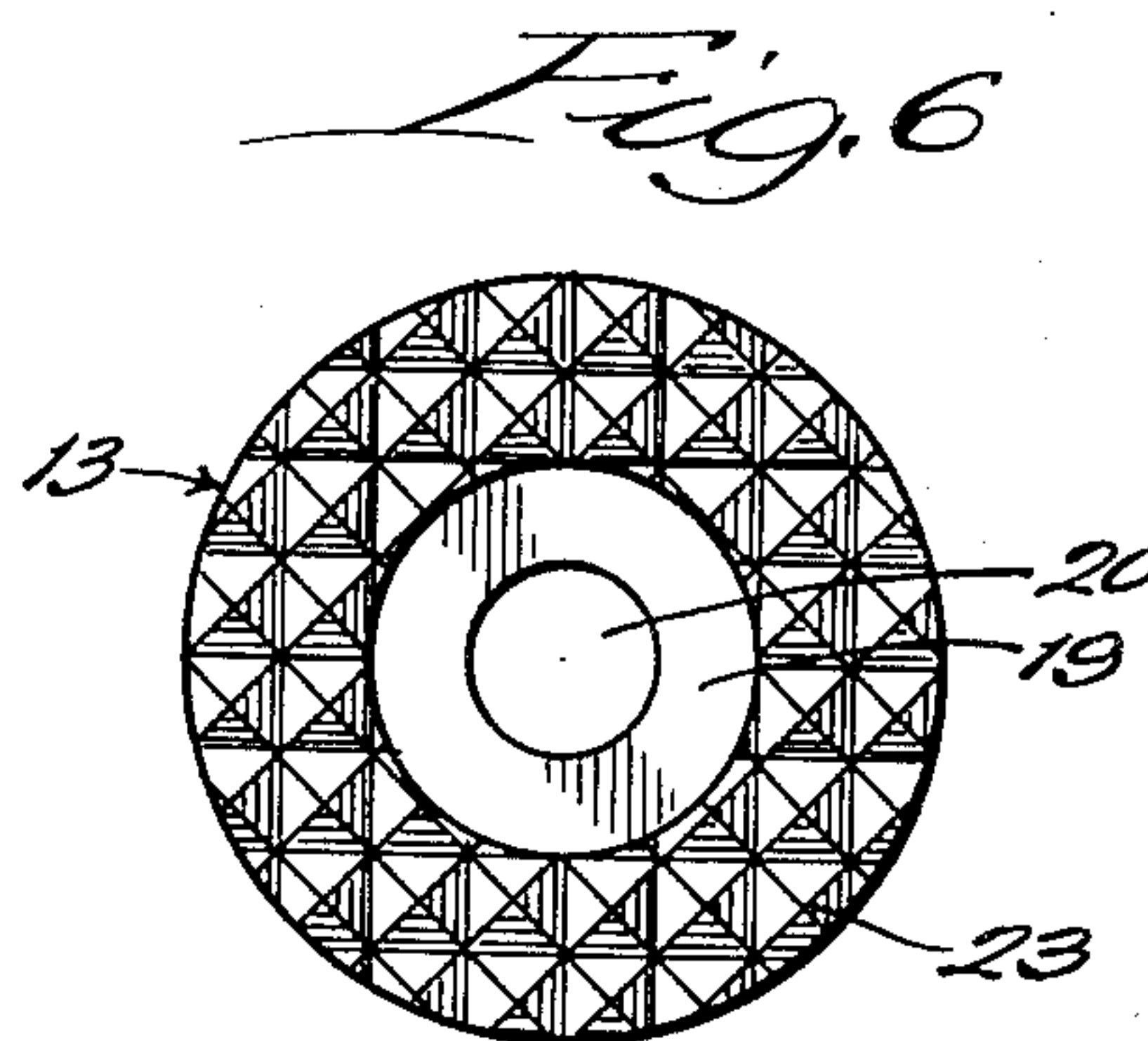
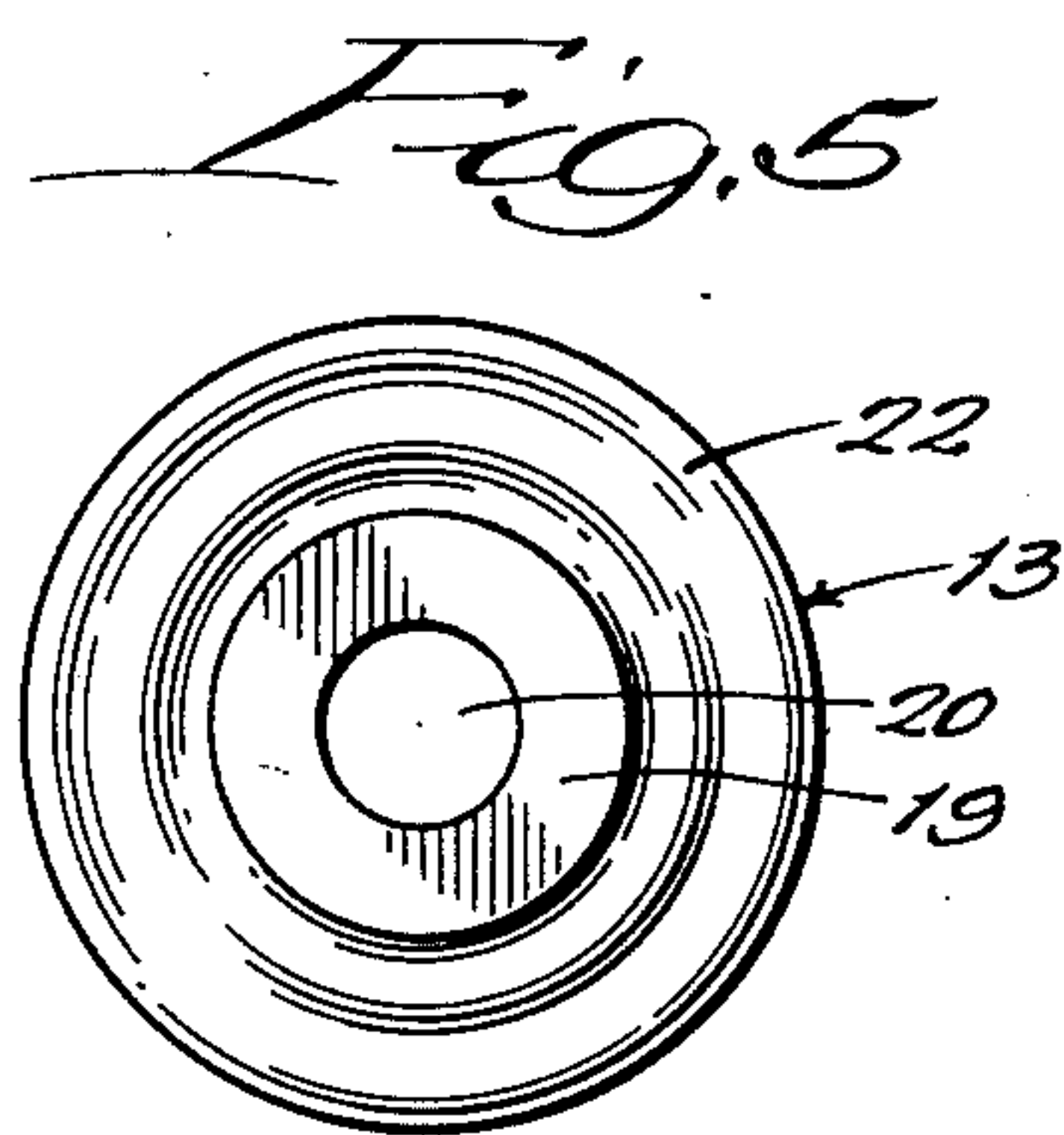
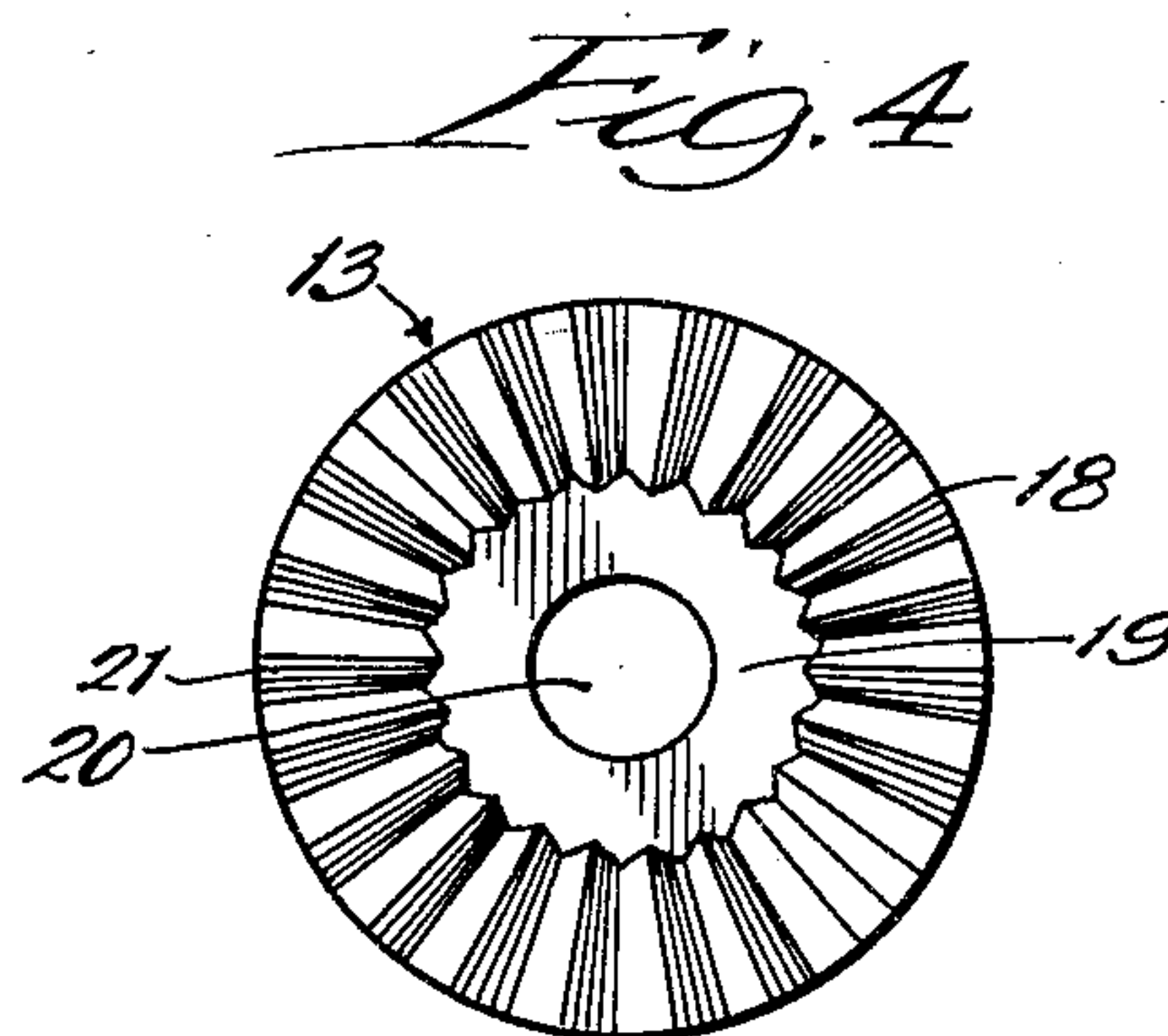
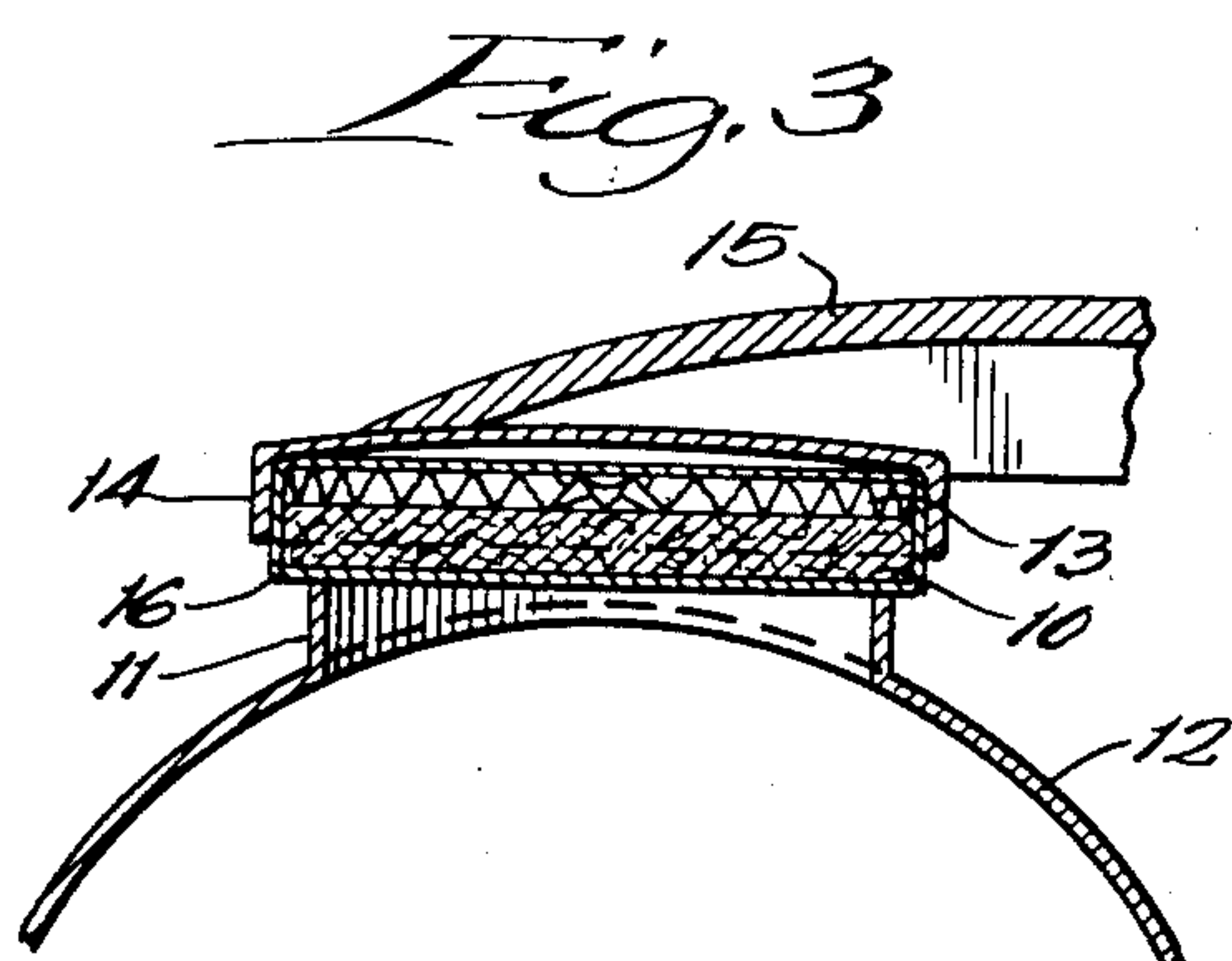
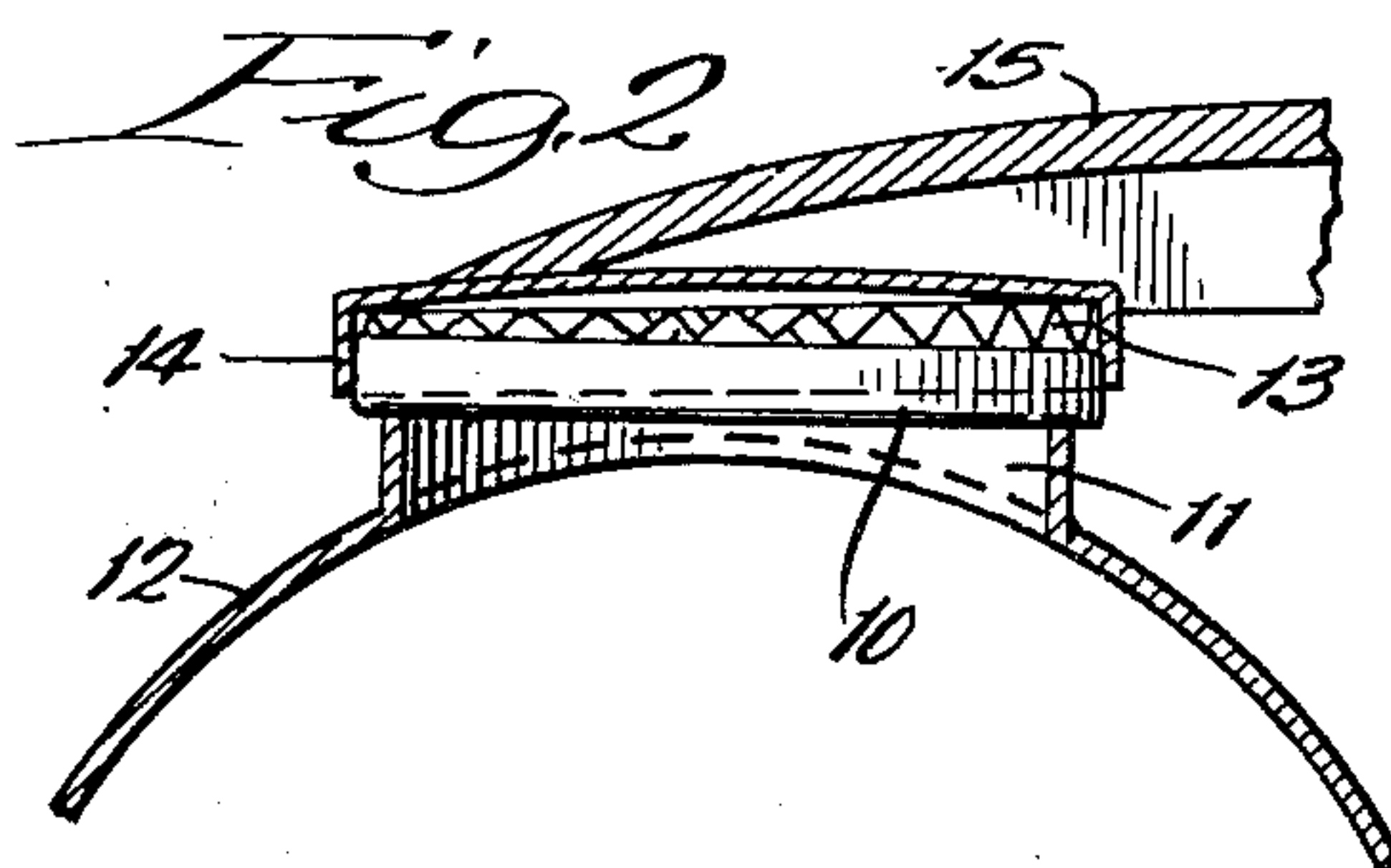
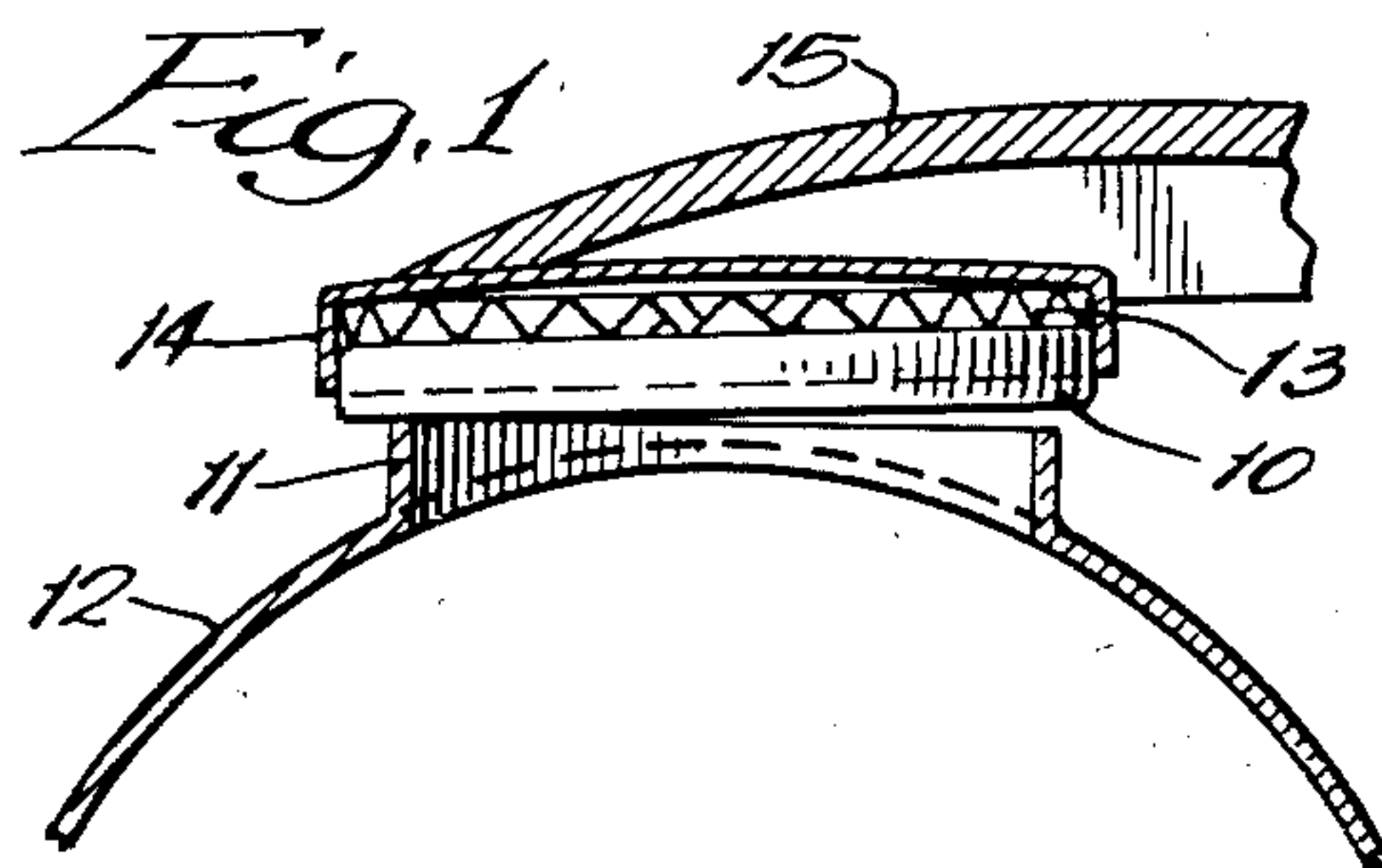
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2,540,760

KEY PAD FOR WIND INSTRUMENTS

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## UNITED STATES PATENT OFFICE

2,540,760

## KEY PAD FOR WIND INSTRUMENTS

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4 Claims. (Cl. 84—380)

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This invention relates to keys for use with wind instruments, such as flutes, clarinets, saxophones, piccolos, oboes, and the like, and it relates particularly to keys having a key pad by which a tone hole socket of a wind instrument is opened or closed while the instrument is being played.

The musical note produced by a wind instrument of the type described is varied by opening or closing one or more or combinations of a plurality of tone-hole sockets. Opening and closing movements are imparted to the key pad by suitable rocker arms which may be manually operated or operated by mechanical means, and together with the pad they form the keys. Pads ordinarily are dimensioned to fit over the respective tone-hole socket in sealing relation, and they are selected of materials which are relatively rigid or inflexible to resist wear and excessive deformation.

Not infrequently, a key is poorly aligned in assembly or its adjustment may be undesirably altered in use. When this occurs, the pad fails properly to seat on the tone-hole socket with the result that air leaks are produced. Obviously such air leaks render the instrument out of tune when certain notes are played, and readjustment or repair of the key is necessitated. In the past, it has been necessary to realign the pad by bending the rocker arms or other parts of the keys or by warping the key which remains fixed to the instrument. Since the adjustment is very critical, it is often necessary to employ expert technicians properly to adjust, repair, or replace the key. Repair, therefore, is often time consuming and costly.

An object of this invention is to produce a key for wind instruments in which proper alignment between pad and tone-hole socket can be secured in a simple and expeditious manner.

Another object is to produce a self-aligning pad for a keyed wind instrument whereby a non-leaking fit of pad to socket can be automatically secured even when the key is out of adjustment.

A further object is to produce a key which may be repaired on the wind instrument without the necessity of warping or bending the key.

A further object is to produce a key for wind instruments in which any irregularities in pad adjustment or socket construction can be easily and quickly compensated without special tools or expert technicians, enabling adjustment or repair to be effected at distant stations.

These and other objects and advantages of this invention will be more readily apparent from

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the following description when read in connection with the accompanying drawing, in which:

Figure 1 is an enlarged sectional elevational view of a key having a pad which is improperly aligned with respect to a tone-hole socket;

Figure 2 is a sectional elevational view, similar to that of Fig. 1, embodying features of this invention by which the pad has been automatically properly aligned;

Figure 3 is a sectional elevational view of a modified key embodying the features of this invention;

Figure 4 is a detail top plan view of a deformable disc for backing the key pad;

Figure 5 is a detail top plan view of another form of backing disc which may be used in this invention; and

Figure 6 is a detail top plan view of still another form of backing disc.

A cardinal feature of this invention resides in a key construction for wind instruments whereby the key pad is backed by a deformable member which permits pad adjustment responsive to pressure of the pad on the tone-hole socket. Such pressures may be constantly applied through the rocker arm which resiliently urges the pad toward closed position, or they may be externally applied with or without the application of heat or otherwise solely for the purpose of effecting pad adjustment. When the applied forces are constant, it is sufficient if the backing member is formed of pliable material, such as rubber, sponge rubber, foamed plastic, or rubber-like plastics, and the like, to enable readjustment of the pad for securing a non-leaking fit between pad and socket when in the closed position. On the other hand, when external forces are applied for the express purpose of pad alignment, the deformable member is preferably formed of materials capable of retaining a set so that the pad will, as a result, remain in the adjusted alignment for an extended period.

Referring now more specifically to the illustrated embodiment of the invention shown in Figs. 1 and 2 of the drawing, 10 indicates a pad adapted to seat in sealing relation on a tone-hole socket 11 forming a part of the wind instrument 12. The pad, backed by a deformable disc 13, is retained in a cup-shaped member 14 which is fixed to one end of a rocker arm 15 by which the pad is carried in the direction toward and away from the socket to its sealed and opened positions of adjustment. Ordinarily, the rocker arm is tensioned constantly to urge the pad toward sealing relation. The rocker arm 15, cup-shaped mem-



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ber 14, pad 10, and disc 13 comprise the key unit which the player manipulates to effect tone changes.

Instead of positioning the pad and deformable disc as separate units in the cup-shaped member 14, the two may be pre-assembled to form a composite unit in a casing 16 which may be removably positioned in the cup-shaped member, as shown in Fig. 3.

As previously pointed out, when the key is out of adjustment, an air gap exists between the pad and the socket, as shown in Fig. 1. If the pad 13 is constantly urged to its sealed position with sufficient pressure, a disc formed of pliable and deformable material, such as rubber, foamed rubber, or rubber-like plastics and the like will enable automatic readjustment of the pad to effect sealing relation with the socket 11 every time the pad is operated to closed position.

By the use of a disc 13 formed of materials capable of retaining a set with or without the application of heat, the pad may be properly aligned for an extended period merely by the application of sufficient pressure to effect deformation or collapse of the disc 13 as the pad is pressed into engagement with the tone-hole socket 11 and urged into alignment, as shown in Fig. 2. Backing discs of the latter type may be formed of such materials as paper, plastics, metal, and other formable sheet stock. These are formed to the contour of the pad and arranged to permit collapse of the disc in an axial direction upon compression.

The desired arrangement may be secured by the formation of the disc with corrugations 18 which may extend throughout the area of the disc or merely about the outer edge portion of the disc where the compressive portions are effective, leaving unmodified the central portion 19, which may have a cut-out 20. Suitable corrugations may comprise radially arranged corrugations 21, as illustrated in Fig. 4. They may also comprise concentric rings 22 of varying diameter, as illustrated in Fig. 5. The corrugations may be in the form of cross-hatching 23, as illustrated in Fig. 6. These or other deformable disc constructions having similar characteristics enabling deformation or collapse may be used to back the key pad for enabling realignment of the pad for temporary or permanent adjustment.

The value of this invention will be apparent to those who play wind instruments. Considerable importance is attributed to the ease and accuracy with which the pad may be realigned by the player himself without resorting to the expense and bother of submitting the instrument to expert technicians. In fact, separate low-cost discs may be provided to repairmen or directly to players throughout the country to enable the desired readjustment of the pad into proper alignment

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to be quickly and economically effected without tampering with the instrument.

It will be understood that a simple carrier may be used instead of the cup-shaped member 14. However, the latter, when formed of rigid material, operates as a reinforcing backing for the deformable disc to impart permanence and strength to the structure, and for that reason it is preferred. Ordinarily, conformance dimensionally between the shape of the tone-hole socket and the corresponding disc and pad is desired, the illustrated elements being substantially circular, but they may be oval, square, or of other corresponding geometric shapes to provide a sealing relation between the pad and tone-hole socket.

The above detailed description is merely for purposes of illustration and the invention is to be limited only by the scope of the appended claims.

What is claimed is:

1. A key operative with a tone-hole socket of a wind instrument comprising a pad adapted to fit over the tone-hole socket in sealing relation, a rigid carrier by which the pad is operated to sealing and open positions of adjustment, and a corrugated layer of sheet material intermediate the rear face of the pad and the carrier to enable readjustment of the pad into alignment with the tone-hole socket.

2. A key operative with a tone-hole of a wind musical instrument comprising a pad cup, a pad mounted in the pad cup, and a backing member of deformable corrugated sheet material capable of retaining a set between the pad and the cup whereby the angle of the pad in the cup can be adjusted.

3. A key operative with a tone-hole of a wind musical instrument comprising a pad cup, a pad mounted in the pad cup, and a corrugated sheet of non-resilient material between the pad and the cup whereby the angle of the pad in the cup can be adjusted.

4. In a key pad for wind musical instruments, a pad adapted to engage and close a tone hole, and a backing member of deformable corrugated sheet material capable of retaining a set secured to one face of the pad.

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