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KEY PAD FOR WIND MUSICAL INSTRUMENTS

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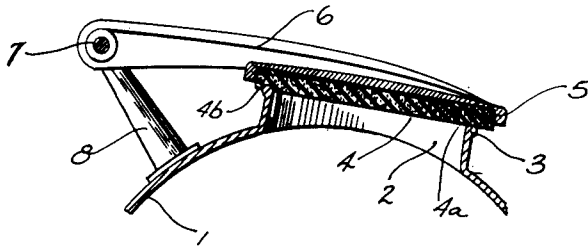


**FIG 1**

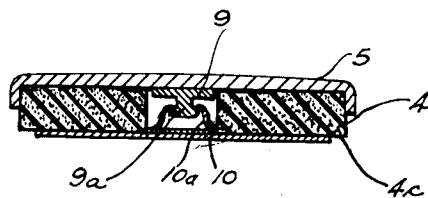


**FIG 2**

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## KEY PAD FOR WIND MUSICAL INSTRUMENTS

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1 Claim. (Cl. 84—385)

This invention relates to wind musical instruments, especially woodwind instruments, such as saxophones, and the like, and is particularly directed to improvements in the key pads therefor by which the tone openings or holes of the instrument are opened or sealed closed while the instrument is being played.

The musical notes of saxophones and other woodwind instruments are produced by opening or closing one or more tone hole sockets by means of key pads supported within pad cups. The opening and closing movements are imparted to the key pads by suitable rocker arms which are manually operated by the fingers of the player in a conventional manner.

In the past such pads have been constructed of a cardboard backing, a felt or cotton filler, and a leather facing or cover surrounding the filler adapted to become seated on the key pad seat in airtight relationship. Such leather coverings were selected because it was felt that, being relatively rigid or inflexible, they would resist wear and excessive deformation. Attempts have also been made to provide such leather covered pads with backings of rubber in the form of rubber discs to permit better self aligning qualities between the pad and the pad seat. However all of these constructions have the outstanding disadvantage of being affected by moisture, or becoming sticky when saliva or other foreign substances are formed on the surface of the leather-covered pad. Also, the relatively stiff and hard leather covering tends to produce pad slap or noises when contacting the seat which interfere with the quality of the music produced. Furthermore, such leather covered pads involve a relatively heavy key action and often times require a certain degree of finger or spring pressure to provide a leak-proof joint. The metal of the key pad seat, in time, usually cuts through the leather forming an annular depression or a hole which makes the joint leaky. Also, the pads are relatively complicated in construction, requiring the assembly of many parts which add to the manufacturing costs and repadding costs. Additionally such pads are not easy to clean since water affects the materials of which the key pad is constructed.

An object of the present invention is to provide a novel key pad construction for wind instruments, such as woodwind instruments, as saxophones and the like, which key pad construction will be devoid of the above named disadvantages of conventional key pads and which are of simple construction so as to provide an inexpensive pad which may be easily assembled and detached and replaced by an amateur, rather than requiring an expert for the purpose as is generally necessary, and which will give an easy and relatively quiet key action.

A more specific object of my invention is to provide a key pad for saxophones and the like in which the pad facing is of very soft rubber, such as foam rubber, which makes direct contact with the key pad seat so as to insure self-alignment and leak-proofness of the joint as well as lighter key action, and which can be very easily cleaned

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by applying water without affecting the sealing or wearing characteristics of the pad material, also which is simple in requiring no additional materials such as a filler, surface covering, or reinforcement and which can be assembled or replaced very quickly without requiring the usual careful adjustments that are extremely tedious and time consuming.

Other objects and advantages of this invention will become apparent from a study of the following description taken within the accompanying drawing wherein:

Figure 1 is a transverse cross-sectional view taken through a saxophone body fragment and showing a key pad embodying the principles of my invention, and

Figure 2 is an enlarged fragmentary cross-sectional view of a modified form showing a snap-on pad construction.

Referring more particularly to Figure 1 of the drawing, numeral 1 denotes a fragmentary portion of a tubular saxophone body which is provided with the usual lateral tone hole or opening 2 which is surrounded by the usual annular upstanding flange or key pad seat 3 on which is adapted to be seated a key pad 4 to seal the opening against passage of air.

The key pad 4 is in the form of a disc of very spongy rubber, preferably air-foam rubber, and is fastened to the pad cup or carrier 5 by ordinary key pad cement. The cement preferably covers the entire upper surface of the pad to provide a continuous joint with the cup 5.

The pad cup 5 is rigidly mounted on a key arm 6 which is pivotally mounted on a pivot 7 supported on post 8, which post is fastened to body 1. Rocker arm 6 is manually operated by mechanical means (not shown) which, in turn, are operated by the fingers of the player to effect opening and closing of the various tone openings on the saxophone, such as 2, in order to obtain different notes.

The use of the soft air-foam rubber pad provides automatic alignment and eliminates the tendency for seating of the pad only at the point nearest pivot 7, namely at 4b, as is the tendency of conventional pads because of the greater radius of more distant points, such as 4a, from pivot 7 as a center. To compensate for this difference of radius it will be noted that portion 4b is deformed more than portion 4a since it makes initial contact before portion 4a. However, due to the extreme softness of the air-foam pad the portion seat 3 closest pivot 7 will become deeply imbedded in portion 4b of the pad and thereby insure seating at 4a and air tightness around the entire perimeter of seat 3.

Since very soft or spongy rubber is desirable for making pad 4, such rubber oftentimes may be too porous, therefore might cause slight air leakage. To insure against this, the outer surface of pad 4, namely 4a, may be coated with rubber or similar sealing and soft pliable material to close the pores adjacent the surface. This coating is in the form of liquid rubber paint, pliable when dry.

It will be noted that no leather or other covering material is interposed between pad 4 and seat 3 since this would have a detrimental effect on the self-aligning and sealing properties of the pad. No deleterious effects are obtained by washing the pad surface with water to effect cleaning thereof. The rubber pad 4 may be sealed directly to cup 5 or, if desired, a stiffening agent such as cardboard may be interposed and cemented to the back of the pad between the cap and rubber.

Figure 2 shows a modification of the invention embodying a snap-on pad arrangement. Cap 5 has rigidly mounted thereto a metal stud 9 having an integral head 9a forming the male member of a snap-on fastener. The rubber pad 4 is provided with a central hole.

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Disc 10 has a female fastening element 10a which engages the male member 9a of the snap-on fastener.

Disc 10 may be relatively large in diameter, but still smaller than the diameter of seat 3, so as to act also as a sound resonator to reflect sound instead of absorbing it as would occur when no disc and only the rubber pad is present. Of course if a resonator is not needed and if it is desired to reduce manufacturing costs, the disc 10 and fastener 10a of Figure 2 may be omitted and the top surface of the centrally perforated pad 10 may be cemented or glued to cup 5.

In addition to the self-aligning and air-tight properties of the air-foam rubber pad, there is also provided a much quieter key action, that is, less pad slap, than obtained by a leather covered pad, also there is not required as much spring tension to provide a leak proof joint. Also since the material of pad 4 is very spongy or resilient, the metal flange 3 will not cut an annular hole therethrough as easily as in a stiffer material such as leather. Furthermore, the slight extra pressure of the player's fingers very easily compresses the pad at the point of initial contact 4b assuring air sealing engagement at the more distant point 4a.

Thus it will be seen that I have provided an efficient key pad for wind instruments, particularly woodwind instruments, such as saxophones and the like, which pad is of very simple construction and which insures self-alignment and leak-proofness, as well as providing much easier key action, also which may be easily and quickly cleaned or replaced by new pads even by an amateur without the necessity of careful adjustments, or bending of the rocker arms such as often times necessary, which adjustments require great skill and the services of an expert and are tedious and time consuming, perhaps requiring several days even by a professional repairman.

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While I have illustrated and described several embodiments of my invention, it will be understood that these are by way of illustration only, and that various changes and modifications may be made within the contemplation of my invention and within the scope of the following claim.

I claim:

In a woodwind musical instrument including a tone hole seat and a key adapted to open and close said hole by manipulation of the fingers of the player, said key being in the form of a key cup having a pad of air-foam rubber adhered thereto, said pad having an outer coating of rubber to seal the pores and prevent air leakage through the outer surface layer, said pad having a central hole, a male fastening member secured to said key cup and projecting into said hole, a thin, flat metal disc adhered to the lower surface of said pad and having a central female fastening member secured thereto and also projecting into said hole for engagement with said male member, said disc being of a diameter slightly less than that of said seat to act as a sound resonator and so as to provide direct contact between the lower peripheral, rubber coated surface of said pad and said seat to secure an air-tight seal.

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