

Nov. 19, 1935.

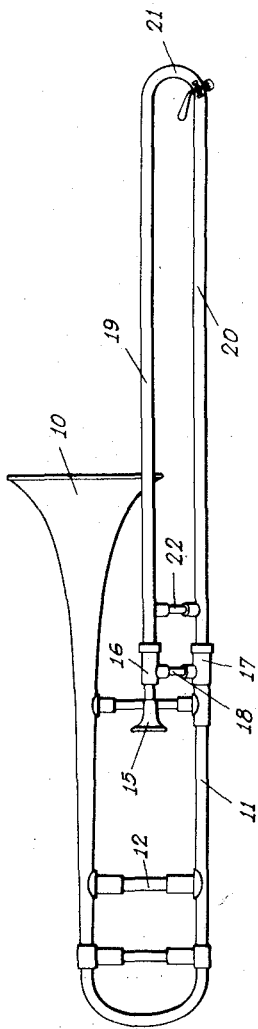
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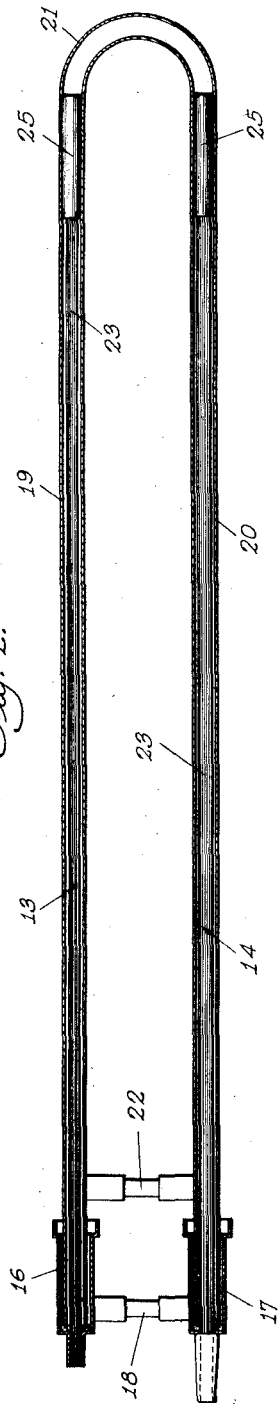
STATIONARY INNER SLIDE TUBE FOR TROMBONES AND SIMILAR INSTRUMENTS

Filed April 11, 1935

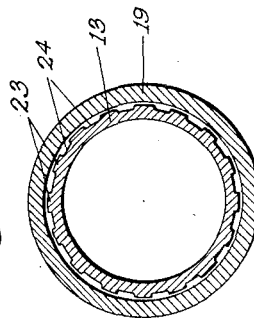
*Fig. 1.*



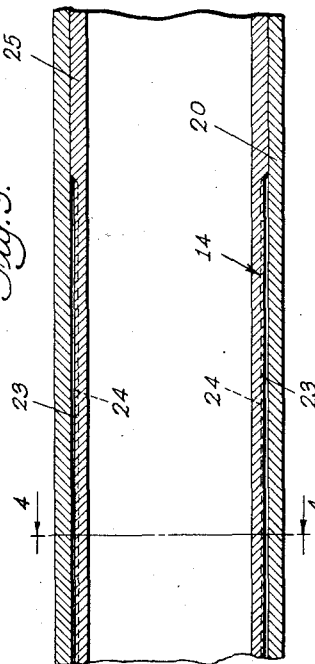
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE

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## STATIONARY INNER SLIDE TUBE FOR TROMBONES AND SIMILAR INSTRUMENTS

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5 Claims. (Cl. 84—395)

This invention relates to musical wind instruments and particularly to instruments of the trombone type employing slides.

The invention concerns an improvement in the construction of the slide. In trombone manufacture endeavors have been made to improve the working characteristics of the slide to enable the movable slide to be operated freely with a minimum amount of friction and consequent wear and to provide adequate lubrication. At the same time a suitable air seal must be maintained throughout all positions of the movable slide so as to form a true closed air column from the mouthpiece of the instrument to the bell. As these instruments are usually formed of relatively long, slender tubes of brass or like metal of thin gauge for the sake of lightness, it is possible to deform the slide during playing of the instrument. This deformation may result in binding of the movable slide on the stationary slide, an unequal distribution of wear, and an unequal distribution of lubricant.

An object of the present invention is to provide an improved slide construction for trombones and like musical wind instruments wherein the design is such that even under the most severe conditions the air seal will be maintained, there will be a minimum, if any, wear, and there is no tendency for the outer slide to bind on the inner slide.

With the foregoing and other objects in view, which will be made manifest in the following detailed description, and specifically pointed out in the appended claims, reference is had to the accompanying drawing for an illustrative embodiment of the invention, wherein:

Fig. 1 is a view in side elevation of a trombone to which the invention has been applied.

Fig. 2 is a vertical section through the movable or outer slide of the trombone, the stationary or inner slide being shown in elevation therein.

Fig. 3 is a partial view in vertical section illustrating the details of construction on an enlarged scale, portions thereof being somewhat exaggerated.

Fig. 4 is a sectional view taken substantially upon the line 4—4 upon Fig. 3.

Referring to the accompanying drawing, wherein similar reference characters designate similar parts throughout, the general construction of the trombone conforms to general practice, having a bell 10, a reversely bent tube 11, and suitable brackets 12 connecting the bell and tube. The inner and stationary slide of the instrument consists of two parallel tubes 13 and 14, the

tube 14 being connected to tube 11. Tube 13 is adapted to have the mouthpiece 15 applied thereto. These tubes extend into and through surrounding shells 16 and 17, which are connected together by means of a transverse bracket 18. The outer or movable slide consists of parallel tubes 19 and 20 connected by a reverse bend 21. These movable tubes telescope over the stationary inner tubes which form the stationary slide. They are connected, such as by a bracket 22.

The improvement concerns the formation of the stationary inner tubes 13 and 14. Each tube is so formed as to present a fluted external surface illustrated in a somewhat exaggerated manner in Figs. 3 and 4. The fluted surface forms a series of spaced high or raised portions 23 separated from each other by intervening grooves 24. These high portions or feathers extend substantially the complete length of each tube 13 and 14 with the exception of the outer end of the tube. At the outer ends the inner tubes 13 and 14 which form the stationary slide are formed with stockings 25 of suitable length which are so formed as to fit the interior of the outer tubes 19 and 20 closer than the inner tubes fit elsewhere. The function of these stockings is to preserve an air seal between the ends of the stationary slide and the interior of the movable slide in all positions of the movable slide. The high portions or feathers 23 may be so arranged as to be substantially as high as the stockings but in the preferred form of construction these high portions are slightly smaller or shallower so that there is a very slight clearance between the raised portions and the interior of the tubes of the outer slide.

The difference in diameter between the stockings 25 and the diameter across diametrically opposed feathers or raised portions 23 is very small, usually being in the neighborhood of .0035 inch. The depths of intervening grooves 24 are likewise very small, usually not being in excess of .003 or .004 inch.

The advantages of the improved slide are as follows: There is a close fit between the interior of the outer movable slide and the stockings 24 of the inner or stationary slide. This maintains the air seal in all positions. In the course of playing, lateral stresses may be applied to the bracket or handle 22 which are sufficient to deform slightly the outer slide. The available deformation is very small, being only that which is allowed to bring the interior of the outer tubes 19 and 20 into engagement with the raised portions 23. As these raised portions collectively

present an engaging surface much smaller than the entire exterior surface of each inner tube the friction between the raised portions and the movable slide is a minimum. At the same time  
 5 the outer slide is kept from being turned relatively to the inner slide to such an extent that binding of the outer slide on the stockings might occur.

The intervening grooves 24 are designed to  
 10 receive and hold suitable lubricating oil so that an adequate supply of lubricating oil is maintained at all times for available use around the stockings 25 and on the surfaces of the raised portions or feathers 23.

15 In manufacturing instruments of this character it is customary to form the tubes by taking a section of brass tubing and drawing it through a die. In order to manufacture an instrument embodying the present invention the die is so  
 20 formed as to form the raised portions 23 and the intervening grooves 24 while the brass tubing is being drawn.

From the above described construction it will be appreciated that the improved trombone which  
 25 has the tubes of the inner and stationary slide presenting a type of rifled external appearance is highly advantageous in that the air seal is maintained, there is no tendency for the movable slide to bind on the stationary slide, and wear  
 30 is reduced to a minimum. Adequate provision is maintained for keeping a lubricant adjacent all engaging parts between the slides. While years of manufacture dictate that the rifling or fluting be formed on the tubes of the inner slide  
 35 there may be occasions for reversing the location of the fluting and having this formed on the interior of the tubes of the outer movable slide.

Various changes may be made in the details of construction without departing from the spirit  
 40 or scope of the invention as defined by the appended claims.

I claim:

1. In a trombone or similar musical wind instrument, a stationary slide and a movable slide  
 45 telescopically arranged, there being spaced raised portions on one slide integral therewith and extending substantially the complete length thereof arranged to be engageable with and slide upon the other so as to reduce friction between the

slides and enabling the intervening spaces to receive and hold lubricant.

2. In a trombone or similar musical wind instrument, a stationary slide and a movable slide  
 5 telescopically arranged, the stationary slide telescoping within the movable slide and having spaced raised portions integral therewith and extending substantially the complete length  
 10 thereof, the tops of which may be engaged by the interior of the movable slide, and the intervening spaces being adapted to receive and hold lubricant.

3. In a trombone or similar musical wind instrument, a stationary slide and a movable slide  
 15 telescopically arranged, the stationary slide telescoping within the movable slide and having a multiplicity of closely adjacent integral spaced raised portions extending longitudinally and substantially the complete length of the slide, the  
 20 tops of the raised portions being engageable by the interior of the movable slide, and the intervening spaces being adapted to receive and hold lubricant.

4. In a trombone or similar musical wind instrument, a stationary slide and a movable slide  
 25 telescopically arranged, the stationary slide telescoping within the movable slide and having spaced raised portions extending longitudinally and substantially the complete length of the slide, the tops of the raised portions being engageable  
 30 by the interior of the movable slide, and the intervening spaces being adapted to receive and hold lubricant, there being a closer fit between the end of the stationary slide and the interior of the movable slide than between the tops of the  
 35 raised portions and the interior of the movable slide.

5. In a trombone or similar musical wind instrument, a stationary slide comprising a pair  
 40 of spaced, parallel, stationary tubes, each tube having a stocking at its end and being longitudinally fluted with a multiplicity of small, closely adjacent flutes throughout substantially its entire length except for the stocking, and a movable slide comprising a pair of spaced, parallel  
 45 tubes telescopically mounted thereover, the tubes of the movable slide being connected by a reverse bend.

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