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STATIONARY INNER SLIDE TUBE FOR TROMBONES AND SIMILAR INSTRUMENTS

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Fig. 1.

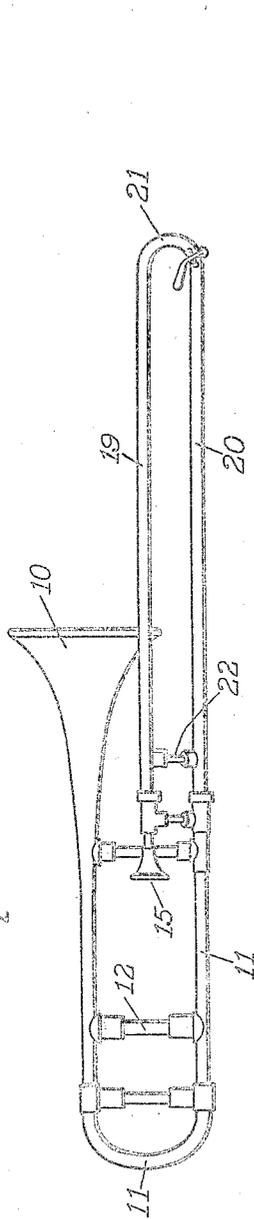


Fig. 2.

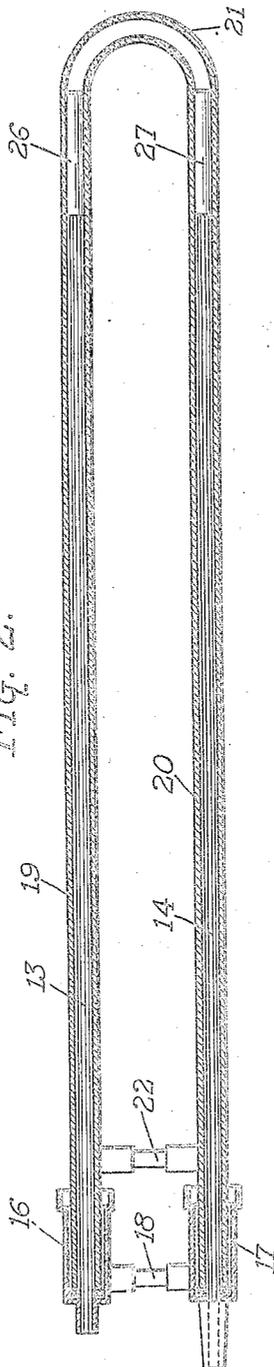


Fig. 4.

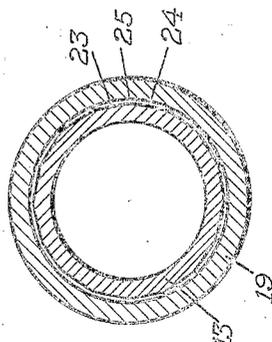
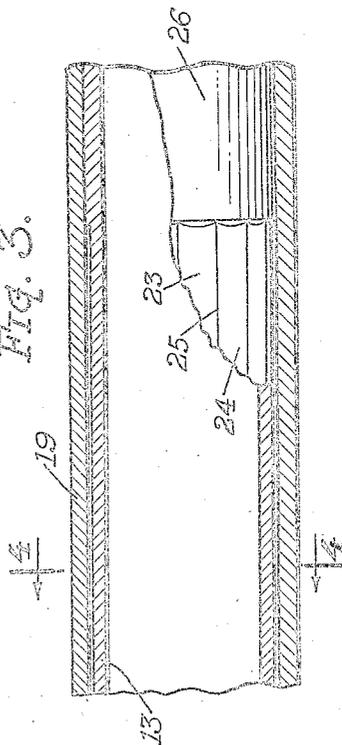


Fig. 3.



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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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Application September 1, 1936, Serial No. 98,841

3 Claims. (Cl. 84—395)

My invention relates to improvements in stationary inner slide tubes for trombones and similar instruments and may be considered an improvement over the disclosure made in my prior United States Letters Patent No. 2,021,323 issued November 19, 1935.

As in my prior patent, an object of the present invention is to provide an improved inner slide tube for trombones which will reduce friction and provide adequate lubrication. In my prior patent the stationary inner slide tube is provided with a plurality of longitudinally extending grooves defined by intervening raised portions or ridges which provide the surfaces that bear on the interior of the outer or movable slide tube. Such a construction, while normally quite satisfactory, is sometimes found to be disadvantageous in the following respects: The surfaces formed by the ridges or beads sometimes become dry, that is, they are not adequately lubricated so that there is still some friction present which can be eliminated and is largely eliminated by the present construction. Also, the tube as disclosed in my prior patent, when made by drawing the tube through a die, sometimes has the metal crowded on one side of the tube so that the tube will be thinner on one side than on the other.

In the present construction the bearing between the inner slide tube and the interior of the outer slide tube, save for the stocking, is formed by a plurality or multiplicity of apices whereby a peripheral line contact as distinguished from a surface to surface contact is provided between the stationary and movable slide. In this way friction is reduced and the engaging edges may be adequately lubricated.

The present construction also facilitates the manufacture of the die in that the cross-sectional shape of the inner slide tube is of a highly regular form and because of this, when the tube is drawn through the die, there is a greater tendency to have the tube with the metal forming it evenly distributed around the circumference.

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 embodying the present invention.

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, a portion of the inner slide tube being shown in elevation.

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

Referring to the accompanying drawing, wherein similar reference characters designate similar parts throughout, the general construction of the trombone conforms to general or conventional practice, having a bell 10, a reversely bent tube 11 and suitable connecting 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 in any conventional or preferred manner. These tubes extend into and through surrounding shelves 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. The movable tubes telescope over the stationary tubes which form the stationary slide and are connected together by a bracket 22.

The improvement covers the formation of the stationary inner tubes 13 and 14. As clearly shown in Fig. 4 each tube 13 and 14 is formed to have an external polygonal shape. The number of sides of the polygon may vary. However, I find that if the exterior surface of each tube 13 and 14 is formed with approximately 14 or 16 sides, that a satisfactory construction is produced. Adjacent sides of the polygonal portion of the tube, such as, for example, those indicated at 23 and 24, define an apex 25 therebetween. These apices extend longitudinally of the tube substantially its complete length except for the stockings 26 and 27 on the respective tubes. These apices constitute longitudinally extending edges which are relatively sharp taking into consideration the obtuse angles forming them. Except for the stockings these edges constitute the sole contacts between the slides. The diameter of the polygonal portion of each tube 13 and 14, that is, the distance across the tube to opposite apices, may be exactly equal to or slightly less than the diameter of the stocking. The stockings 26 and 27 are cylindrical and are formed to closely fit with a smooth running fit the interior of the outer tubes 19 and 20 respectively. Except for the engagement of the stockings with the outer or movable slide, the sole bearing contact between the inner or stationary slide and

the outer movable slide is provided by the apices 25 which form a plurality of line contacts with the interiors of the outer tubes. The sides 23 and 24 being spaced slightly from the cylindrical interior surface of the outer tubes, form or define lubricant receiving spaces designed to receive lubricant and hold it adjacent the apices 25 and adjacent the stockings.

In manufacturing instruments embodying the present invention, it is preferable to draw a section of tubing through a polygonally shaped die up to the point where the stocking is formed. The tube is then pulled through the die in the reverse direction so as to remove the tube therefrom and thereafter the tube is drawn through a cylindrical die so as to draw and shape the stocking. In this way it will be found that the tube can be conveniently formed of one integral piece of metal and that the metal of the tube will be evenly distributed about the circumference of the polygonally shaped portion. By the improved construction it will be appreciated that such friction as occurs between the movable outer slide and the stationary inner slide is restricted to the friction created by the stockings and the lines of contact made by the apices 25. The spaces adjacent each apex hold adequate supplies of lubricant which are readily fed into the lines of contact at the apices. As the polygonal shape of the inner tubes is highly regular, the die through which the tube is drawn may be easily formed and as the drawing of the tube merely deforms it from a cylinder into a many-sided polygon, the drawing of the tube through the die is somewhat facilitated. While the apices may be arranged on a circumference the diameter of which is equal to the diameter of the stocking, if the apices are made slightly smaller

as shown, the difference in diameter preferably does not exceed about 6/1000 of an inch.

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

I claim:

1. In a trombone or similar musical wind instrument, a stationary slide and a movable slide telescopically arranged, there being longitudinally extending relatively sharp edges formed on one slide engageable with the other slide so as to reduce friction between the slides and enabling spaces between the edges to receive and hold lubricant.

2. In a trombone or similar musical wind instrument, a stationary slide and a movable slide telescopically arranged, the stationary slide telescoping within the movable slide and having a polygonal exterior, the apices of which are arranged to engage the interior of the movable slide, and the spaces between the sides of the stationary slide and the interior of the movable slide being adapted to receive and hold lubricant.

3. In a trombone or similar musical wind instrument, a stationary slide comprising a pair of spaced parallel stationary tubes, each tube having a stocking at its end, and the remainder of the tube being largely of polygonal exterior section with the apices of the polygonal section arranged to be engageable with the interior of the movable slide and the sides to be slightly spaced therefrom, and a movable slide comprising a pair of spaced parallel tubes telescopically mounted over the stationary tubes, the tubes of the movable slide being connected by a reverse bend.

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