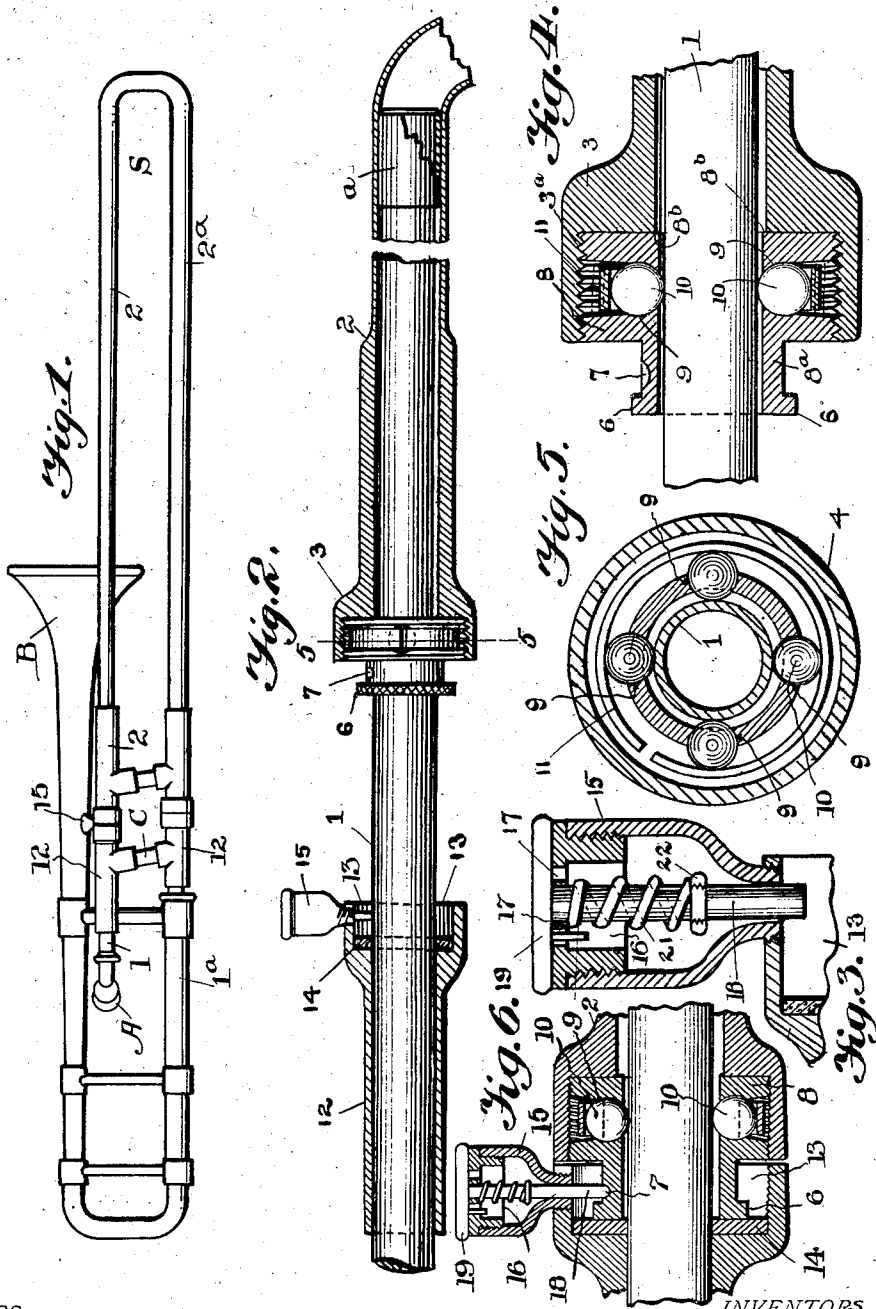


A. W. HARTHILL & I. E. STAMETS.
TROMBONE SLIDE.

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1,062,279.

Patented May 20, 1913.



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UNITED STATES PATENT OFFICE.

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TROMBONE-SLIDE.

1,062,279.

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To all whom it may concern:

Be it known that we, ALFRED W. HARTHILL and IRA E. STAMETS, citizens of the United States, residing at Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Trombone-Slides; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to slide trombones, *i. e.*, wind musical instruments of the trumpet class in which a fixed tube carrying a mouthpiece is connected with the bell or discharge portion of the instrument through another fixed tube by way of two parallel sliding tubes connected with each other and telescoping with the fixed tubes. The sliding tubes or "slide," as they are commonly called, have considerable range of movement and it is important that they should move freely and with as little friction as possible in order to facilitate in the skilful handling of the instrument. It is also desirable that the accidental separation of the slide from the fixed tubes when the slide is fully drawn out should be prevented and some means should be provided for locking the slide to the fixed tubes when the instrument is closed, *i. e.*, when the slide is moved inward to its full extent.

According to our invention we construct the instrument for the most part in the usual way, *i. e.*, we employ fixed tubes connected with the mouthpiece and the bell and which we call the inner tubes and we use a slide consisting of two tubes connected at their outer ends as usual and fitting over or telescoping with the inner tubes.

The outer ends of the inner tubes as usual are provided with bushings or stockings which serve to hold the outer portions of the inner tubes and the outer tubes apart, and we provide the inner ends of the outer tubes with anti-friction devices which serve to hold the inner ends of these tubes away from the inner tubes and enable the several tubes to slide easily and freely relatively to each other. The inner tubes are provided with cushions which yieldingly receive the end thrust of the slide when the latter is moved inward to its full extent and locking devices of improved construction are employed to

secure the slide to the inner tubes when the instrument is closed.

In the accompanying drawings, Figure 1 shows a side elevation of a trombone embodying our improvements. The remaining figures are on an enlarged scale. Fig. 2 is a view partly in elevation and partly in longitudinal section showing the connections between one of the inner and one of the outer tubes of the instrument. Fig. 3 is a detail view in section showing the devices for locking the slide to the inner tubes. Fig. 4 is a detail view in longitudinal section showing one of the anti-friction devices interposed between the inner and outer tubes. Fig. 5 shows a transverse section thereof on the line 5-5 of Fig. 2. Fig. 6 is a detail view in longitudinal section showing the manner in which the inner and outer tubes are locked when the slide is closed.

The fixed tubes 1 and 1^a are connected with the mouthpiece A and the bell B in the usual way. Each of the fixed tubes carries a sleeve 12 and these are connected by a brace C. The outer end of each sleeve 12 is enlarged and formed with a chamber 13 in which is located a cushion 14 of cork or other suitable material and which receives the end thrust of the corresponding member of the slide in the manner hereinafter described. The fixed or inner tubes 1 and 1^a are extended outward from the sleeves 12 and enter the two tubular members of the slide S. At their outer ends the inner tubes carry bushings or stockings *a*, preferably made of German silver, which serve to hold the fixed tubes away from the tubes of the slide in the manner shown in Fig. 2. By employing German silver stockings working in brass tubes friction is largely reduced and by employing stockings of small length a corresponding reduction in friction is obtained. Each of the inner tubes is provided with a stocking *a* for the purpose above mentioned. This device is commonly employed in trombones and no claim is made by us to the use of such a device *per se*.

The inner or rear ends of the two members of the slide carry improved means for holding them away from the inner tubes and in connection with the stockings above mentioned provide a space between the inner and outer tubes for the greater part of their lengths when the slide is drawn outward. These devices on the outer tubes each com-

prises a ball carrier or cage provided with anti-friction balls which bear on the inclosed inner tube and are pressed into engagement therewith by a spring arranged in the cage. As shown in the drawings the cage consists of a cylinder 8 formed with radial pockets 9 for the balls 10 and with an annular groove for the split ring 11 made of spring metal. The pockets 9 are preferably tapered inwardly, as shown, and the balls extend for a short distance inward out of the pockets when moved inward by the spring to their full extent. The cage or cylinder 8 on its periphery is screw-threaded and engages threads formed in the inside of a socket 3^a formed in the enlarged end 3 of the outer tube. The part 3 is shown as being formed integrally with the tube, but of course it may be made separate and affixed to said tube in any suitable way. The cylinder or cage 8 is formed with a rearward extension 8^a having a milled flange 6 and provided between the flange and the rear side of the cage with a recess 7 to receive the locking device hereinafter described. Each of the outer tubes is provided with the anti-friction devices described. It will be observed that the bore of the cage 8 is slightly less than that of the outer tube providing a shoulder 8^b which is adapted to strike the inner end of the stocking *a*. In this way the separation or disconnection of the outer and inner tube is prevented. When thus arranged the slide can be moved back and forth with great ease and freedom and with a minimum amount of friction. When the slide is moved inward to its full extent the extensions 8^a enter the recesses 13 and strike the cushions 14 relieving the shock. The split ring 11 yieldingly holds the balls 10 and allows them to ride easily over any broken or rough places that there may be on the inner tube.

In order to lock the slide to the fixed member of the instrument we may employ the locking devices shown particularly in Figs. 3 and 6. Each inner tube may be provided with such devices, but only one is essential. We have shown them applied to the upper tube 1. The locking device comprises a sliding bolt 18 which enters the chamber 13 and the upper or outer portion of which is contained within a housing 15. The housing is open at its inner end, its neck portion being threaded and connected with the wall of the chamber 13 in the manner shown. At its outer end the housing is closed by a screw cap 16 having a central opening through which the bolt 18 extends and formed with holes 17 on opposite sides of the central opening. The bolt is provided with a head 19 by which it may be manipulated and it is surrounded by a spring 21 which bears against the cap and against a collar 22 attached to the bolt.

The spring tends to move the bolt inward but the bolt may be moved radially outward against the force of the spring. The head 19 carries an inwardly projecting pin 20 adapted to enter either of the holes 17. When the pin extends through one of the holes the bolt occupies the position shown in Figs. 3 and 6 in which position it is adapted to engage the recess 7 of the extension 8^a of the ball carrier. By raising or pulling outward the head 19 the bolt may be withdrawn from engagement with the recess 7 and by turning the bolt a short distance about its axis the pin 20 may be moved out of line with the recess and may then engage the outer face of the cap 19 and hold the bolt in its withdrawn position.

By our invention we have so improved a slide trombone that it may be made to work with but little friction, perfect alinement is insured and thus the bending, flattening or distortion of any of the parts is prevented. The slide cannot be accidentally separated from the fixed members of the instrument and when the slide is moved inward to its full extent it may be very easily locked and unlocked. If it be desired to separate the slide from the instrument, this can easily be done by taking hold of the milled flange 6 and unscrewing the ball carrier or cage from the threaded recess 3^a. When both of the ball carriers are removed in this way, the slide will slip over the stockings *a* and separate from the instrument. This may be done without dropping the balls from the cage, but the balls may be removed from the cage by simply springing open the split ring 11 and removing it.

That end of the instrument shown on the left hand side of the drawings, Fig. 1, we call the inner end and the opposite end we call the outer end.

We claim as our invention:

1. A trombone having fixed tubes, a slide having tubes telescoping with the fixed tubes and provided at their inner ends with ball cages carrying balls engaging the fixed tubes and springs which press the balls inward against the tubes.

2. A trombone having fixed tubes provided with stockings on their outer ends, a slide having tubes telescoping with the fixed tubes and provided at their inner ends with ball cages having shoulders adapted to engage the stockings and carrying balls engaging the fixed tubes.

3. The combination with the inner and outer tubes of a trombone, of a ball cage removably connected with the inner end of the outer tube and provided with radial pockets carrying balls engaging the inner tube, and a spring engaging the balls and pressing them inward.

4. The combination with the inner and outer tubes of a trombone, of a ball cage

formed with radial ball pockets and detachably connected with the inner end of the outer tube, and a split spring ring arranged in the cage surrounding the balls and pressing them inward into engagement with the inner tube.

5 5. The combination with the inner and outer tubes of a trombone, of a ball cage detachably connected with the inner end of the
10 outer tube, carrying balls engaging the inner tube and formed with an inwardly projecting extension, an enlargement on the inner tube formed with a chamber into which said extension on the ball cage enters when
15 the instrument is closed and a sliding bolt operating in said chamber and adapted to engage with said extension on the ball cage.

20 6. The combination with the inner and outer tubes of a trombone, of a ball carrying cage detachably connected with the outer tube and having an extension projecting

rearwardly from it, an enlargement on the inner tube having a chamber which receives said extension, a radially moving bolt which enters said chamber and engages said extension, a housing for the bolt, a cap having an opening for the bolt and a hole at the side thereof, a spring within the housing and connected therewith and with the bolt which tends to move the bolt inward, a head for the bolt, and a pin carried by said head adapted to support the bolt in its withdrawn position or to enter the hole in the end of the housing to permit the bolt to engage the extension of the ball cage.

In testimony whereof we affix our signatures in presence of two witnesses.

ALFRED W. HARTHILL.
IRA E. STAMETS.

Witnesses:

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