

Feb. 14, 1956

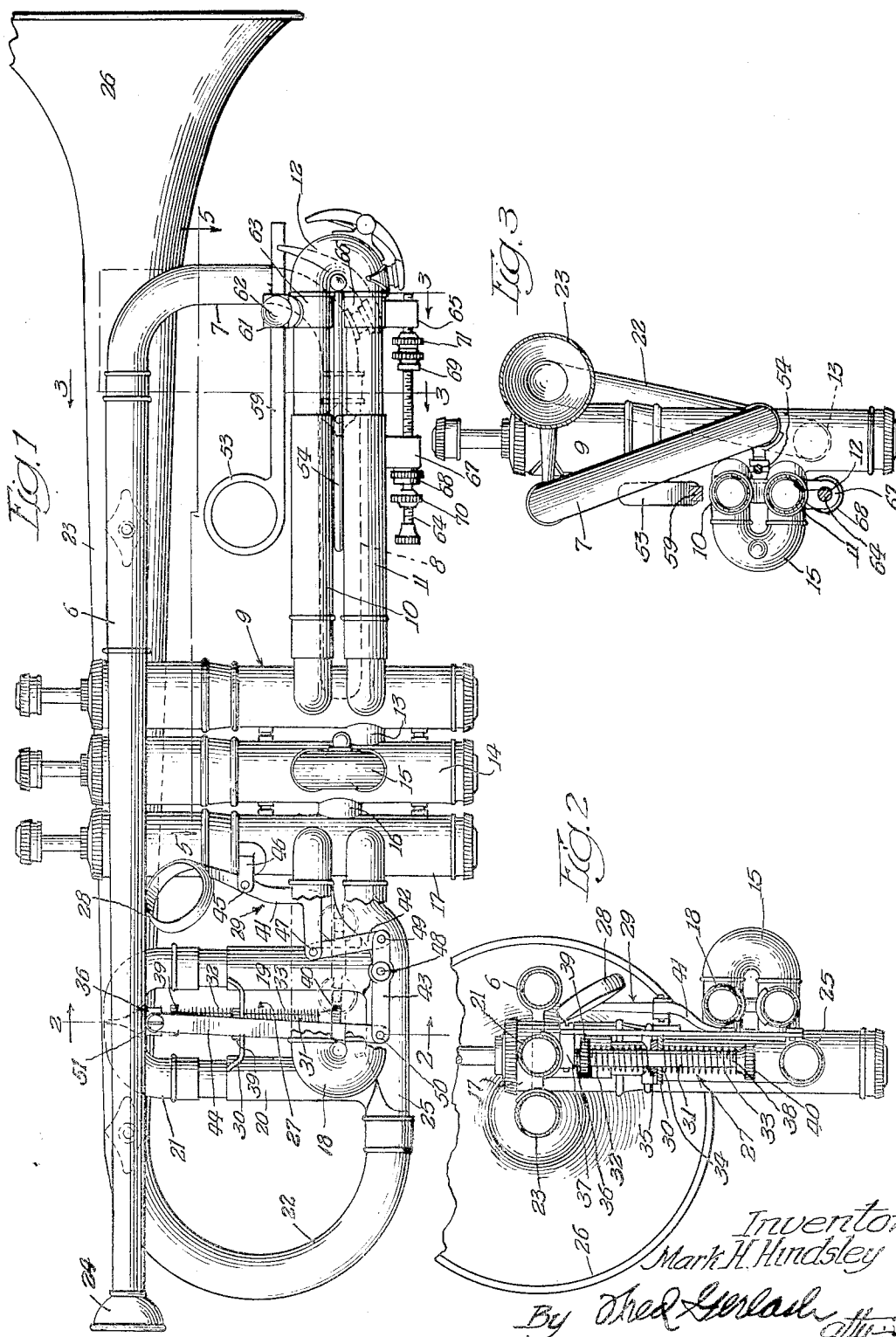
M. H. HINDSLEY

2,734,417

VALVE BRASS MUSICAL INSTRUMENT

Filed Feb. 5, 1951

2 Sheets-Sheet 1



Inventor
Mark H. Hindsley
By *Thed. L. Leland* atty.

Feb. 14, 1956

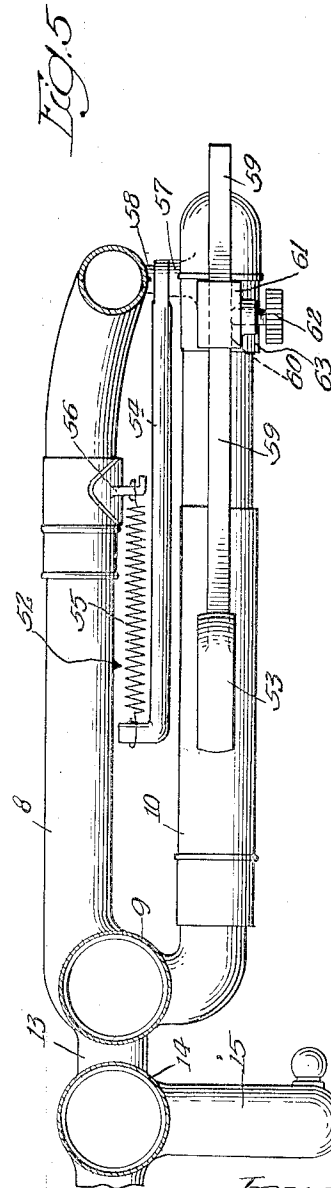
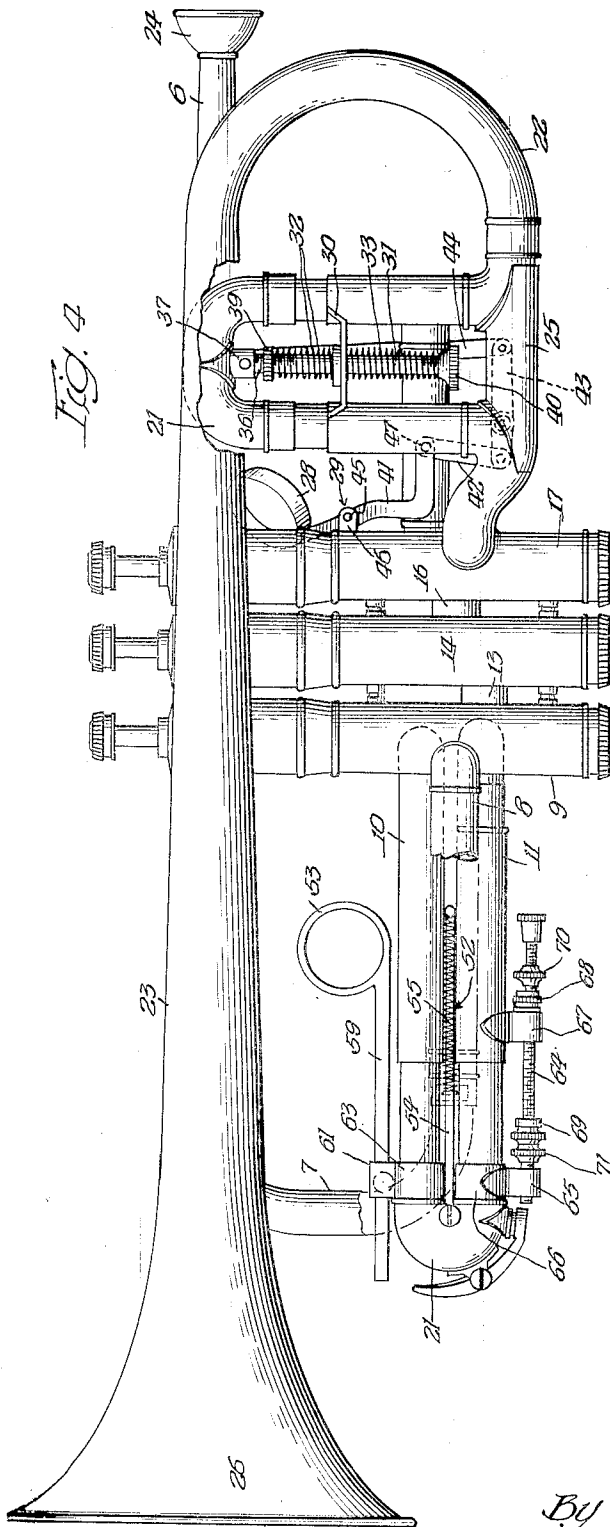
M. H. HINDSLEY

2,734,417

VALVE BRASS MUSICAL INSTRUMENT

Filed Feb. 5, 1951

2 Sheets-Sheet 2



Inventor
Mark H. Hindsley
By Fred Enlach atty

1

2,734,417

VALVE BRASS MUSICAL INSTRUMENT

Mark H. Hindsley, Urbana, Ill.

Application February 5, 1951, Serial No. 209,493

3 Claims. (Cl. 84—394)

The present invention relates generally to wind musical instruments. More particularly the invention relates to that type of musical instrument which is known in the art as a valve brass instrument, is ordinarily supported by the left hand and played with the right hand, and comprises a sectional or composite tube which is curved or bent back and forth to form an elongated unit, has a mouthpiece at one end thereof and a bell at its other end, and embodies a horizontal series of three or more upstanding valves adjacent the central portion of the unit, a main U-shaped tuning slide for varying the pitch of all tones played on the instrument, and a U-shaped slide for each of the valves.

One object of the invention is to provide a valve brass musical instrument of this type which is an improvement upon, and has certain inherent advantages over, previously designed instruments and is characterized by the fact that it embodies simple and novel means whereby during playing of the instrument the main U-shaped tuning slide may be readily shifted or slid in order to correct intonation of imperfect tones by changing their pitch.

Another object of the invention is to provide a valve brass musical instrument of the type under consideration in which the main U-shaped tuning slide is yieldingly maintained in a neutral or intermediate position by way of a particular spring arrangement and the means for adjusting the slide during playing of the instrument comprises a ring which is positioned and arranged to receive the thumb of the left hand of the player of the instrument and in addition a lever variety linkage which extends between the thumb ring and the main U-shaped tuning slide and is so arranged and designed that when the ring is moved forwards it slides the slide inwards and hence raises the pitch, and when the thumb ring is moved rearwards, i. e., away from the first valve, it operates to slide the tuning slide outwards to the end that there is effected a lowering of pitch.

A further object of the invention is to provide a valve brass musical instrument which is generally of new and improved construction and is characterized by high efficiency and improved intonation properties.

Other objects of the invention and the various advantages and characteristics of the present valve brass musical instrument will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a right hand side elevation of a valve brass musical instrument embodying the invention, certain parts being broken away or omitted in order to illustrate in detail the construction and arrangement of the thumb ring and lever type linkage for effecting outward and in-

2

ward sliding movement or adjustment of the main U-shaped turning slide;

Figure 2 is a vertical transverse section taken on the line 2—2 of Figure 1 and showing the spring arrangement for normally maintaining the tuning slide in a neutral or intermediate position;

Figure 3 is a vertical transverse section taken on the line 3—3 of Figure 1 and illustrating in detail the construction and arrangement of the means for effecting, in connection with playing of the instrument, sliding adjustment of the U-shaped slide for the third valve;

Figure 4 is a left hand side elevation of the instrument; and

Figure 5 is an enlarged horizontal section taken on the line 5—5 of Figure 1 and showing the spring arrangement for normally holding the U-shaped slide for the third valve in its extended position.

The valve brass instrument that is illustrated in the drawings is a cornet and exemplifies one form or type of valve brass instrument in which the invention is capable of being embodied or employed. It is of standard or conventional construction except for the particular hereinafter described slide adjusting means or mechanisms and comprises a sectional or composite tube which is curved or bent back and forth to form an elongated normally horizontal unit and consists of an upper horizontally extending tube section 6, a vertically extending C-shaped tube section 7, a lower horizontally extending tube section 8, a third valve 9, a pair of vertically spaced horizontally extending tube sections 10 and 11, a horizontally extending U-shaped slide 12 for the third valve, a horizontally extending tube section 13, a second valve 14, a horizontally extending U-shaped slide 15 for the second valve, a horizontally extending tube section 16, a first valve 17, a horizontally extending U-shaped slide 18 for the first valve, a pair of laterally spaced vertically extending tube sections 19 and 20, a main inverted U-shaped tuning slide 21, a vertically extending C-shaped tube section 22, and an upper horizontally extending tube section 23. The three valves 9, 14 and 17 extend vertically and are located adjacent to the central portion of the horizontally elongated unit that is formed or defined by the bent or curved sectional tube. They are arranged or disposed in a longitudinal series and each consists of a vertically extending tubular housing with closures at its ends, a vertically slidable piston type valve (not shown) in the housing, an upstanding valve stem and a finger button at the upper end of the valve stem. The valve stems of the three valves extend slidably through holes in the closures of the upper ends of the valve housings as well understood in the art. Springs (also not shown) within the housings serve yieldingly to hold the piston type valves in their normal or raised positions. The upper horizontally extending tube section 6 has a mouthpiece 24 at its rear or inner end and is arranged so that the central portion thereof is located at one side of the upper ends of the valve housings. The upper end of the vertically extending C-shaped tube section 7 is connected to, and communicates with, the front or outer end of the tube section 6. The lower horizontally extending tube section 8 of the tube is located beneath the front end of the tube section 6 and extends between, and communicates with, the lower end of the C-shaped tube section 7 and the lower portion of the housing of the third valve 9. The vertically spaced horizontally extending tube sections 10 and 11 are located at one side of the tube section 8 and are connected to, and project forwards from, the lower portion of the third valve housing. The horizontally extending U-shaped slide 12 is disposed adjacent to the lower end of the vertically extending C-shaped tube section 7 and is arranged so that

its extremities or end portions extend slidably into the front ends of the tube sections 10 and 11 in order that it may be slid forwards or rearwards for pitch varying or changing purposes. The horizontally extending tube section 13 extends between and communicates with the lower portions of the housings of the third and second valves. The U-shaped slide 15 is associated with, and projects laterally from, the lower portion of the housing of the second valve 14 and is slidable inwards and outwards for pitch varying purposes. The horizontally extending tube section 16 of the tube extends between and communicates with the lower portions of the housings of the second and first valves. The horizontally extending U-shaped slide 18 is associated with, and projects rearwards from, the lower portion of the housing of the first valve 17 and is slidably mounted in order that it may be slid forwards and rearwards in order to effect pitch variation. The vertically extending tube section 19 is located directly rearwards of the housing of the first valve and has its lower end connected to the lower portion of such housing. The vertically extending tube section 20 is spaced rearwards from the tube section 19 and has its lower end connected to, and in communication with, the lower end of the vertically extending C-shaped tube section 22. As shown in Figures 1 and 4, the lower ends of the vertically extending tube sections 19 and 20 are cross connected by a tubular brace 25. The main inverted U-shaped slide 21 is arranged so that the end portions thereof extend slidably into the upper ends of the tube sections 19 and 20 in order that the slide as a whole is capable of being slid upwards and downwards in order to correct intonation of imperfect tones. As well understood, downward or inward sliding movement of the slide 21 raises the pitch of all tones and upward or outward sliding movement of the slide effects a lowering of the pitch. The lower end of the vertically extending C-shaped tube section 22 is connected to, and communicates with, the lower end of the tube section 20 and the upper end of the tube section 22 is connected to, and communicates with, the rear or inner end of the upper horizontally extending tube section 23. The last mentioned tube section is disposed in substantially parallel relation with the tube section 6 and is provided at its front end with a bell 26. The parts heretofore specifically described are standard or conventional parts of a cornet or like valve brass instrument.

In addition to the parts heretofore specifically specified the instrument (cornet) comprises means or mechanism for slidably adjusting the main inverted U-shaped tuning slide 21 and means or mechanism for effecting sliding adjustment of the U-shaped slide 7 for the third valve 9. As pointed out hereafter these means or mechanisms are manually manipulatable while the instrument is being played.

The means or mechanism for slidably adjusting the main tuning slide 21 comprises a spring arrangement 27, a ring 28 and a lever type linkage 29 between the ring 28 and the slide 21. The spring arrangement 27 serves yieldingly to hold or maintain the tuning slide in a neutral or intermediate position, i. e., a position wherein the extremities or end portions of the slide are slid but part way into the upper ends of the vertically extending tube sections 19 and 20. As its parts the spring arrangement comprises a horizontally extending plate 30, a vertically extending rod 31, an upper spiral compression spring 32 and a lower spiral compression spring 33. The plate 30 of the spring arrangement 27 extends between, and has its ends suitably fixedly secured to, the upper ends of the tube sections 19 and 20. The central portion of the plate 30 is provided with a circular hole 34 and has welded or otherwise fixedly secured to it a washer 35, the hole of which is the same in diameter as, and registers with, the hole 34. The vertically extending rod 31 is arranged so that the central portion thereof extends slidably through

the hole 34 and the washer 35. The upper end of the rod is provided with an external screw thread 36 and extends into an internally threaded socket or bore in a lug 37 which is fixedly connected to, and depends from, the curved or intermediate portion of the tuning slide 21. The lower end of the rod 31 is provided with an external screw thread 38 and terminates a small distance above the tubular brace 25 as shown in Figures 2 and 4. The upper spiral compression spring 32 extends around the upper end portion of the vertically extending rod 31 and is arranged so that the lower end thereof abuts against the washer 35 and its upper end abuts against a nut 39 on the upper end of the rod. The purpose of the spring 32 is to retract the tuning slide 21 to its neutral or intermediate position after it has been slid downwards in order to effect a raising of pitch. The lower spiral compression spring 33 extends around the lower end portion of the rod 31 and is arranged so that its upper end abuts against the central portion of the plate 30 and the lower end thereof abuts against a nut 40 on the screw thread 38 on the lower end of the rod 31. The purpose of the spring 33 is to retract the slide 21 to its neutral position after it has been raised as hereinafter described, to effect lowering of pitch. The two springs coact as heretofore indicated to maintain the slide in its so-called neutral or intermediate position. Such position may be changed or adjusted, if so desired, by turning the nuts 39 and 40 so as longitudinally to adjust them with respect to the rod 31. If it is desired to raise the neutral position of the tuning slide the nuts 39 and 40 are adjusted downwards with respect to the rod 31 and if it is desired to lower the neutral position of the tuning slide the two nuts are adjusted by proper turning upwards with respect to the rod 31. The ring 28 is located beneath the central portion of the upper horizontally extending tube section 6 and adjacent the upper portion of the housing of the first valve 17. It is adapted to receive the thumb of the left hand of the player of the instrument and is mounted so that in response to bending or flexing of the thumb it may be moved forwards or rearwards. The lever type linkage 29 serves as an operating connection whereby forward movement of the thumb ring 28 results in lowering of the tuning slide 21 from its neutral position and rearward movement of the ring results in raising of the slide from its said neutral position. As its components or parts the linkage 29 consists of a bell crank type lever 41, a link 42, a lever 43 and a link 44. The bell crank type lever 41 directly underlies the thumb ring 28 and consists of a substantially vertical arm and a substantially horizontal arm. The substantially vertical arm of the lever 41 is located directly rearwards of the central portion of the housing of the first valve 17 and has the upper end thereof welded or otherwise fixedly secured to the thumb ring 28. The central portion of the substantially vertical arm is pivotally connected by a pin 45 to the rear end of a horizontally extending rearwardly projecting lug 46 on the central portion of the first valve housing. The pin 45 extends horizontally and forms a pivot whereby the bell crank type lever 41 is permitted to tilt forwards and rearwards in a vertical plane. The substantially horizontal arm of the lever 41 is fixedly connected to, and projects rearwards from, the lower end of the aforementioned substantially vertical arm. The link 42 of the linkage 29 extends substantially vertically. It is disposed adjacent the slide valve 18 for the first valve 17 and has the upper end pivotally connected by a horizontal pin 47 to the rear end of the substantially horizontal arm of the lever 41. The lever 43 extends substantially horizontally and has the central portion thereof fulcrumed by way of a horizontal pivot pin 48 which is connected to, and projects laterally from, the front end of the tubular brace 25. The pin 48 is so arranged that it permits the lever 43 to tilt upwards and downwards in a substantially vertical plane. The front end of the lever

43 is pivotally connected to the lower end of the link 42 by a horizontal pin 49. The link 44 of the linkage 29 extends substantially vertically and is located between the vertically extending tube sections 19 and 20. The lower end of the link 44 is pivotally connected to the rear end of the centrally fulcrumed lever 43 by a horizontal pin 50 and the upper end of the link is pivotally connected by a horizontal pin 51 to the depending lug 37 on the curved or intermediate portion of the inverted U-shaped tuning slide 21. When in connection with playing of the instrument the thumb ring 28 is moved or swung forwards in the direction of the first valve 17 the linkage 29, due to the arrangement and design of the component parts thereof, operates to slide the tuning slide 21 downwards against the force of the upper spiral compression spring 32 and thus cause an increase in the pitch of the tones emanating from the bell 26. As soon as the thumb ring 28 is released by the player the upper spiral compression spring 32 raises the tuning slide in its neutral or intermediate position. When in connection with playing of the instrument the player shifts or swings the thumb ring 28 rearwards the linkage 29 raises the tuning slide 21 against the force of the lower spiral compression spring 33 and thus results in a lowering of pitch. As soon as the thumb ring 28 is released by the player the spring 33 operates to return the tuning slide 21 to its normal neutral or intermediate position.

The means or mechanism for slidably adjusting the tuning slide 21 is essentially simple in construction and may be manipulated with facility. It may be utilized to good advantage to correct intonation of imperfect tones and consists of a comparatively small number of parts.

The means or mechanism for effecting sliding adjustment of the U-shaped slide 12 for the third valve 9 in order to effect tonal or pitch adjustment in connection with use or operation of the third valve comprising a spring arrangement 52 and a finger receiving ring 53. The spring arrangement 52 serves yieldingly to hold the slide 12 in its out or extended position. It consists of a horizontally extending rod 54, a spiral tension spring 55 and a lug 56. The rod 54 is disposed between the lower horizontally extending tube section 8 and the slide 12 and extends lengthwise of the horizontally elongated unit that is formed by the tube. The front end of the rod 54 is fixedly secured to a laterally extending lug 57 on the curved central or intermediate portion of the slide 12 by way of a screw 58. The latter extends through a hole in the front end of the rod 54 and into an internally threaded socket in the lug 57. The rear or inner end of the rod 54 is bent at right angles in the direction of the tube section 8. The spiral tension spring 55 is disposed at one side of, and in parallel relation with, the rod 54 and has the rear end thereof suitably connected to the rear end of said rod as best shown in Figure 5 of the drawings. The front end of the spring 55 is connected to the lug 56 which is connected to, and projects laterally from, the front end of the tube section 8. As heretofore indicated the spring arrangement 52 is such that it serves yieldingly to hold the slide 12 for the third valve in its out or forwardly extended position. The ring 53 is adapted to receive the third or fourth finger of the player's left hand and serves as a medium for sliding the slide 12 rearwards against the force of the tension spring 55. It is located directly over the tube section 10 and is provided at the bottom thereof with a substantially horizontal forwardly extending rod 59. The latter is square in cross section as shown in Figures 1, 4 and 5. The front end of the rod 59 extends slidably through a square hole 60 in a vertically extending lug 61, and is adjustably secured in place by means of a set screw 62. The lug 61 is connected to a bracket 63 on the front extremity of the upper end portion of the slide 12, and the set screw 62 extends transversely through a transverse screw threaded bore in the lug. When the set screw 62 is loosened the finger receiving ring 53 may be adjusted forwards or rearwards in order that it may be readily

gripped by the third or fourth finger of the player's left hand. Upon proper adjustment of the ring the set screw is tightened in order that the rod 59 serves rigidly to connect the finger receiving ring for the third valve. It is contemplated that when the first and second valves are used or operated the player of the instrument will, by use of the ring 53, hold the slide 12 for the third valve in its in or rearwardly slid position. It is also contemplated that when the third valve is used simultaneously with the first or second valve, or both, the rearward pressure on the ring 53 will be released in order that the tension spring 55 will effect retraction or outward sliding movement of the slide 12. By sliding the slide 12 rearwards and forwards the player of the instrument may obtain the desired correction of imperfect tones.

In order to determine or vary the stroke of the slide 12, i. e., inward and outward sliding movement, a screw rod 64 is provided. This rod is disposed beneath and extends lengthwise of the slide and has the front end thereof disposed in a screw threaded socket in a depending lug 65 on a bracket 66. As shown in Figures 1 and 4, such bracket is connected to the front extremity of the lower end portion of the slide for the third valve 9. The central portion of the screw rod 64 extends slidably through a depending lug 67 on the front end of the tube section 11. A stop nut 68 on the rear or inner end of the screw shaft 64 coacts with the lug 67 to limit outward sliding movement of the slide 12 and a stop nut 69 on the front end of the rod coacts with the lug to limit inward sliding movement of the slide. The stop nut 68 has associated with it a lock nut 70 for locking it in place and the stop nut 69 has a lock nut 71 associated with it for locking it in place. By adjusting the nut 68 on the shaft 64 the end of the outward sliding stroke of the slide 21 may be varied as desired and by adjusting the nut 69 the end of the inward sliding stroke of the slide 21 may be varied.

The means or mechanism for affecting sliding movement of the slide for the third valve is essentially simple and is capable of being readily actuated while the instrument is being played.

The herein described valve brass instrument is highly efficient so far as operation is concerned and this is directly attributable to the fact that the means or mechanisms for controlling or effecting sliding movement of the tuning slide 21 and the slide 12 for the third valve permit of ready correction of intonation of imperfect tones during playing of the instrument.

Whereas the invention has been illustrated and described in connection with a cornet it is to be understood that it is capable of being embodied in any similar valve brass musical instrument, such as a trumpet, fluegelhorn, baritone or tuba. It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. A valve brass musical instrument adapted to be supported by the player's left hand and played with the right hand and comprising: a sectional tube curved back and forth to form an elongated normally horizontal unit, having a mouthpiece at the rear end thereof and a bell at its front end, and embodying a horizontal series of side by side upstanding valves adjacent to the central portion of the unit, a pair of spaced apart parallel tube sections between the rearmost valve and the mouthpiece, and a main U-shaped tuning slide having the ends thereof of mounted slidably in certain adjacent ends of the tube sections so that it is capable of being slid towards and away from said tube sections for pitch varying purposes; a spring arrangement associated with the tuning element, operative yieldingly to hold the slide in a neutral position, and consisting of a plate extending between and con-

nected to said certain adjacent ends of the tube sections and having a hole in its central portion, a rod disposed between and in parallel relation with the tube sections, having its central portion extending slidably through the hole in the plate, provided at its ends with abutment-forming members, and having the end thereof that is nearer to the slide connected to the curved intermediate portion of the slide, and a pair of oppositely disposed coaxial spiral compression springs mounted on the end portions of the rods respectively and having the outer ends thereof in abutment with said members and their inner ends disposed adjacent to the central portion of the plate; an element positioned rearwards of the upper portion of said rearmost valve, adapted to be engaged and manipulated by the thumb of the player's left hand and mounted to move back and forth; and a lever variety linkage extending between, and connected to, the element and the slide and so arranged that when the element is moved in one direction it operates to slide the tuning slide in one direction from its neutral position and when the element is moved in the opposite direction it operates to slide the tuning slide in the opposite direction from its said neutral position.

2. A valve brass musical instrument according to claim 1 and wherein the thumb-engaged element is in the form of a ring, and the lever variety linkage is so designed

and constructed that when the ring is moved forwards it operates to slide the tuning slide towards the tube sections for pitch raising purposes and when the ring is moved rearwards it operates to slide the tuning slide away from said tube sections for pitch lowering purposes.

3. A valve brass musical instrument according to claim 1 and wherein the end portions of the rod are provided with screw threads, and the abutment-forming members are in the form of nuts which are mounted on the screw threads and are adapted when turned relatively to the rod to vary or change the neutral position of the U-shaped tuning slide.

References Cited in the file of this patent

UNITED STATES PATENTS

550,967	Harris	Dec. 10, 1895
935,626	Lockhart	Sept. 28, 1909
1,662,076	Newman	Mar. 13, 1928
1,764,562	Gulick	June 17, 1950

FOREIGN PATENTS

417,200	France	Aug. 25, 1910
13,509	France	Dec. 5, 1911
305,385	Great Britain	Feb. 7, 1929