

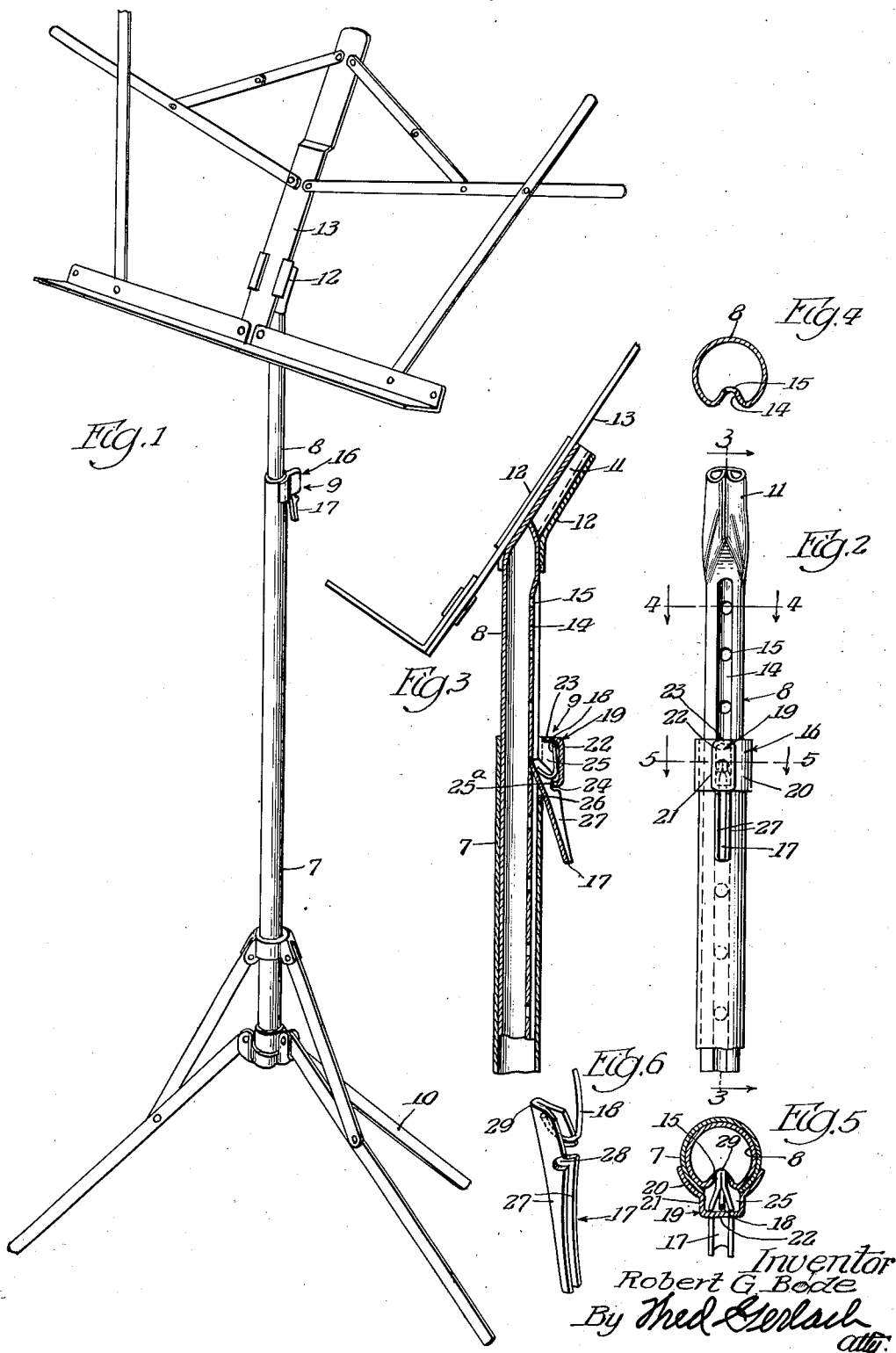
June 21, 1949.

R. G. BODE

2,473,632

EXTENSIBLE STRUT

Filed May 5, 1945



UNITED STATES PATENT OFFICE

2,473,632

EXTENSIBLE STRUT

Robert G. Bode, Chicago, Ill., assignor to The
Norwood Company, Chicago, Ill., a corporation
of Illinois

Application May 5, 1945; Serial No. 592,207

1 Claim. (Cl. 248—161)

1

The present invention relates generally to extensible struts. More particularly the invention relates to that type of extensible strut which is designed for use in connection with, and to form a part of, a music stand or like article and comprises a vertically extending tubular lower member, a vertically extending tubular upper member in telescopic relation with the lower member, and releasable means on the upper end of the lower member for locking the upper member against downward displacement with respect to the lower member after it has been shifted or slid relatively to the latter.

One object of the invention is to provide an extensible strut of this type which is an improvement upon, and has certain advantages over, previously designed struts and is characterized by the fact that it effectively and efficiently fulfills its intended purpose and not only is light in weight but also is capable of being produced at a low and reasonable cost.

Another object of the invention is to provide an extensible strut in which the releasable locking means at the upper end of the vertically extending tubular lower member is of simple and novel design and comprises a lever type detent which is so arranged and constructed that it functions as a one-way clutch whereby the vertically extending tubular upper member may be readily slid upwards without the necessity of manipulating or releasing the lever type detent and is automatically locked against downward displacement after upward shift or sliding thereof relatively to the lower member.

Another object of the invention is to provide an extensible strut of the type and character under consideration in which the vertically extending tubular upper member is formed of sheet metal stock and has an inrolled longitudinally extending rib of U-shaped cross section and the lever type detent constituting the releasable means at the upper end of the tubular lower member for locking the tubular upper member against downward displacement after upward shift thereof is arranged so that one end thereof fits within the rib and coacts therewith to hold the tubular upper member against turning or rotation with respect to the tubular lower member.

A further object of the invention is to provide an extensible strut of the aforementioned type and character in which the lever type detent is constructed and mounted in a novel manner and coacts with a longitudinal series of equidistantly spaced holes in the bottom of the in-

2

rolled rib on the tubular upper member positively to lock the upper member against downward displacement with respect to the lower member after upward shift or sliding movement thereof.

A still further object of the invention is to provide an extensible strut which is generally of new and improved construction and possesses novel characteristics and structural features.

Other objects of the invention and the various advantages and characteristics of the present extensible strut 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 the claim at the conclusion hereof.

In the drawing which accompanies and forms 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 perspective of a music stand having as a part thereof an extensible strut embodying the invention;

Figure 2 is a fragmentary rear elevation of the strut;

Figure 3 is a vertical or longitudinal section taken on the line 3—3 of Figure 2 and illustrating the construction, design and manner of mounting of the lever type detent;

Figure 4 is a horizontal section taken on the line 4—4 of Figure 2 and showing in detail the design and arrangement of the longitudinally extending inrolled rib on the tubular upper member of the strut;

Figure 5 is a horizontal section taken on the line 5—5 of Figure 2 and showing the manner in which the lever type detent constituting the releasable means at the upper end of the tubular lower member for locking the tubular upper member against downward displacement after upward shift thereof, coacts with the rib on the upper member to hold the upper member against turning or rotation with respect to the lower member; and

Figure 6 is a perspective of the lever type detent and the spring for urging the latter into its operative or locking position.

The extensible strut which is shown in the drawing constitutes the preferred form or embodiment of the invention. It is illustrated in connection with, and as forming a part of, a music stand and comprises a vertically extending tubular lower member 7, a vertically extending tubular upper member 8, and releasable

3

means 9 on the upper end of the lower member for locking the upper member against downward displacement with respect to the lower member after it has been shifted or slid relatively to the latter.

The tubular member 7 is preferably formed of sheet metal stock and is circular in cross section and uniform in diameter throughout its length. The upper end of the lower member 7 is open and the lower end is provided with a plurality of depending equidistantly spaced legs 10 whereby the music stand with which the strut is associated is maintained in an upstanding position.

The vertically extending tubular upper member 8, like the lower member 7, is preferably formed of sheet metal stock. It is circular in cross section and fits slidably within the lower member. The external diameter of the upper member is but slightly less than the internal diameter of the lower member in order that the upper member is slidable freely with respect to the lower member while at the same time it is not so loose that it is subject to pronounced lateral displacement with respect to the lower member. The upper end of the upper member 8 is crimped and bent rearwards to form a fitting 11 for slidably receiving a socket equipped clip 12 on a conventional or standard music rack 13. When the rack is in connected relation with the fitting 11 it may be raised or lowered to any desired extent within a predetermined range by sliding the tubular upper member 8 upwards or downwards with respect to the tubular lower member 7. The rear portion of the vertically extending tubular upper member 8 is provided with an inrolled longitudinally extending rib 14 of U-shaped cross section. This rib extends downwards from the fitting 11 to the lower end of the upper member 8 and has a twofold purpose in that it serves to reenforce the upper member against twisting and transverse bending and coacts with the releasable locking means 9 at the upper end of the tubular lower member 7. The upper member 8 is preferably the same in length as the lower member in order that the strut as a whole may be extended to a maximum extent. The inner or bottom portion of the inrolled rib 14 is provided with a longitudinal series of equidistantly spaced transversely extending circular holes 15. Such holes extend completely through the inner portion of the rib and are preferably spaced but a small distance apart.

The releasable locking means 9 on the upper end of the vertically extending tubular lower member 7 operates or functions as hereinafter described and comprises a bracket 16, a lever type detent 17 in pivotally connected relation with the bracket, and a V-shaped wire spring 18 for urging the detent into its locking or operative position. The bracket 16 is in the form of a one-piece sheet metal stamping and consists of a vertically elongated housing part 19 and a pair of attaching parts 20. The housing part of the bracket is located adjacent the rear portion of the upper end of the tubular lower member 7 and embodies a pair of vertically extending laterally spaced parallel side walls 21, an outer wall 22, a top wall 23 and a bottom wall 24. The outer wall 22 extends between, and serves to space apart, the side walls 21 and has its side margins joined to the outer side margins of the side walls. The top wall 23 extends across and is joined to the upper end margins of the side and outer walls of the housing part 19 of the bracket

4

16. The bottom wall 24 extends across and is joined to the lower end margins of the side and outer walls and defines with the latter and the top wall 23 a compartment 25, the inner portion of which opens onto the rear portion of the upper end of the lower member 7. Said rear portion of the upper end of the lower member 7 is provided with a vertically elongated cutout 26 in order that the compartment 25 is in communication with the interior of the upper end of the lower member 7. As best shown in Figure 3 the bottom wall 24 is of less depth than the top wall and hence its inner margin is spaced from the lower inner corners of the side walls 21 of the bracket housing part 19 and forms a bottom opening 25^a leading to the compartment 25. The attaching parts 20 of the bracket are joined to, and extend forwards from, the inner side margins of the side walls 21 of the housing part 19 and extend around the side portions of the upper end of the tubular lower member 7 of the strut. They are arcuate in cross section and are spot welded or otherwise fixedly secured to the adjacent portions of said upper end of the lower member 7. The lever type detent 17 is positioned in an upstanding manner adjacent the rear portion of the upper end of the tubular lower member 7. It is vertically elongated and is preferably in the form of a one-piece sheet metal stamping. As shown in Figure 6 the sheet metal stock of which the detent is formed is bent centrally and longitudinally in order that the detent is of U-shaped cross section and embodies a pair of substantially parallel spaced apart sides 27. The upper end of the detent extends into the compartment 25 via the opening 25^a as shown in Figure 3. The detent is arranged so that the free side margins of the sides thereof project rearwards. The central portions of the rear side margins of the detent sides 27 are provided with opposed or horizontally aligned notches 28 which are in interfitting relation with the inner margin of the bottom wall 24 of the bracket housing part and form therewith a pivotal connection whereby the detent is permitted to tilt or rock laterally with respect to the upper end of the tubular lower member 7. The upper ends of the detent sides 27 are crimped together to form a pointed tooth 29 which extends through the cutout 26 into the inrolled longitudinally extending rib 14 on the tubular upper member 8 and is adapted when the detent is swung in a counterclockwise direction as viewed in Figure 3 when one of the holes 15 is disposed in alignment therewith, to become seated in the hole and thus lock the upper member against downward displacement with respect to the lower member 7. The tooth 29 functions in the manner of a one-way clutch in that it permits the upper member 8 to be slid freely upwards with respect to the lower member 7 without interference on the part of the detent. When the upper member 8 of the strut is slid upwards the tooth 29 is cammed out of seated relation with the adjacent hole 15 thus causing the detent 17 to tilt or rock in a clockwise direction as viewed in Figure 3 and into an inoperative position wherein it releases the upper member. However, when the upper member is brought to rest while one of the holes 15 is in alignment with the tooth 29 the tooth, as heretofore pointed out, seats within the hole and thus locks the upper member against downward displacement with respect to the lower member 7. When it is desired to release the lever type detent 17 in order to

5

lower the upper member 8 the lower end of the detent is swung inwards towards the lower member 7. Such swinging movement on the part of the lower end of the detent effects withdrawal of the tooth 29 from the adjacent hole 15 and thus renders the tooth ineffective to prevent downward sliding movement of the upper member 8 with respect to the lower member 7. The lower end of the lever type detent 17 is exteriorly disposed with respect to the housing part 19 of the bracket 16 and serves as a finger piece whereby the detent 17 may be readily gripped in connection with swinging thereof into its inoperative position. By reason of the fact that the tooth 29 is disposed within the rib 14 regardless of whether it is in its operative or inoperative position it coacts with the rib to hold the tubular upper member 8 against turning or rotation with respect to the tubular lower member 7. The V-shaped wire spring 18 of the releasable locking means 9 serves to urge the tooth 29 on the upper end of the lever type detent in the direction of the holes 15 in the bottom of the inrolled rib 14. It is disposed within the housing part 19 of the bracket 16 and has one leg thereof positioned between the upper ends of the detent sides 27 and its other leg in abutment with the outer wall 22 of said housing part 19, as shown in Figure 3.

When it is desired to extend the strut in order to elevate the rack 13 the tubular upper member 8 is merely slid upwards with respect to the lower member 7. During upward sliding of the upper member the lever type detent 17 is cammed into its inoperative position as hereinbefore pointed out and the tooth 29 at the upper end of the detent snaps past the holes 15 in the bottom of the inrolled rib 14. As soon as the upper member is brought to rest after upward sliding to the desired extent the spring 18 swings the tooth 29 of the detent into its operative position wherein it is in seated relation with the adjacent hole 15 and serves positively to lock the upper member against downward displacement with respect to the lower member. Should the upper member be brought to rest at a point where there is no hole 15 opposite the tooth the tooth will, as a result of frictional engagement with the rib 14, yieldingly hold the upper member against downward sliding movement. However, should the upper member be slid downwards to a limited extent until one of the holes is in opposed relation with the tooth 29 the tooth, as a result of the action of the spring 18, will snap into the hole and thus form a lock whereby the upper member is positively held against downward sliding movement with respect to the lower member 7. When it is desired to lower the upper member 8 the lower end of the lever type detent 17 is swung inwards as hereinbefore described in order to withdraw the tooth 29 from seated relation with the adjacent hole 15. As soon as the tooth is withdrawn from the adjacent hole the upper member 8 is released and hence may be slid downwards to any desired extent.

The herein described extensible strut effectively and efficiently fulfills its intended purpose and because of the construction and design of the releasable locking means 9 it may be extended

6

with facility. Because of the construction of its component parts the strut is capable of being produced at a low and reasonable cost.

Whereas the strut has been described in connection with, and as forming a part of, a music stand it is to be understood that it has other capabilities of use. 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 claim 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:

As a new article of manufacture, an extensible strut comprising a cylindrical vertically extending tubular lower member with a cutout in its upper end, a substantially cylindrical vertically extending upper member slidably mounted within the lower member and provided with a longitudinal groove in alignment with the cutout, a bracket connected to the upper end of the lower member and embodying a housing part shaped to form a compartment with the inner portion thereof open and in communication with said cutout, consisting of top, outer, side and bottom walls, and having an opening in the inner portion of its bottom wall, an upstanding lever type detent of U-shaped cross section having the upper end thereof extending into the compartment via said opening and provided with a ratchet type tooth extending into the groove in the upper member and coacting therewith to hold the two members against relative rotation, said detent having the central portions of its sides notched and in such interfitting relation with the bottom wall of the bracket housing part as to form a pivotal connection whereby the detent may be rocked into and out of an operative position wherein said tooth engages the groove defining portion of the upper member and serves to hold said upper member against downward sliding movement with respect to the lower member, and a V-shaped wire spring disposed wholly within the housing part of the bracket, having one leg thereof fitting against the outer wall of said housing part and its other leg disposed within and abutting against the upper end of the detent, and serving to urge the detent into its said operative position.

ROBERT G. BODE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
60 744,386	Norton	Nov. 17, 1903
1,320,613	Gilcrease	Nov. 4, 1919
1,534,759	Betterley	Apr. 21, 1925
1,786,308	Latourelle et al.	Dec. 23, 1930
1,994,980	Cook	Mar. 19, 1935
65 2,164,609	Cusick	July 4, 1939

FOREIGN PATENTS

Number	Country	Date
5,173	Great Britain	1888