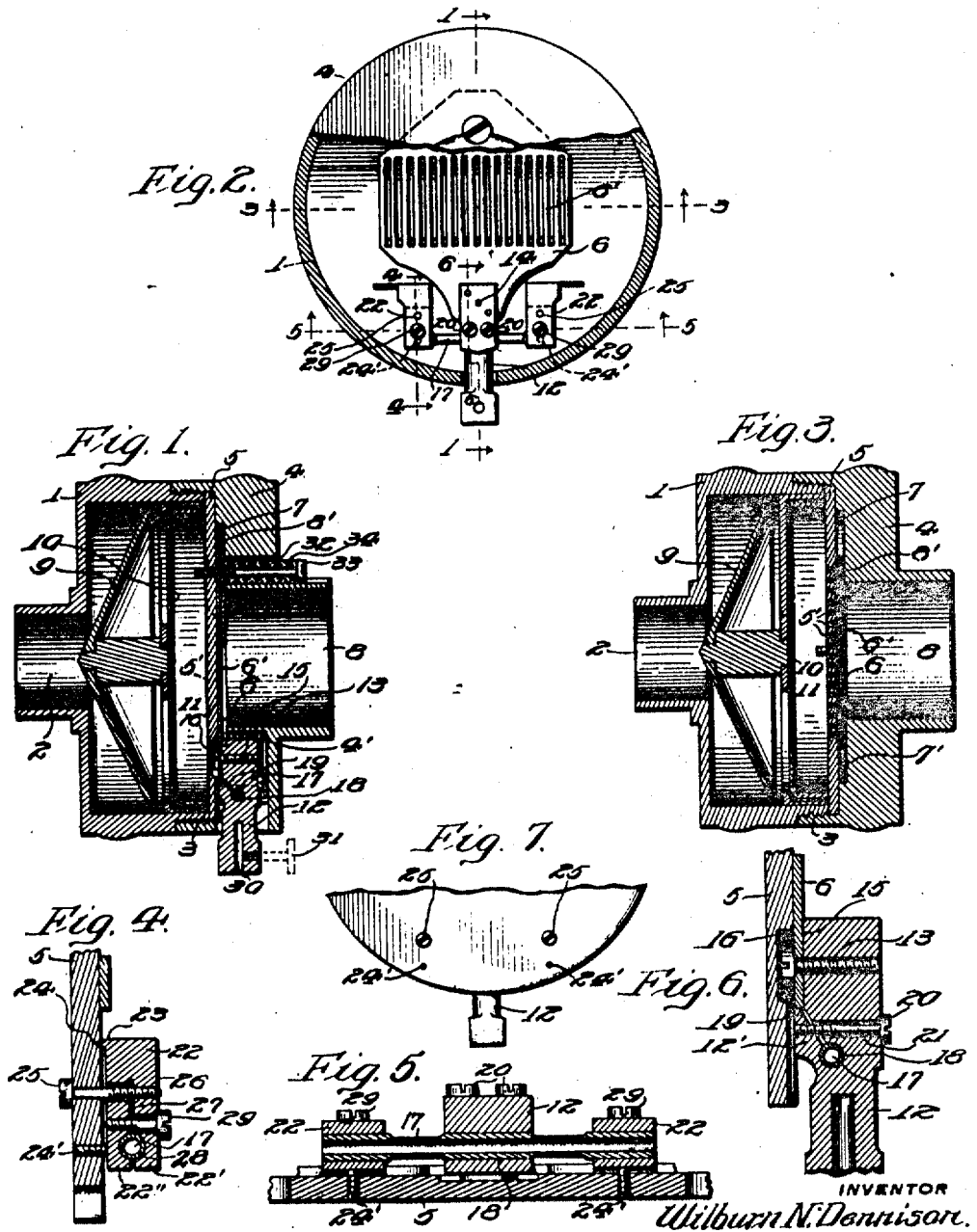


W. N. DENNISON.
SOUND BOX FOR TALKING MACHINES.
APPLICATION FILED JAN. 24, 1907.

1,060,672.

Patented May 6, 1913.



WITNESSES
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UNITED STATES PATENT OFFICE.

WILBURN N. DENNISON, OF MERCHANTVILLE, NEW JERSEY, ASSIGNOR TO VICTOR TALKING MACHINE COMPANY, A CORPORATION OF NEW JERSEY.

SOUND-BOX FOR TALKING-MACHINES.

1,060,672.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed January 24, 1907. Serial No. 353,774.

To all whom it may concern:

Be it known that I, WILBURN N. DENNISON, a citizen of the United States, and a resident of the borough of Merchantville, county of Camden, State of New Jersey, have invented certain new Improvements in Sound-Boxes for Talking-Machines, of which the following is a full, clear, and complete disclosure, reference being had to the accompanying drawings, forming part of this specification.

This invention relates in general to sound boxes, but more particularly to pneumatic sound boxes for talking machines and includes improvements in that form of pneumatic sound box in which a valve is provided, the movable member of which is positioned within and very close to the sound box casing so that the air passing through the valve is caught or trapped between the movable member and the casing to cushion or balance the movable member.

The main objects of this invention are to provide in a sound box an improved mounting for a stylus bar and a valve carried thereby, and whereby the valve may be conveniently and accurately adjusted; to provide a yielding resistance in the path of the valve and adjustable from the outside of the sound box casing; and to provide other improvements as will appear hereinafter.

In the drawings: Figure 1 is a longitudinal section on line 1—1 of Fig. 2; of a sound box constructed in accordance with this invention; Fig. 2 a fragmentary front view of the same; Fig. 3 a longitudinal sectional view on line 3—3 of Fig. 2; Fig. 4 an enlarged sectional view on line 4—4 of Fig. 2; Fig. 5 an enlarged sectional view on the line 5—5 of Fig. 2; Fig. 6 an enlarged sectional view on line 6—6 of Fig. 2; and Fig. 7 a fragmentary back view of a portion of the device.

Referring to the drawings, the improved sound box shown, comprises a casing having a substantially cylindrical hollow main portion 1, the central portion of the back end face of which is provided with a reduced tubular extension having a cylindrical opening 2 forming an inlet through which air or other suitable fluid is forced by any suitable means into the sound box. The front end of the main portion 1 of the casing is reduced exteriorly in diameter and is pro-

vided with external screw threads 3 over which is threaded a cap or cover 4 which forms the front end of the casing.

For impressing sound waves on a fluid current passing through the sound box, there is provided a stationary valve seat 5, and a valve 6 cooperating therewith. The valve seat 5, which is preferably flat and circular, is securely clamped in position by and between the main portion 1 and the cap 4 of the casing, and is provided centrally with a series of parallel oblong openings or ports 5'. The valve 6, which preferably consists of a normally flat flexible plate of steel, or other resilient or suitable material, is arranged between the seat 5 and the cap 4 of the casing, and is provided with a series of parallel oblong openings or ports forming grid bars 6', which are proportioned and arranged to cover the ports 5' in the valve seat.

The inner face of the cap 4 is provided with an annular recess 7 for the reception of the valve 6, and the valve 6 is normally separated from the inner wall 7' of the cap by only a few thousandths of an inch thereby forming a chamber 8' between the valve and the wall 7'. The cap 4 is further provided upon its front end with a reduced tubular extension, forming a cylindrical outlet 8 which is in axial alinement with the valve, the cross sectional area of the opening being less than the area of the valve. In this arrangement the openings through the valve 6 extend on opposite sides of the outlet 8 through the cap, and the air after passing through the openings in the valve will enter the chamber 8' between the cover and the valve to cushion or balance the valve and will then pass out through the opening 8 of the cap.

For spreading and distributing the fluid current in the sound box, there is arranged with the casing 1 and between the valve seat 5 and the inlet 2 a conical deflector or spreader 9, which tapers toward the inlet 2 coaxially therewith, the marginal edge of the deflector being spaced from the inner surface of the casing to provide an annular passage between the edge of the spreader and the casing. Spaced between the spreader 9 and the valve seat 5 is a reticulated or foraminous diaphragm 10, preferably of closely woven silk or other fabric,

which acts to filter the fluid received from the spreader and to equalize its pressure, and diffuse the fluid equally throughout the chamber 11 between the diaphragm and the valve seat 5, so that the fluid will pass through the several ports of the valve seat with equal velocities.

For oscillating the valve 6 in accordance with a sound record, the valve is carried by a stylus bar 12, the lower portion of the valve being rigidly secured to the bar by means of a screw 13 and steady or guide pins 14, and the stylus bar is preferably cut away, as at 15, to receive the valve, and the valve seat 5 is provided with a recess 16 for the reception of the head of the screw 13.

For supporting the stylus bar and the valve carried thereby, a torsional spring bar or pivot 17 extends adjustably through an opening 18 in the stylus bar. An oblique kerf 19 is provided between the opening 18 through the stylus bar and the cut out portion 15 of the bar, and screws 20 pass freely through suitable transverse openings 21 of the main portion of the stylus bar and are threaded through the portion 12' separated from the main portion by the kerf 19 whereby the stylus bar is securely clamped to the torsional spring, the bar being adjustable rotatively with respect to and longitudinally of the spring as shown in Figs. 2-5-6.

To provide a mounting for the stylus bar which will hold the bar and valve carried thereby upon a substantially fixed axis, but which will permit of the proper freedom of oscillation, the torsional spring bar 17 is preferably tubular in form and made of steel or other resilient material. The ends of the tubular spring 17 are rigidly mounted in bearing blocks 22 which are adjustably mounted on the face of the valve seat 5 as hereinafter described, and the spring is preferably weakened upon each side of the stylus bar by being provided with an external annular recess between the stylus bar and each bearing block.

To provide space for the upper portion of the stylus bar and for the parts upon which the bar is mounted, the inner wall of the cap 4 is recessed as at 4' the recess being no larger than is actually required for the purpose. This provides a space for the reception of those parts of the device that project from the valve in the direction of the balancing or cushioning chamber 8' without materially increasing the effective size of the balancing chamber, and therefore without decreasing the balancing effect.

For adjusting the axis of oscillation of the valve toward or away from the plane of its seat, each of the blocks 22 supporting the stylus bar is provided at one end with a knife edge 23 engaged in a knife edge groove 24 in the face of the valve seat. An adjust-

ing screw 24' for each block is threaded through the valve seat from the back thereof and the inner end of the screw engages against the rear face of the bearing block. Also inserted from the back of the valve seat and extending loosely therethrough is a clamping screw 25 for each block, this screw being threaded as at 26, into the front portion 22' of the block and passing freely through the rear portion 22'' of the block, the lower end of the block being divided into the two portions 22' and 22'' by the longitudinal kerf 27.

By properly adjusting the screws 24' and then clamping the blocks 22 upon the knife edges 23 and upon the ends of the screws 24' by means of the screws 25 the bearing blocks are held rigidly against the valve seat. By this construction it is evident that the axis of oscillation of the stylus bar and valve carried thereby can be readily adjusted toward or away from the valve seat whereby the valve may be adjusted to rest normally squarely upon the seat, which is a very desirable result.

To clamp the torsional spring 17 within the openings 28 in the journal blocks 22, each block is provided with a screw 29 passing freely through the front portion 22' of the block in front of the kerf 27, and threaded into the portion 22'' of the block upon the other side of the kerf 27, whereby when the screw 29 is tightened the two portions of the block are forced toward each other and are clamped rigidly upon the torsional spring. The lower end of the stylus bar projects outwardly through the recess 4' which opens through the side of the cap 4 of the casing, and is provided with the usual socket 30 for holding a stylus, the stylus being clamped in the socket by the usual set screw 31 or other suitable means.

For yieldingly restraining the oscillations of the valve there projects outwardly through an opening 32 in the front end of the cap 4 a screw 33, the inner end of which passes loosely through a suitable opening in the upper end of the valve and is threaded into the valve seat 5. An elastic bushing or washer 34 is mounted upon the screw between the head thereof and the front of the valve. The pressure upon the elastic washer 34 may be adjusted by the adjustment of the screw in the valve seat whereby the valve may be held yieldingly against its seat under a predetermined adjustable tension.

In the operation of this device, with a substantially uniform pressure of air in the chamber 11, the tensioning screw 33 might be dispensed with, and the valve allowed to oscillate freely upon its spring 17, but since the pressure of the air in the chamber 11 generally varies and may be greater than is absolutely necessary for the operation of the

device, the elasticity of the washer 34 prevents the valve from being blown or forced too far from its seat. It usually happens that while the pressure of air in the chamber 11 forces the whole of the valve away from its seat during the operation of the device the undulations are impressed upon the moving current of air by the flexing as well as the vibrating of the valve.

10 Although this invention has been described as embodied in a pneumatic sound box, it is obvious that some of the features of the invention might be used in other forms of sound boxes or in other devices. 15 For instance the improved mounting for the stylus bar might be used in connection with any well known form of sound box having a diaphragm instead of a valve. Therefore when the term "sound box" is 20 used it is intended to cover any form of sound reproducing means to which this invention might be applied. Moreover, the term "a mounting for said bar" and similar terms in the claims are intended to cover 25 either a mounting for a stylus bar or a mounting for a sound reproducing valve, or any other movable member. Furthermore, although only one form in which this invention may be embodied is described herein, in many changes might be made in the construction set forth without departing from the spirit of this invention or the scope of the appended claims.

Having thus fully described the invention 35 I claim and desire to protect by Letters Patent of the United States:

1. In a sound box, the combination with a valve seat, of a valve mounted to oscillate with respect to said seat, a stylus connected to said valve, and means to adjust 40 the position of the axis of said valve toward and away from said seat.

2. In a sound box, the combination with a flexible valve, of a stylus bar on which said valve is mounted, a torsional spring forming a pivot for said bar, and laterally adjustable means to clamp said bar to said spring.

3. In a sound box, the combination with 50 a stylus bar, of a torsional spring on which said bar is mounted, mountings for said spring, laterally adjustable means to clamp said mountings to said spring, and means to adjustably clamp said bar to said spring.

4. In a sound box, the combination with 55 a relative stationary member, of a stylus bar, a torsional spring upon which said stylus bar is adjustable, clamping blocks for said spring, means to adjust said blocks 60 laterally with respect to said stationary member, and a valve mounted on said stylus bar.

5. In a sound box, the combination with a stationary member, of a stylus bar, a tor-

sional spring upon which said bar is adjust- 65 ably mounted, blocks for said spring secured to said stationary member, means to adjust said spring laterally with respect to said stationary member, and a flexible valve 70 mounted on the inner end of said stylus bar.

6. In a sound box, the combination with a relatively stationary member, of a valve, a pivoted stylus bar on which said valve is mounted, journal blocks for said bar, each 75 of said blocks being provided at one end with a knife edge engaging in a groove provided therefor in said stationary member, adjusting screws passing through said stationary member and engaging the opposite 80 ends of said blocks respectively, means to secure said blocks to said stationary member, and means to adjustably clamp said stylus bar to said blocks.

7. In a sound box, the combination with a valve seat, of a valve coöperating there- 85 with, laterally adjustable means to cause said valve to rest squarely upon said seat when said sound box is inoperative, and means to oscillate said valve in accordance 90 with sound waves.

8. In a sound box, the combination with a valve seat, of a flexible valve, a pivoted stylus bar to which said valve is secured, and means to adjust the pivot of said bar 95 toward and away from said seat, to cause said valve to rest squarely on said seat.

9. In a sound box, the combination with a valve seat, of a pivoted valve, a casing within which said valve is mounted, means 100 adjustable from the outside of said casing for holding one end of said valve yieldingly against said seat, and means for vibrating said valve in accordance with sound waves.

10. In a sound box, the combination with 105 a cap provided with a stylus bar recess, of a relatively stationary valve forming with said cap a valve chamber, a valve located within said chamber, a stylus bar secured to one end of said valve and located within and substantially filling said stylus bar recess, said cap being also provided with an opening adjacent the opposite end of said 110 valve, and adjustable yielding means substantially filling said opening and acting to force the latter end of said valve against said seat.

11. In a sound box, the combination with a casing, of a valve seat adjacent one side of said casing and forming therewith a balancing chamber, a valve within said chamber, a stylus bar secured to said valve, and blocks in which said stylus bar is pivoted, said casing being provided with a recessed 115 portion substantially filled by said stylus bar and said blocks.

12. In a sound box, the combination with a valve seat, of a valve mounted to oscillate 120 in accordance with sound waves with re-

spect to said seat, and means to adjust the position of the axis of oscillation of said valve toward and away from said seat.

13. In a sound box, the combination with a substantially flat valve seat, of a valve mounted to oscillate about an axis substantially parallel to said seat, and in accordance with sound waves, and means to adjust the position of said axis laterally.

14. In a sound box, the combination with a valve seat, of a valve mounted to oscillate with respect thereto in accordance with sound waves, and means to adjust said valve longitudinally of its axis of oscillation.

15. In a sound box, the combination with a valve mounted to vibrate in accordance with sound waves, of a casing inclosing said valve, and means adjustable from without said casing for limiting the extent of vibration of said valve.

16. In a sound box, the combination with a valve mounted to vibrate in accordance with sound waves, of a casing inclosing said valve, and yielding means adjustable from without said casing for limiting the extent of vibration of said valve.

17. In a sound box, the combination with a valve seat, of a valve mounted to vibrate with respect to said seat in accordance with sound waves, a longitudinally adjustable member extending through said casing and into said seat, and yielding means between said member and said valve to restrain the movement of said valve.

18. In a sound box, the combination with a stylus bar, of a mounting therefor comprising a pair of blocks rotatably mounted on knife edges on the same axis, means to adjust the free end of each block with respect to said axis, and a rod connecting said blocks and said bar.

19. In a sound box, the combination with a stylus bar, of a tubular torsional spring fixed intermediate of its ends to said bar, and means holding the ends only of said spring in fixed position.

20. In a sound box, the combination with a stylus bar, of a tubular torsional spring fixed intermediate of its ends to said bar, and means to hold the ends of said spring in fixed position, said bar being adjustable longitudinally of said spring, and said spring being adjustable laterally.

21. In a sound box, the combination with a stylus bar, of a tubular torsional spring fixed to said bar, and means to hold the ends of said spring in fixed position, said spring being adjustable longitudinally and laterally.

22. In a sound box, the combination with a valve mounted to vibrate in accordance with sound waves, of a casing inclosing said valve, and means cooperating within said casing with said valve, and adjustable from

without said casing, for applying a yielding resistance to the vibration of said valve.

23. In a sound box, the combination with a movable sound reproducing member, of a mounting therefor, comprising a pair of blocks rotatably mounted upon the same axis, means to adjust the free end of each block with respect to said axis, and means connecting said blocks and said movable member.

24. In a sound box, the combination with a movable sound reproducing member, of a tubular torsional spring fixed intermediate of its ends to said movable member, and means to hold the ends of said tubular member in fixed position, said tubular member being weakened between one end and said movable member.

25. In a sound box, the combination with a movable sound reproducing member, of a mounting therefor comprising a tubular spring said spring being weakened intermediate of its ends.

26. In a sound box, the combination with a movable sound reproducing member, of a mounting therefor, comprising a tubular yielding member, said tubular member being provided with an annular recess to weaken the same.

27. In a sound box, the combination with a fixed valve member, of a movable valve member mounted to oscillate with respect thereto in accordance with sound waves and means to adjust the position of the axis of said movable member with respect to said fixed member.

28. In a sound box, the combination with a valve seat of a movable member mounted to oscillate adjacent one side of said seat in accordance with sound waves, and means adjustable from the other side of said seat for adjusting the axis of said movable member with respect to said seat.

29. In a sound box, the combination with a valve seat, of a movable member mounted to oscillate adjacent one side of said seat in accordance with sound waves and means extending through said seat and adjustable from the other side thereof for adjusting the axis of said movable member.

30. In a sound box, the combination with a valve seat of a movable sound reproducing valve upon one side of said seat, a mounting for said valve comprising a block upon one side of said seat, a screw threaded through said seat from the other side thereof and resting against said block, and a screw passing freely through said seat and threaded into said block said block being adjustable by means of said screws to change the position of the said movable member.

31. In a sound box, the combination with a flexible sound reproducing valve, mounted to oscillate, of a casing inclosing said valve,

and means adjustable from the outside of said casing for applying a pressure adjacent to the free end of said valve.

32. In a sound box, the combination with a substantially flat valve seat of a flexible sound reproducing valve mounted to oscillate on an axis, a casing inclosing said valve, yielding means adjustable from the outside of said casing for applying a pressure to the free end of said valve, and in a direction substantially perpendicular to said seat.

33. In a sound box, the combination of a casing, a valve seat therein provided with a port, a valve for opening and closing said port in accordance with sound waves, and means coöperating within said casing with said valve, and adjustable from outside said casing for counterbalancing pressure on the inner side of said valve.

34. In a sound box, the combination with a stylus bar provided with an aperture extending therethrough and a kerf extending from said aperture, means extending through said aperture to support said bar, and means for drawing the sides of said kerf together to clamp said stylus bar on said supporting means.

35. In a sound box, the combination with a torsional support, of a stylus bar rigidly mounted thereon, and a pair of split blocks clamped on said support for supporting the same.

36. In a sound box the combination with a valve seat, of a movable valve member mounted to oscillate in accordance with sound waves adjacent said seat upon an adjustable axis.

37. In a sound box, the combination with a pair of fixed supports, of a stylus bar between said supports, and yielding means connecting said bar to said supports, said means being reduced in cross section between said bar and each of said supports.

38. In a sound box, the combination with a pair of fixed supports, of a stylus bar be-

tween said supports, and a yielding tube connecting said bar to said supports, said tube being reduced in cross section between said bar and each of said supports.

39. In a sound box, the combination with a member forming a valve seat, of a movable sound reproducing member mounted to oscillate with respect to said seat, and means to adjust the position of said movable member in a direction substantially parallel to said seat.

40. In a sound box, the combination with a valve seat, of a movable valve member arranged to coöperate with said seat to reproduce sounds, and adjustable in a direction substantially parallel to said seat.

41. In a sound box, the combination with a valve seat, of a valve member arranged to be moved toward and away from said seat to reproduce sounds, and adjustable in a direction substantially parallel to said seat.

42. A stylus lever for talking machine reproducers having an opening therein to receive pivoting means, said lever being formed with resiliently connected portions on opposite sides of said opening adapted to snugly incase said pivoting means within said opening.

43. A stylus lever for talking machine reproducers having an opening formed therein to receive pivoting means and having a slot or kerf therein communicating with said opening.

44. A stylus lever for talking machine reproducers having an opening therein to receive pivoting means and having a kerf or slot intersecting said opening and extending to the periphery of the lever.

In witness whereof I have hereunto set my hand this 22nd day of January A. D., 1907.

WILBURN N. DENNISON.

Witnesses:

HARRY COBB KENNEDY,
ALSTON B. MOULTON.

It is hereby certified that in Letters Patent No. 1,060,672, granted May 6, 1913, upon the application of Wilburn N. Dennison, of Merchantville, New Jersey, for an improvement in "Sound-Boxes for Talking-Machines," an error appears in the printed specification requiring correction as follows: Page 3, line 56, for the word "relative" read *relatively*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of June, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents

and means adjustable from the outside of said casing for applying a pressure adjacent to the free end of said valve.

32. In a sound box, the combination with a substantially flat valve seat of a flexible sound reproducing valve mounted to oscillate on an axis, a casing inclosing said valve, yielding means adjustable from the outside of said casing for applying a pressure to the free end of said valve, and in a direction substantially perpendicular to said seat.

33. In a sound box, the combination of a casing, a valve seat therein provided with a port, a valve for opening and closing said port in accordance with sound waves, and means coöperating within said casing with said valve, and adjustable from outside said casing for counterbalancing pressure on the inner side of said valve.

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35. In a sound box, the combination with a torsional support, of a stylus bar rigidly mounted thereon, and a pair of split blocks clamped on said support for supporting the same.

36. In a sound box the combination with a valve seat, of a movable valve member mounted to oscillate in accordance with sound waves adjacent said seat upon an adjustable axis.

37. In a sound box, the combination with a pair of fixed supports, of a stylus bar between said supports, and yielding means connecting said bar to said supports, said means being reduced in cross section between said bar and each of said supports.

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