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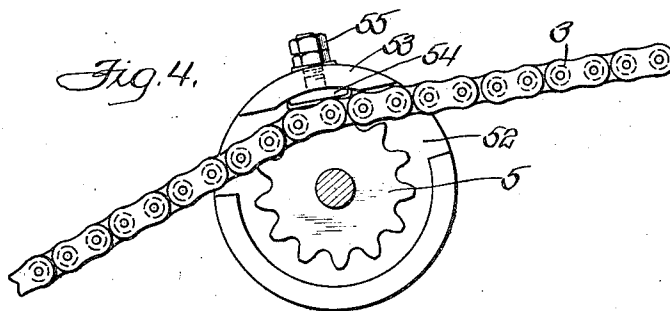
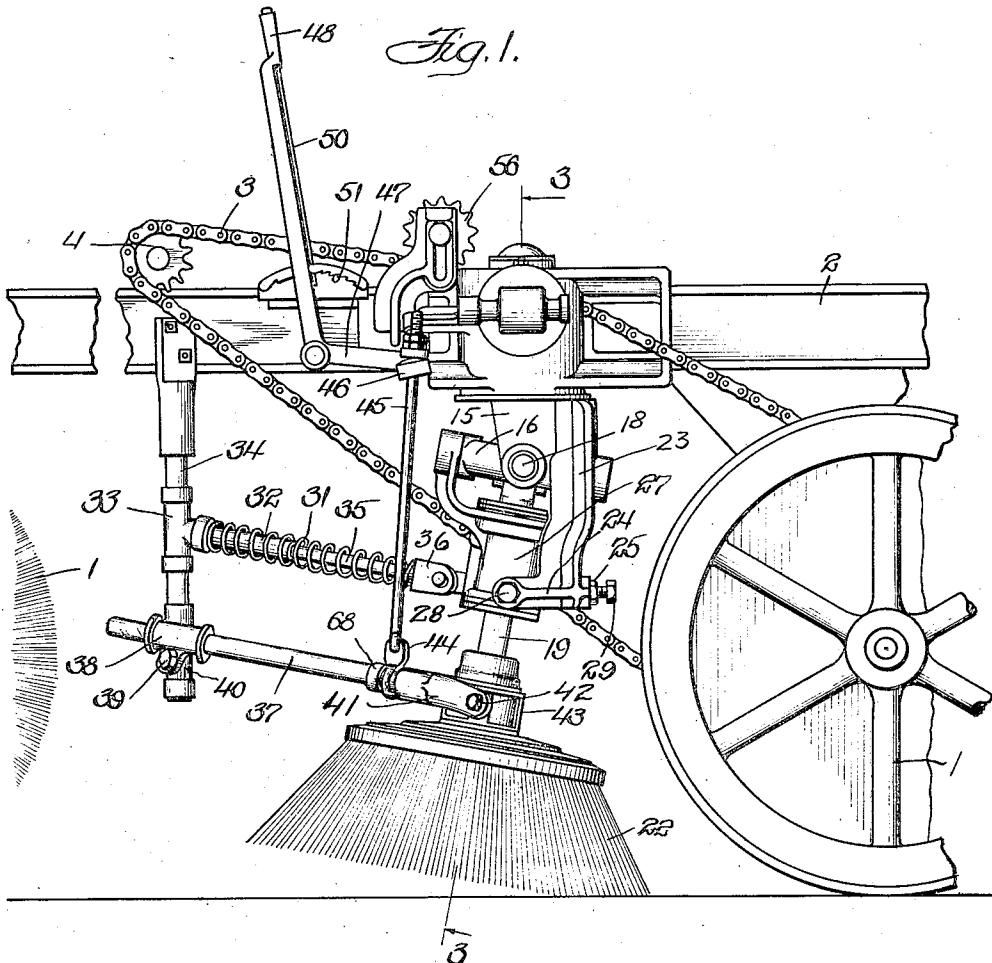
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E. R. MARTIN

GUTTER BROOM ARRANGEMENT FOR STREET SWEEPERS

Filed March 28, 1922

3 Sheets-Sheet 1



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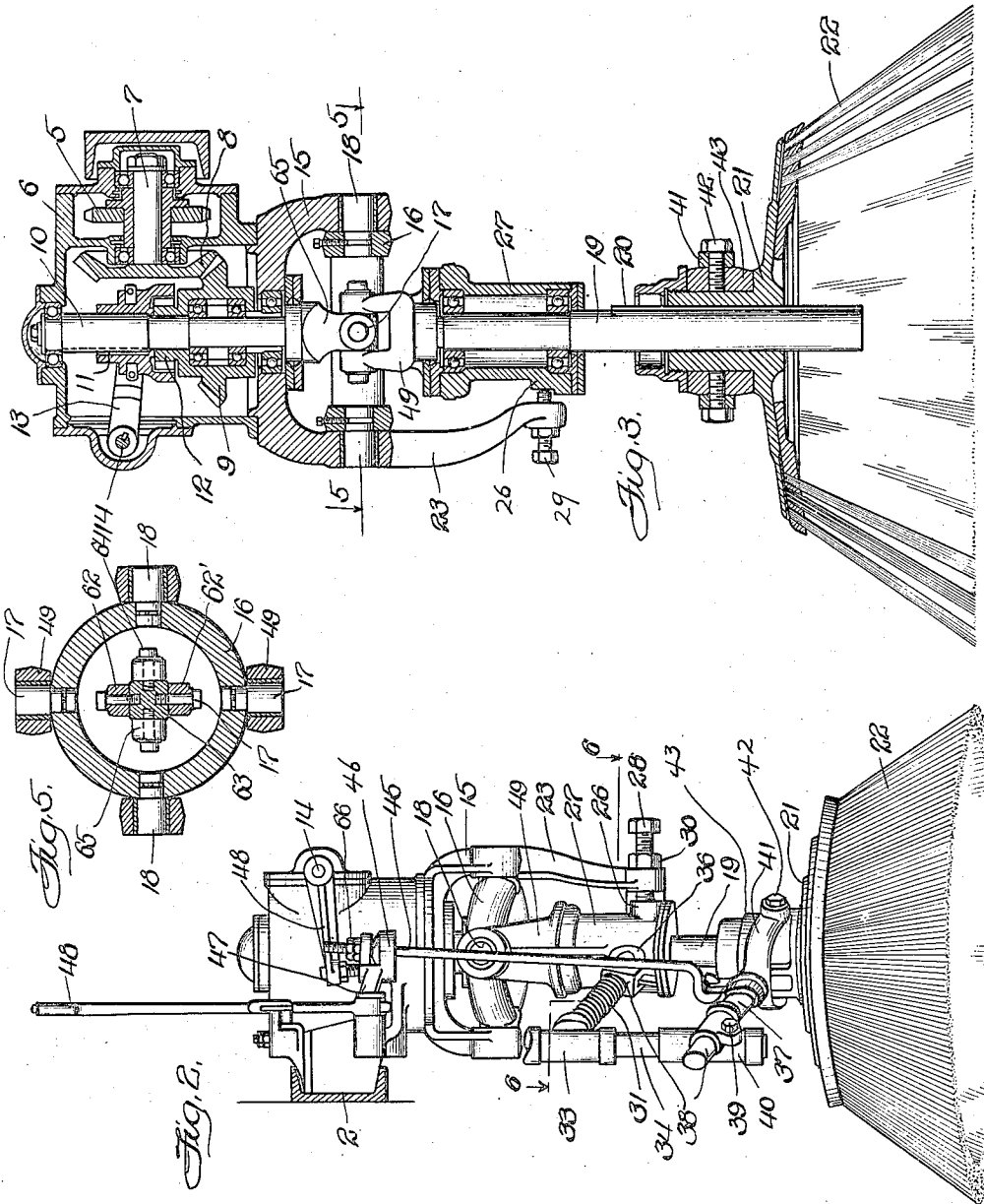
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GUTTER BROOM ARRANGEMENT FOR STREET SWEEPERS

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3 Sheets-Sheet 2



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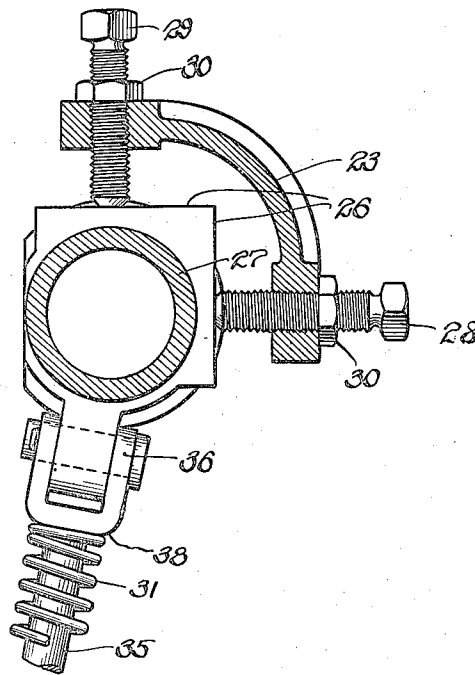
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3 Sheets-Sheet 3

Fig. 6.



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UNITED STATES PATENT OFFICE.

ELMER R. MARTIN, OF ELGIN, ILLINOIS, ASSIGNOR TO ELGIN STREET SWEEPER CO.,
OF ELGIN, ILLINOIS, A COPARTNERSHIP CONSISTING OF CHARLES A. WHITING,
JAMES TODD, AND DANIEL M. TODD.

GUTTER-BROOM ARRANGEMENT FOR STREET SWEEPERS.

Application filed March 28, 1922. Serial No. 547,361.

To all whom it may concern:

Be it known that I, ELMER R. MARTIN, citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in a Gutter-Broom Arrangement for Street Sweepers; and I 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.

My invention relates to gutter cleaning attachments for street sweeping machines and in one of its general aspects aims to provide a strong and easily adjusted arrangement for normally maintaining a gutter-cleaning brush tilted at any desired angle both rearwardly and laterally of the machine while permitting a movement of the brush out of its said disposition when it encounters an undue obstacle, and while permitting the ready raising and lowering of the brush. Furthermore, it aims to provide an arrangement for this purpose which will not impose unduly severe strains on the universal joint needed in the gutter brush shaft for permitting the said angular adjustment, aims to provide effective means for operatively disconnecting the brush from the driving mechanism whenever it is raised off the street, and aims to arrange the said connecting means so that the rotation of the brush will be started before the latter is lowered to the extent of contacting with the surface of the street.

In another aspect, my invention aims to provide simple and effective means for preventing the link belt employed for driving such a gutter brush from slipping out of mesh with a sprocket wheel associated therewith, and aims to arrange this provision in such a manner that it can readily be employed without unduly tensioning the link belt and so that the tension of this belt can readily be adjusted to compensate for the stretching of the same or for variations in its length. Still further and also more detailed objects will appear from the following specification and from the accompanying drawings, in which—

Fig. 1 is a fragmentary side elevation of a street sweeping machine employing a gutter-cleaning brush ahead of a main rotary

broom, showing a desirable embodiment of my invention.

Fig. 2 is an enlarged end view of the same, taken from the left hand end of Fig. 1, omitting the driving chain and the upper portion of the stem which takes the thrust of the shaft-tilting spring.

Fig. 3 is an enlarged transverse section taken through Fig. 1 along the correspondingly numbered line of that figure.

Fig. 4 is an enlarged and fragmentary elevation of the chain guiding arrangement forming part of the mechanism of Fig. 1, but taken in the opposite direction from that figure.

Fig. 5 is a transverse section through two concentric universal joints associated respectively with the gutter-brush shaft and the thrust collar on this shaft, taken along the correspondingly numbered line in Fig. 3.

Fig. 6 is an enlarged horizontal section taken along the line 6—6 of Fig. 2.

In one of its immediate commercial applications, my invention is particularly adapted for use on street sweeping machines of the general class of the one described in U. S. Patent No. 1407180, issued Feb. 21, 1922, to Daniel M. Todd on a gutter cleaning attachment for street sweepers. In this Todd patent, the main rotating broom of the machine is preceded along one side by a gutter-sweeping broom mounted on a pendent shaft and this pendent shaft has a universal joint in the same to permit the angle at which the brush engages the street to be varied as desired. In the arrangement of the said Todd patent, the rearward thrust upon the brush is rigidly resisted by the stem of a lifting lever which can be shifted in position by the driver of the machine. While such a rigid resistance is generally desirable, it does not allow for the unusual strains which occur when the gutter-sweeping brush strikes an immovable projection or other obstacle, so that parts of the mechanism are liable to be damaged when such an occasion arises.

Moreover, in the arrangement disclosed in the said Todd patent, the strains due to unusual obstacles in the path of the gutter-sweeping brush are also transmitted to the universal joint in the shaft of that brush in such a manner as to impose stresses on this joint, which stresses are apt to be too severe

for the necessarily small pivotal parts of a compactly built universal joint. Furthermore, the arrangement of the cited patent is apt to leave the gutter-cleaning brush stationary until this brush strikes the ground, so that the brush has to be started in rotation from rest against the resistance due to the friction of the brush on the ground, thereby imposing undesirable strains on the clutch.

My invention in some of its aspects aims to overcome all of these objections; first, by providing a yielding resistance to a swinging of the gutter-brush shaft out of its normal angular disposition, while permitting a ready adjustment of this position and also of the extent of the yielding resistance; second, by providing a separate universal joint associated with the means for yieldingly resisting the swinging of the gutter-brush shaft, which second universal joint relieves the joint in the brush shaft of the strains produced when the brush encounters an undue obstacle; and third, by arranging the clutch so that when the brush is lowered, rotation of the same will be started before the brush strikes the ground. Furthermore, my invention aims to provide simple means for keeping the driving chain from skipping.

Illustrative of these improvements, Fig. 1 shows a fragmentary side elevation of such a street sweeping machine, including a main sweeping brush 1 supported below the frame 2 of the machine and having a suitable sprocket connection to a link belt 3 trained over a rear sprocket 4 supported by the said frame and meshing also with a driven sprocket 5 within the casing 6 of the brush-driving mechanism. This sprocket 5 is fast upon a shaft 7 connected by a bevel gear 8 to a second bevel gear 9 which is freely rotatable upon the upper portion 10 of the brush shaft. Splined to this shaft is a clutch head 11 having downwardly directed jaws adapted to mesh with corresponding clutching teeth 12 which are integral with the bevel gear 9, so that the said two clutch portions together with the splining of the collar 11 to the shaft 10 will connect this shaft in driven relation to the sprocket 5 when the clutch collar 11 is lowered as shown in Fig. 3. However, this driving of the clutch shaft will be interrupted whenever the clutch collar 11 is raised by means of the lever 13 fastened to a rock-shaft 14 operable by suitable means as hereafter more fully described.

The shaft 10 has its lower end fastened to a fork 65 which is pivoted by pins 64 to a pivot block 63, and this block is pivoted by pins 62 to a fork 49 fastened to the extension shaft portion 19 which carries the brush. Hence these parts, as shown in Fig. 5 af-

ford a universal joint which will permit the ready tilting of the lower shaft portion in case the gutter brush 22 strikes any undue obstacle. Surrounding this universal joint in the articulated shaft and with its axes normally in the same plane with those of the said joint is a second universal joint which is operatively interposed between the bottom 15 of the gear and clutch casing and a thrust collar 27 through which the lower shaft portion 19 extends. This outer universal joint is here shown as consisting of a ring 16 pivoted by pins 18 to a forked portion of the said casing bottom 15, which ring is pivoted by pins 17 to a fork 49 secured to the top of the thrust collar 27.

To control the tilting of the shaft, I also provide the forked extension of the said casing bottom 15 with a depending arm 23 having at its lower end a cross-bar 24 which extends partially around the thrust collar 27. These thrust screws are threaded through circumferentially spaced portions of the cross-bar 24 and extend at right angles to each other, each of the thrust screws being latched by a lock nut 30 which permits the screw to be clamped in an adjusted position. Each thrust screw bears at its tip against a flattened portion 26 on the collar 27. Thus arranged, it will be evident from Fig. 2 that by running the screw 29 further inwards or towards the left of that figure I can cause the sleeve 27 and the pendent shaft portion within the same to tilt laterally inward of the machine, and likewise by tightening the bolt 28 I can cause this pendent shaft portion to tilt rearwardly of the machine. Gravity will normally oppose such a tilting but ordinarily would be inadequate for affording the needed extent of frictional engagement between the brush and the street, hence I desirably supplement the action of gravity by spring means interposed between the lower portion of the articulated shaft and a stationary part of the machine. For this purpose, I am here showing the thrust collar 27 as continuously pressed towards the screws 28 and 29 by a spring 31 which is operatively interposed between the collar 27 and a rigid stem 34 depending from the frame 2 of the machine. This compression spring 31 is desirably guided by a stem which has one portion 32 pivotally socketed in a T 33 secured to the pendent stem 34, and which has a companion part 35 telescoped within the tube 32 and equipped at its free end with a fork 36 which is pivoted to a suitably arranged ear on the thrust collar 27. Thus arranged, the slidably interfitting guide stem parts 32 and 35 combine in forming a guide for the spring, while the socketing of the part 32 at its free end and the pivoting of the fork 36 to the journal permit the required tilting of

this guide stem in response to the swinging movement of the lower shaft portion 19. At the same time, the forked connection of this guide to the thrust collar prevents the latter from rotating and hence holds the bearing face portions continuously opposite the screws 28 and 29 respectively.

latching plate 51 to permit this lever to be latched either in the position in which it disengages the clutch and holds the gutter-cleaning brush considerably above the ground, or in any one of the number of positions in which the brush engages the surface of the street to a varying degree.

To permit of the needed raising and lowering of the gutter-cleaning brush 22, I desirably employ the rigid pendent stem 34 as a support for a rocking lever 37 which forms part of the means for raising the brush. For this purpose, I am here showing this lever as extending slidably through a sleeve 38 which is pivoted on a bolt 39 to a sleeve 40 fastened to the lower end of the rigid stem 34, and am showing the other end of the lever 37 as carrying a fork 41 pivoted by bolts 42 to a collar 43 which is journaled on the brush head 21 as to allow this head to rotate freely with respect to the collar. Then I also provide the said lever with a screw eye 44 engaged by a lifting rod 45, which rod extends through a finger 46 on one arm 47 of a bell-crank lever so that it can slide upwardly through this finger. Threaded on this lifting link are nuts 66 which can be adjusted in position to vary the effective length of the link. The other arm of the bell-crank lever has a handle 48 disposed within easy reach of the driver of the machine. This lever also has its said arm 47 disposed in the path of the free end of an arm 48 secured to the rock-shaft 14 which carries the clutch-actuating arm 13 of Fig. 3.

With the parts thus arranged, it will be obvious that when the gutter-cleaning brush is thrown into action as shown in Fig. 1, and impinging of this brush either against the curb or against some undue obstacle on the surface of the street will swing the lower portion 19 of the articulated shaft towards the pendent stem 34, and that the spring 31 which resists such a swinging movement will return the shaft to its previous position as soon as the sweeper has passed the encountered obstacle. Consequently, I avoid a damaging of parts of the mechanism associated with such a gutter-cleaning brush, as heretofore encountered with brushes of this kind supported by rigidly mounted shafts. It will also be obvious that by forming the spring guide of two slidably interfitting parts 32 and 35 and by extending the stem 37 slidably through the sleeve 38, I readily permit such a swinging movement and also permit the raising and lowering of the brush without interfering with the arrangements for yieldingly holding the lower portion of the articulated shaft at a desired angle. So also, the slip joint connection between the finger 46 on the bell-crank lever and the lifting rod will permit the brush to be raised in riding over elevations on the street surface without affecting the adjustment of this rod. To prevent the tilting of the lower shaft portion from twisting the screw eye 44 in a way which might tend to tilt the collar 43 on the head of the brush, I desirably do not fasten this screw eye rigidly to the lever 37 but employ as its lower portion a collar loosely surrounding a part of the said lever and held near the fork 41 by a ring 68 fastened to the said lever.

Thus arranged, it will be obvious from Fig. 1 that a movement of the lever which carries the handle 48 towards the left will raise the lever arm 47, thereby causing the lifting rod 45 to raise the brush off the street to a height depending on the adjustment of the nuts 66, and also causing the lever arm 48 and the parts connected to the latter to raise the upper clutch head 11 out of engagement with the lower clutch portion 12. Consequently, such a movement of the handled lever will lift the gutter-cleaning brush clear of the surface of the street and also will disconnect the articulated shaft from the driving mechanism, so that no power will be expended in rotating the brush when duly lifted. However, the effective length of the lifting rod 45 is such that the clutch will be engaged upon a corresponding movement of the bell-crank lever before the brush engages the ground. By so doing, I permit the brush-carrying shaft to be started in its rotation while free of resistance by engagement of the brush with the ground, thereby avoiding undue strains on the clutch and undue shocks on the driving mechanism. I also desirably provide the handle lever 48 with any customary type of latching arrangement 50 engaging a suitably notched

While my arrangement effectively avoids an overstraining of parts of the gutter-cleaning mechanism, the encountering of obstacles by the gutter-cleaning brush (as for example by the impact against a curb due to an unduly close approach of the machine to the curb) may still cause a sudden shock to the driving mechanism, which shock may tend to halt the sprocket 5 and hence might cause the driving chain 3 to bow upwardly out of engagement with this sprocket. To avoid this, I desirably provide a guard adjacent to this sprocket and equip this guard with a flange surrounding the major portion of the sprocket but having parts of the flange cut away to permit the chain to pass freely through the guard after the manner shown in Fig. 4. Then I mount on a portion 53 of this flange a check-plate 54 which

desirably has a threaded stem so that it can be adjusted in position by nuts 55, and which plate approaches the chain 3 but still permits the chain to pass freely between the said plate and the sprocket 5. If any tendency to halt the sprocket should occur, the check-plate 54 will prevent the chain from being bowed or otherwise lifted out of mesh with the sprocket, so that this simple arrangement enables me to avoid the skipping of the chain which heretofore has been a considerable source of trouble, particularly in view of the fact that variations in the lengths of the links when duly assembled or variations due to the gradual stretching of the chain makes it difficult to provide the exact needed length of chain even if an idler 56 is employed in connection with the same after the manner shown in Fig. 1.

However, while I have illustrated and described my invention as embodied in a form having various highly desirable features, I do not wish to be limited to the details of construction and arrangement here disclosed. Obviously, these might be modified in many ways without departing from the spirit of my invention or from the appended claims, and certain of the features might likewise be used independent of other features.

I claim as my invention:—

1. In a street sweeping machine, an articulated shaft depending at one side of the machine, a brush mounted thereon, means yieldingly resisting a swinging of the brush-carrying shaft portion rearwardly of the machine, and means limiting the swinging of the said shaft portion forwardly of the machine.

2. In a street sweeping machine, an articulated shaft depending at one side of the machine, a brush carried by the shaft, means yieldingly resisting a swinging of the brush-carrying shaft portion both rearwardly and inwardly of the machine, and positive means limiting the swinging of the said shaft portion in the opposite directions.

3. In a street sweeping machine, an articulated shaft depending at one side of the machine, a brush carried by the shaft, means yieldingly resisting a swinging of the brush-carrying shaft portion rearwardly and inwardly of the machine, and separately adjustable means for limiting the swinging of the said shaft portion in the opposite directions.

4. In a street sweeping machine, a brush, a pendulatively mounted shaft supporting the brush and splined thereto, means for yieldingly predetermining the direction in which the shaft depends, and separate means for sliding the brush on the shaft to raise or lower the brush.

5. In a street sweeping machine, an articu-

lated shaft depending at one side of the machine, a brush slidably but non-rotatably mounted on the shaft, means yieldingly resisting a swinging of the brush-carrying shaft portion rearwardly and inwardly of the machine, separately adjustable means for limiting the swinging of the said shaft portion in the opposite directions, and means operable by the driver of the machine for raising and lowering the brush by sliding it upon the shaft without affecting the said adjustments.

6. In a street sweeping machine, a pendulatively supported shaft, a brush mounted at the lower end of the shaft, a thrust collar journaled upon the shaft, an extensible guide pivoted to the collar and extending transversely of the shaft continuously in one general direction, and spring means associated with the said guide for urging the pivoted end thereof toward the collar.

7. In a street sweeping machine, a pendulatively supported shaft, a brush mounted at the lower end of the shaft, a thrust collar supported by and journaled upon the shaft, an extensible guide pivoted to the collar and extending transversely of the shaft continuously in one general direction, means fast upon the frame of the machine and in engagement with the other end of the guide, and a spring interposed between the said means and the other end of the guide and tending to extend the guide.

8. In a street sweeping machine, a pendulatively supported shaft, a brush mounted on the lower end of the shaft, a thrust collar journaled upon the shaft, a telescoping guide pivoted to the collar and extending transversely of the shaft continuously in one general direction, a thrust-receiving member fast upon the frame of the machine and disposed on the opposite side of the collar from the guide, and yielding means continuously tending to extend the guide so to move the shaft away from the thrust-receiving member.

9. In a street sweeping machine, a pendulatively supported shaft, a brush mounted on the lower end of the shaft, a thrust collar journaled upon the shaft, a guide pivoted to the collar and extending transversely of the shaft continuously in one general direction, a thrust-limiting member disposed on the opposite side of the collar from the guide, yielding means continuously urging one end of the guide toward the thrust-limiting member, and means on the thrust-limiting member for adjusting the extension of the latter toward the collar.

10. Mechanism as per claim 9, in which the adjusting means comprise a pair of elements threadedly connected to the thrust-limiting member and converging toward the collar.

11. Mechanism as per claim 9, in which the adjusting means comprise a pair of ele-



ments threadedly connected to the thrust-limiting member and converging toward the collar, and in which the collar has portions respectively formed for engaging the said elements.

12. In a street sweeping machine, a shaft portion mounted on the frame of the machine, an extension shaft portion connected thereto by a universal joint, a collar in which the extension shaft is journaled; means associated with the collar for preventing rotation thereof and for resisting a swinging movement of the said extension above its universal joint connection in certain directions; a gutter-cleaning brush splined to the extension shaft, and means under control of the driver of the machine for sliding the brush on the shaft to raise or lower the brush.

13. In a street sweeping machine, a shaft portion mounted on the frame of the machine, an extension shaft portion connected thereto by a universal joint, a collar in which the extension shaft is journaled; means associated with the collar for preventing rotation thereof and for resisting a swinging movement of the said extension about its universal joint connection in certain directions; a gutter-cleaning brush splined to the extension shaft, means under control of the driver of the machine for sliding the brush on the shaft to raise or lower the brush, and means including a universal joint substantially concentric with the aforesaid joint for supporting the collar.

14. In a street sweeping machine, a gut-

ter-cleaning attachment including a brush adapted to be raised and lowered, driving mechanism for the said broom including a clutch having a jaw adapted to be raised or lowered for respectively disengaging or engaging the clutch; a lever connected to the said clutch jaw, and a lifting rod connected to the brush and a bell-crank lever arranged for simultaneously moving the said rod and lever, the rod being adjustable in effective length and connected to the lever by a slip joint.

15. In a street sweeping machine, a rigid stem and an articulated shaft both depending from the frame of the machine, a collar journaled upon the lower shaft portion, a lever pivoted to both the collar and the stem, a gutter-cleaning brush having a head journaled between the collar and the lower shaft portion and slidably splined to this shaft portion, and lifting means connected to the lever.

16. In a street sweeping machine, a pendulating shaft, a brush slidably but non-rotatably mounted on the lower end of the shaft, a lever pivoted on a rigid portion of the machine and connected at its free end to the brush, an eye member mounted on the lever with freedom for limited twisting movement thereon, a control lever operable by the driver of the machine, and a lifting rod connecting the control lever with the eye member.

Signed at Elgin, Illinois, March 24, 1922.

ELMER R. MARTIN.