March 3, 1959 H. BURGDORFF 2,875,459

KNEE-ACTION STREET SWEEPER BROOM

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Fig. 1

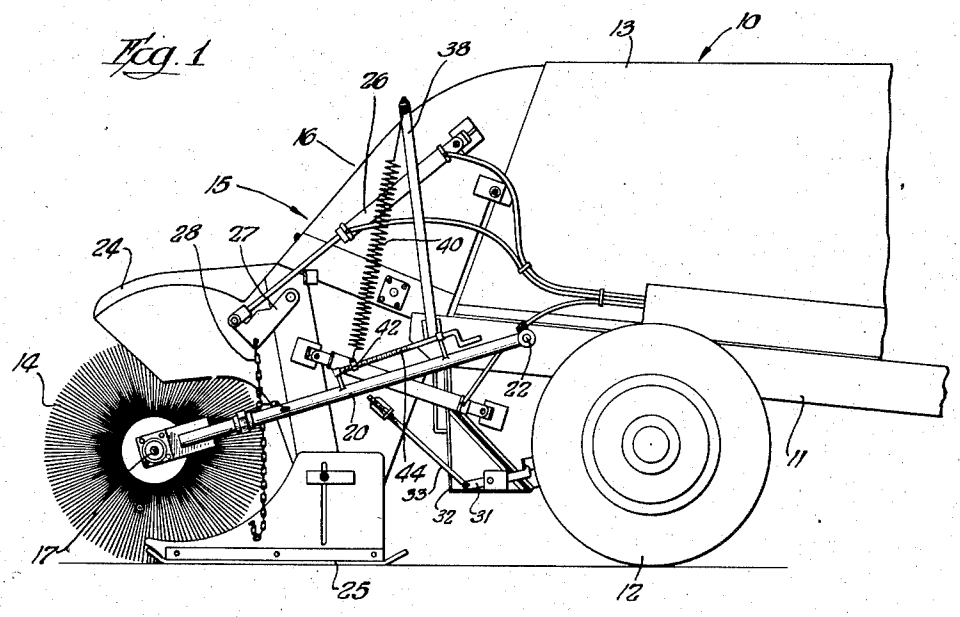


Fig. 2

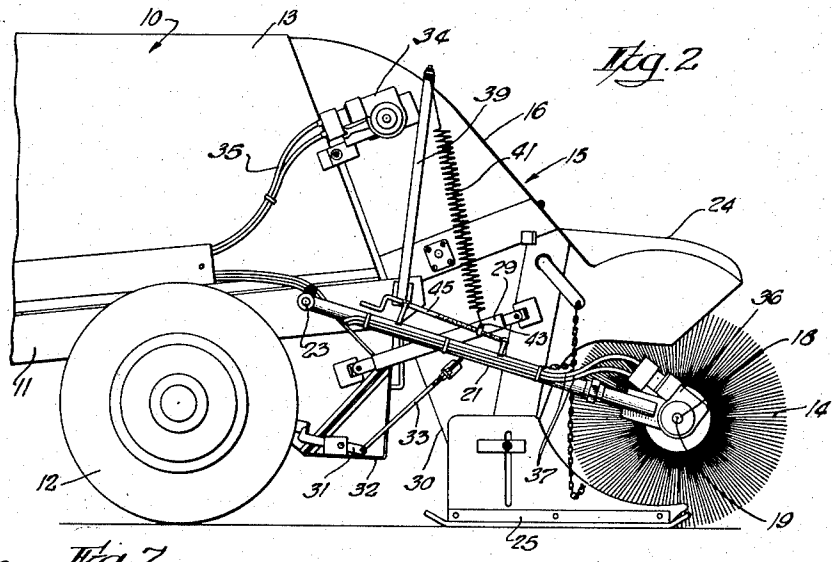
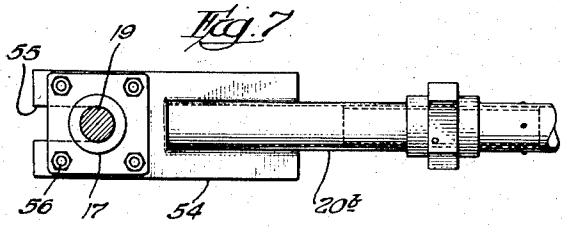


Fig. 7



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Fig. 3

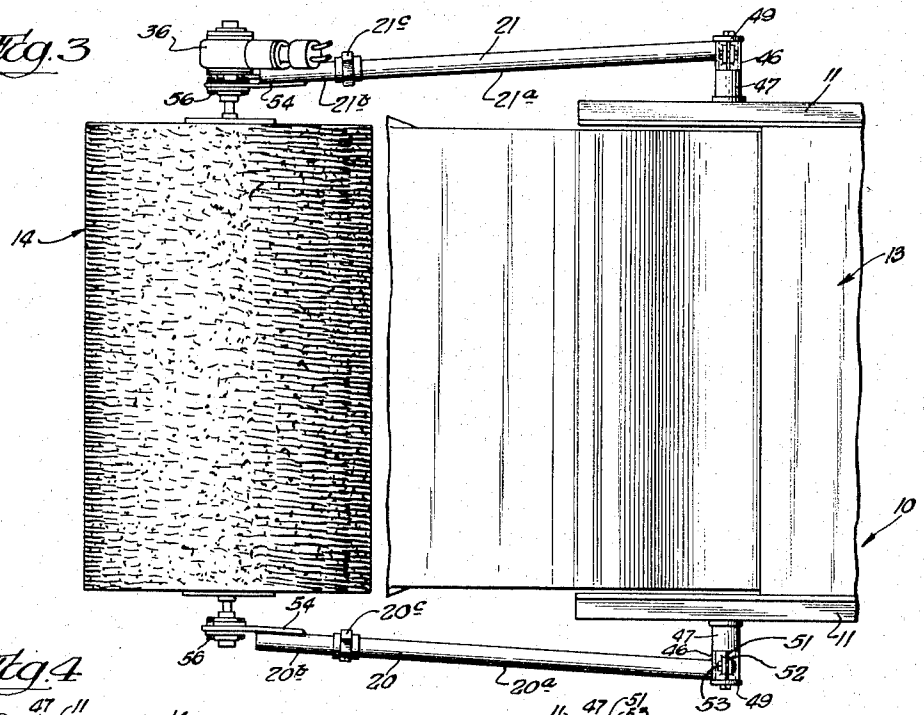


Fig. 4

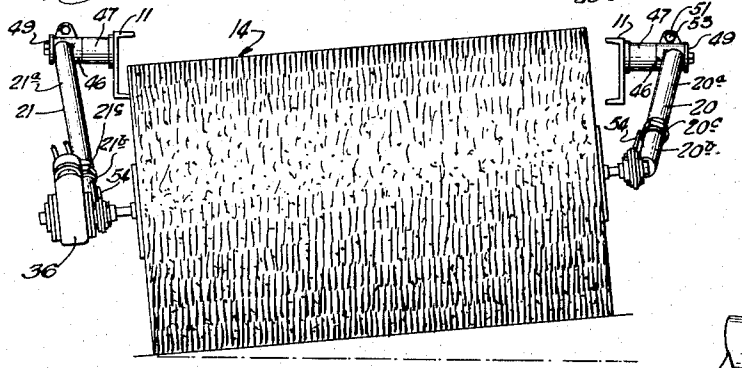


Fig. 6

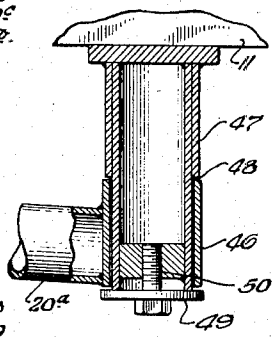
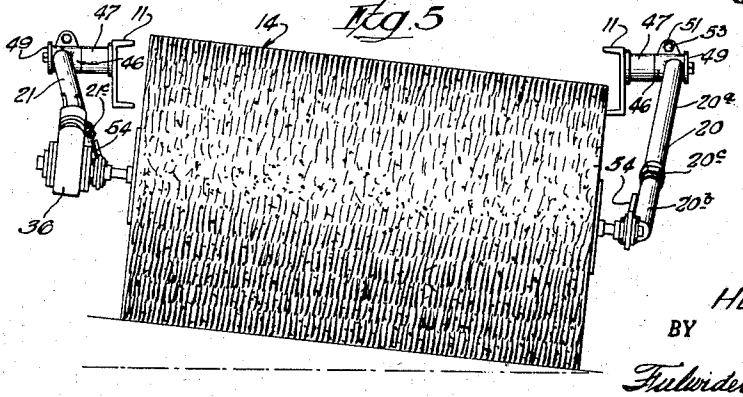


Fig. 5



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KNEE-ACTION STREET SWEEPER BROOM

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5 Claims. (Cl. 15—84)

This invention relates generally to truck-type street sweepers which employ a large power driven cylindrical broom, transversely disposed with respect to the street sweeper, to whisk refuse from the street into the street sweeper, usually by way of an elevator means which transports the refuse from the pickup broom to a refuse hopper. More particularly, the present invention relates to a novel arrangement for carrying the pickup broom between a pair of arms each capable of swiveling about one end and of longitudinal rotation to permit said pickup broom to adjust to the contour of the street surface.

In street sweepers heretofore known, it has been customary to employ a large cylindrical broom transversely mounted at the rear of the street sweeper and rotated by means of a power take-off from the street sweeper engine, to pick up refuse from the street. It has been customary to carry the broom on bearings mounted in a frame swinging about a transverse horizontal axis at the rear of the street sweeper. Springs, or other yielding support for the frame have been used to carry the broom in light brushing contact with the street surface. Most of the weight of the broom is thus carried by the street sweeper rather than by the broom bristles, thus avoiding unnecessary power consumption and bristle wear.

However, the great majority of paved roads are more or less crowned in the center, so that a street sweeper travelling down the right side of a crowned street subjects its pickup broom to very heavy wear near its left end, until the broom has been worn down to the shape of frustum of a cone. Even then, excessive wear is encountered as the street sweeper changes from streets having one angle of crown to another, or attempts to sweep a relatively flat surface.

The same forces which wear down the broom by bearing unequally across its transverse dimension, also subject the supporting framework to bending stresses, which are sometimes severe enough to be felt by the street sweeper operator as a jolting of the entire apparatus.

It is a major object of the present invention to provide a street sweeper pickup broom with "knee-action suspension," that is with each end of the broom axis sufficiently free to move to permit any lateral rocking of the broom required for adjustment to inclinations of the road surface transverse to the direction of travel of the street sweeper.

It is another major object of the invention to provide broom driving motor means riding with the broom itself and free to move relative to the street sweeper, without any mechanical driving interconnection therewith.

It is another object of the present invention to provide a knee-action suspension with means for adjusting the looseness of fit of movable joints in the suspension, to permit twisting accommodation of the suspension without bending of its structural members.

Still other objects of the invention, and advantages thereof, will be apparent from the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a right side elevation of the rear part of a truck-type street sweeper;

Figure 2 is a left side elevation of the rear part of a street sweeper;

Figure 3 is a plan view of a pickup brush mounted in a street sweeper with a form of the knee-action suspension of the present invention;

Figure 4 is a rear elevation of the pickup broom and suspension of Figure 3;

Figure 5 is a view taken from the same direction as Figure 4 but showing the accommodation of the broom and suspension to a street surface of opposite slope;

Figure 6 is a fragmentary section detailed view of the suspension mounting on the street sweeper; and

Figure 7 is a detail of the broom mounting.

In Figure 1, a street sweeper is indicated generally by the numeral **10**, only the rear part of the sweeper, particularly those associated with a pickup broom being illustrated.

The rear part of the street sweeper chassis **11** is supported on the rear wheels **12** and carries a street sweeper body **13**, the interior of which (not shown) serves at least in part as a refuse receiving hopper.

A large cylindrical pickup broom **14** is transversely disposed at the rear of the street sweeper **10** and carried in combination with a pickup assembly indicated generally by the numeral **15** and including a housing **16** for a chute and elevator means (not shown) for transporting refuse swept up by the pickup broom to the refuse hopper within sweeper body **13**.

Broom bearings **17** and **18** (see Figure 2) at each end of the broom axis **19** are carried at the swinging end of a pair of supporting arms **20** and **21**, which are swivel connected to the chassis **11** at **22** and **23** respectively. A hood **24**, side shoes **25**, and arms **20** and **21**, can be raised from the street surface, together with the broom **14** by means of hydraulic cylinder **26**, link **27**, and chain **28**.

When it is desired to dump refuse from the hopper within the sweeper body **13**, the hydraulic cylinder **29** (seen in the left side view of Figure 2) is actuated to expel its plunger and thereby lift the assembly including the broom **14**, hopper **24**, shoes **25**, and supporting arms **20** and **21**, and also to retract the lower part of the chute **30**, thereby unlatching hopper gate latch **31** and opening the hopper gate **32** by means of the rod **33**.

Hydraulic motor means are used to drive each part of the street sweeper **10** independently of the others. A hydraulic motor **34**, supplied with hydraulic fluid through lines **35**, is used to drive the street sweeper elevator system (not shown) and a hydraulic motor **36**, supplied with hydraulic fluid through lines **37**, mounted on supporting arm **21**, drives the pickup brush **14**. Note that the hydraulic motor **36** rides with the pickup brush assembly and is connected to the street sweeper body **13** only by flexible hydraulic conduits, so that complex mechanical driving means are avoided, and assembly and disassembly is relatively simple.

Each of the brush-supporting arms **20** and **21** is suspended near its midpoint from brackets **38** and **39** on the street sweeper body **13** by means of helical springs **40** and **41**, respectively. The springs **40** and **41** are anchored to the arms **20** and **21** by means of nuts **42** and **43**, and crank screws **44** and **45**, to provide anchorage points which are longitudinally adjustable along the supporting arms. Ordinarily, the left side spring **41** is anchored at a point nearer the pickup broom than the right side spring **40**, so that the transverse position of the broom **14** matches the usual contour of the street surface as the street sweeper **10** moves down the right side.

As best seen in the Figures 3, 4, and 5, the supporting arms **20** and **21** are each comprised of two sections, **20***a*

and 20*b*, and 21*a* and 21*b*, respectively, which are rotatable relative to each other about the longitudinal axis of the arm which they comprise. Thus, a first section 20*a* is coupled to a section 20*b* by means of a tubular coupling 20*c* which combines the first and second sections 20*a* and 20*b* into a single beam arm 20 but permits free rotation of the second section 20*b* about a longitudinal axis while the first section 20*a* experiences no rotation. The left side arm 21 is similarly provided with a coupling 21*c*.

The first section 20*a* of the arm 20 is swiveled at the truck chassis 11 by means of a transverse tubular bearing 46, welded at the pivot end of the first section 20*a*, and received on a stub shaft 47, seating against a shoulder 48 thereon, and retained by a cap 49 threaded into the end of the stub shaft 47 as indicated at 50. The left arm 21 is similarly swiveled.

As seen in Figure 3, the tubular bearing 46 is longitudinally split at 51 and provided with a pair of ears 52, through which a tightening screw 53 is passed to provide means for loosening or tightening the play in the swivel connection.

The second section 20*b*, the bearing supporting section of the arm 20 is shown in detail in Figure 7. A bearing plate 54 is welded to the end of the second section 20*b* and notched at its outer end with a notch 55 to receive the end of broom shaft 19. Four bolt holes 56 are provided with which to fasten the bearing 17 to the bearing plate 54.

It will be seen from the foregoing description that each end of the broom 14 is free to accommodate itself to the street surface independently of the other. Figures 4 and 5 illustrate typical accommodation to road surfaces of opposite contour by lateral rocking of several degrees.

An important feature of the invention is that the hydraulic driving means 36 is associated with a safety hydraulic by-pass line, preferably at the pump (not shown) supplying hydraulic fluid under pressure. Thus, in case the pickup broom 14 is jammed by refuse or the street surface, the pressure in the hydraulic system grows until the by-pass valve opens, which pressure is established at some point lower than that at which structural damage could occur to the street sweeper.

It will be understood that the specific embodiment above described is exemplary only of the invention and not limitative. It is my intention to include within the scope of my invention all those variations, modifications, and improvements which fall within the scope of the appended claims.

I claim:

1. In a street sweeper, a pickup broom for projecting refuse from the street surface into said street sweeper, which includes: a cylindrical broom; a pair of bearings rotatably supporting said broom at each end of its axis; a pair of arms, one at each end of said broom, each carrying one of said bearings near one end and swivelably attached to said street sweeper at the other end each of said arms having means therein permitting rotation of the bearing end of said arm relative to the swivelably attached end about the longitudinal axis of said arm, and resilient supporting means between said street sweeper and each of said arms to support said broom in sweeping contact with the street surface.

2. A pickup broom as described in claim 1 which is driven by means of a hydraulic motor carried on one of said supporting arms, and supplied with hydraulic fluid by means of flexible connections with said street sweeper.

3. In a street sweeper, a pickup broom for projecting refuse from the street surface into said street sweeper, which includes: a cylindrical broom; a pair of bearings rotatably supporting said broom at each end of its axis; a pair of arms, one on each side of said street sweeper, each of said arms being swivelably attached to said street sweeper; a pair of bearing carrying means, one with each of said bearings attached to the swinging end of each of said arms by means of a coupling permitting relative rotation between said means and said arm about the longitudinal axis of said arm; motor means associated with one of said bearing carrying means for driving said broom; and resilient support means between said street sweeper and each of said arms.

4. A street sweeper as described in claim 3 which said swivelable attachment includes: shaft means projecting from each side of said street sweeper; cylindrical bearing means on the swivelable attached end of each of said arms and received on said shaft means, said cylindrical bearing means being longitudinally split and adjustable to increase or reduce play.

5. A street sweeper as described in claim 3 in which each of said bearing carrying means includes a vertically disposed plate with a horizontal slot to receive a broom bearing and which said resilient support means includes a spring suspension from said street sweeper, on each arm, and anchoring means on each arm for said spring suspension which is longitudinally adjustable along said arm.

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