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GUARD ROLLER FOR SWEEPING MACHINES

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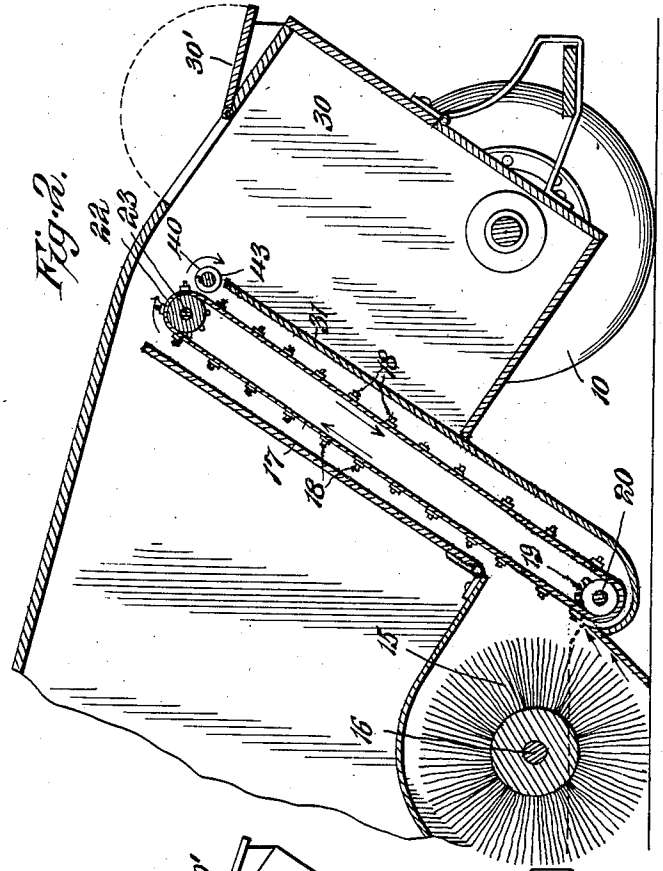

Fig. 2.

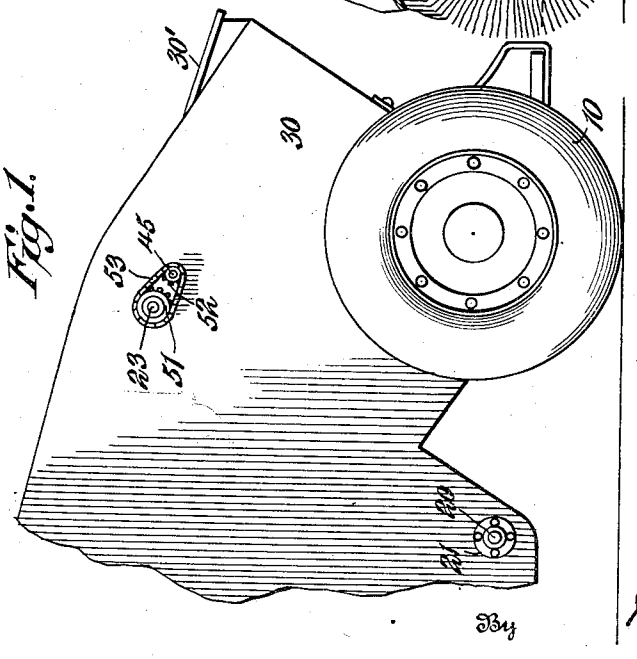

Fig. 1.

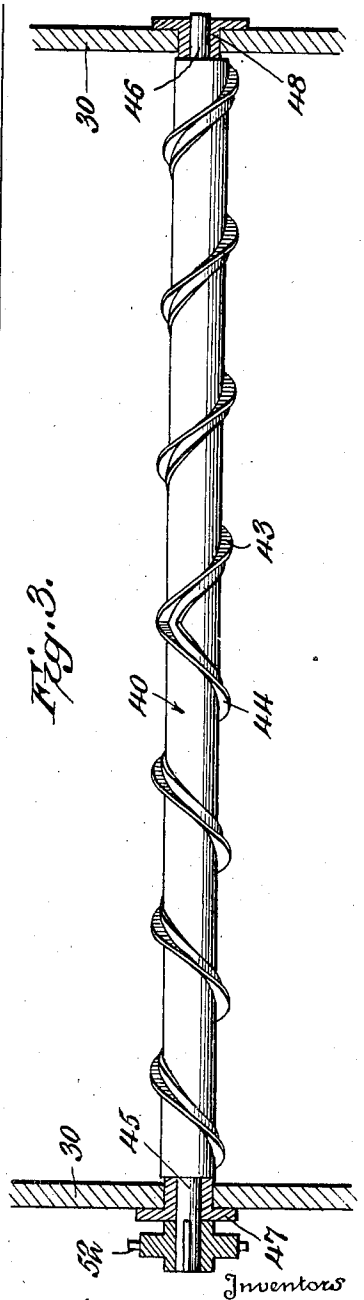

Fig. 3.

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GUARD ROLLER FOR SWEEPING MACHINES

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5 Claims. (Cl. 214—17)

Our invention relates to street sweepers, and particularly to motor driven sweepers. It is applicable to many machines of this class, but is herein shown and described as applied to what is known in the trade as the "Elgin Motor Sweeper". In this machine, a motor driven brush sweeps the material from the street on to an endless belt conveyor by which the dirt and refuse is raised and deposited in a suitable receptacle or hopper, from which it is removed from time to time, as circumstances require.

As these machines have heretofore been constructed, there is a tendency for sticks, stones and other trash to lodge between the inside wall of the refuse receptacle and the conveyor belt, resulting in clogging the machine, and in some instances in tearing the same. These belts are expensive, and frequent renewals are a source of great expense and trouble.

The objects of our invention are two-fold; first, to evenly distribute the dirt and refuse in the refuse receptacle; second, to prevent jamming of the machine, and the tearing of the belts by the accumulation of sticks, stones and other refuse, between the conveyor and the refuse receptacle.

These objects are attained by mounting directly beneath the upper end of the belt conveyor, and above the rear side of the receptacle, a transverse distributing roll, which shall receive the refuse from the conveyor, prevent its falling behind the conveyor, and evenly distribute it to the receptacle. This protecting and distributing roll is geared, or in some other way mechanically connected to, the motor driven parts of the machine.

In the accompanying drawing:—

Fig. 1 is a side elevation of the front end of a typical motorized street sweeper, showing the general outline thereof,

Fig. 2 is an enlarged sectional view of the front portion of the machine, showing the roller of the invention applied to the machine,

Fig. 3 is an enlarged front view of our special guard roller, mounted in the sides of the machine, and showing the distributing flange as in the form of a double spiral.

Inasmuch as our invention is a specific attachment to an existing mechanism, only so much of the commercial machine is shown and described as is essential to an understanding of our invention.

As stated above, Fig. 1 represents a partial right side view of a typical Elgin motor sweeper. In general, it comprises a suitable chassis and wheels, one of the front wheels **10** only being shown, and mechanism for sweeping, elevating, and depositing the refuse; but our invention is of course not restricted to this type of machine, and may be applied to any form.

A sweeper element in the form of a motor driven rotatable brush **15**, secured to a suitable axle **16**, is mounted in the lower part of the machine. When the machine is in operation, this sweeping element contacts the street and is rotated to brush away the dirt and refuse. The material thus removed is delivered upon a belt conveyor **17**, having thereon the usual cleats or strips **18**. This conveyor likewise is driven in any convenient manner from the motor of the machine. These driving connections are not illustrated, because they do not constitute any part of our invention. The elevator **17** is supported and driven in any convenient manner; as here illustrated, the lower end is supported adjacent the sweeper element on a roller **19**, mounted on an axle **20**, rotatably supported in suitable bearings **21**, the bearing on one side only being here shown. The upper end of the elevator **17** passes over a similar roller **22**, secured on a shaft **23**, which is likewise rotatably mounted in suitable bearings in the sides of the machine.

The refuse receptacle or hopper **30**, having therein a lid or door **30'**, is shown mounted in the front part of the structure. It is so placed with respect to the upper end of the conveyor **17** that the refuse carried thereby is discharged into the hopper, as shown best in Fig. 2. The rear of the hopper **30** is formed by a plate **31**, which is placed close to, but out of contact with the return flight of the conveyor **17**, and has its upper end just below the top conveyor roller **22**, so that as the refuse passes from the conveyor as it moves over the top roller **22**, and is discharged into the hopper **30** itself.

This standard construction has two defects which our invention is designed to overcome. In the first place, the refuse is not well distributed in the hopper, but tends to collect in a pile in the middle thereof, necessitating manual distribution by a shovel or other implement from time to time. In the second place, trash, such as sticks, stones and similar rubbish, tends to collect between the underside of the belt **17** and the top of the rear side **31** of the hopper **30**, thus causing the machine to choke at this point. To overcome both of these difficulties, we place an element, here shown in the general form of a roller **40** and described as a guard roller, Fig. 2. This has on its periphery a spiral flange arranged as a right spiral **43** and a left spiral **44** (as viewed in Fig. 3). As the refuse is delivered by the con-

veyor 17, it will be received on this roller 40, and the material will be distributed by these spirals 43 and 44, more or less evenly in the hopper; and at the same time the accumulation of rubbish between the top of the rear hopper plate and the conveyor belt is prevented.

The roller has reduced ends 45 and 46, the right hand end 45 being mounted for rotation in a suitable bearing 47, and the left hand end 46, likewise mounted for rotation in a bearing 48.

The bearings here shown are simple bushings; but in practice, and in some instances at least, shielded ball bearings should be used. However, the character of these bearings is not of the essence of our invention, and simple bushings are shown.

This guard roller 40 is arranged to rotate in the direction of the arrow, Fig. 2, thus bringing that portion of its periphery next the under side of the conveyor belt, but moving in a direction opposite the direction of movement of the under side of the belt, thus constantly throwing the trash away from the belt and into the hopper 30.

While the guard roller 40 may be driven by any convenient means, it is here shown as receiving motion from the upper roller 22 of the conveyor belt 17. This roller 22 has secured on the right hand end of the axle thereof a sprocket wheel 51. A similar but small sprocket wheel 52 is secured to the right hand end of the roller 40. A sprocket chain 53 passes over the sprockets 51 and 53. Thus, as the upper elevator roller 22 is operated by its driving connections, the roller 40 of our invention will be rotated in the same direction, and at a speed determined by the ratio of the two sprockets; but at a speed at least equal to, and preferably exceeding the speed of the conveyor belt 17. Thus the spirals 43 and 44 on the face of the roller will receive the refuse delivered by the conveyor 17 and assist in delivering the same into the hopper 30.

The roller 40 may be constructed in any convenient way. The entire structure, including the spiral flanges 43 and 44, may be cast as a unitary structure; or the shaft may be made of solid stock with the ends machined to a size to fit their bearings, and the spiral flanges secured by rivets, by spot welding, or in any other convenient manner; or the roller may be made of pipe with the spirals spot welded, or otherwise secured to the outer surface thereof, and stub shafts inserted into the pipe.

Operation

In practice, as the sweeper is set in motion, and the brush or broom 15 rotated, the refuse is thrown upon the upper side of the belt 17, which likewise is now in motion, and is carried by the belt or strips 18 thereof to the top of the machine, and from there delivered into the hopper 30. The roller 40 which now also is being rotated by the sprockets and chain 51, 52, 53, receives the material from the conveyor, and assists in passing it on into the hopper 30. The right and left hand sections 43 and 44 of the spiral act to effectively spread the material to the right and left of the middle portion of the hopper, and more or less evenly distribute the same in the hopper, thus making it unnecessary to open the receptacle and distribute the material therein by hand.

The periphery of the roller 40, or the spiral flanges 43 and 44 thereof, runs close to, but preferably out of contact with the under side of the conveyor belt 17. It is not a brush to clean the under side of the belt, but is formed and operated to catch the refuse, throw it back, and deliver it into the hopper; and at the same time prevent its clogging at the top of the back of the hopper. The clogging of the machine at this point is thus entirely prevented.

What we claim is:

1. In a conveying and storing system, the combination of a belt conveyor, a receiving hopper having its rear side terminating below the top of the conveyor, and a guard roller having a spiral flange which extends at least once around the roller on the face thereof arranged above the rear side of the hopper and with the spiral flange adjacent but spaced from the return flight of the belt conveyor, and means for rotating the guard roller in the direction of movement of the upper flight of the conveyor so that the guard roller shall prevent refuse accumulating between the rear side of the hopper and the return flight of the belt conveyor and the spiral flange shall assist in delivering material from the conveyor to the hopper.

2. In a conveying and storing system, the combination of a belt conveyor, a receiving hopper having its rear side terminating below the top of the conveyor, and a guard roller having right and left flanges on the face thereof with the apex of the flanges near the middle thereof arranged above the rear side of the hopper and adjacent but spaced from the return flight of the belt conveyor, and means for rotating the guard roller in the direction of movement of the upper flight of the conveyor so as to prevent refuse accumulating between the rear side of the hopper and the return flight of the conveyor and to assist in delivering material from the conveyor to the hopper.

3. In a conveyor system, the combination of an endless conveyor for moving material to a place of delivery, and a rotatable delivery roller having a spiral distributing flange thereon which extends at least once around the roller mounted adjacent the top of the conveyor but spaced therefrom, and means for rotating the roller in the direction of movement of the material delivered by the conveyor.

4. In a conveyor system, the combination of an endless conveyor for moving material to a place of delivery, and a rotatable delivery roller having right and left spiral distributing flanges thereon with the apex of the spirals at or near the middle of the roller mounted adjacent the top of the conveyor but spaced therefrom, and means for rotating the roller in the direction of movement of the material delivered by the conveyor and at a speed in excess of the speed of the conveyor.

5. In a conveyor system, the combination of an endless conveyor for moving material to a place of delivery, and a rotatable delivery roller having right and left spiral distributing flanges thereon which extend at least once around the roller and with the apex of the spirals at or near the middle of the roller mounted adjacent the top of the conveyor but spaced therefrom, and means for rotating the roller in the direction of movement of the material delivered by the conveyor and at a speed in excess of the speed of the conveyor

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