Oct. 8, 1968 A. L. LINDQUIST 3,404,639

PUSHER ATTACHMENT FOR CHAIN CONVEYOR

Filed June 6, 1966 2 Sheets-Sheet 1

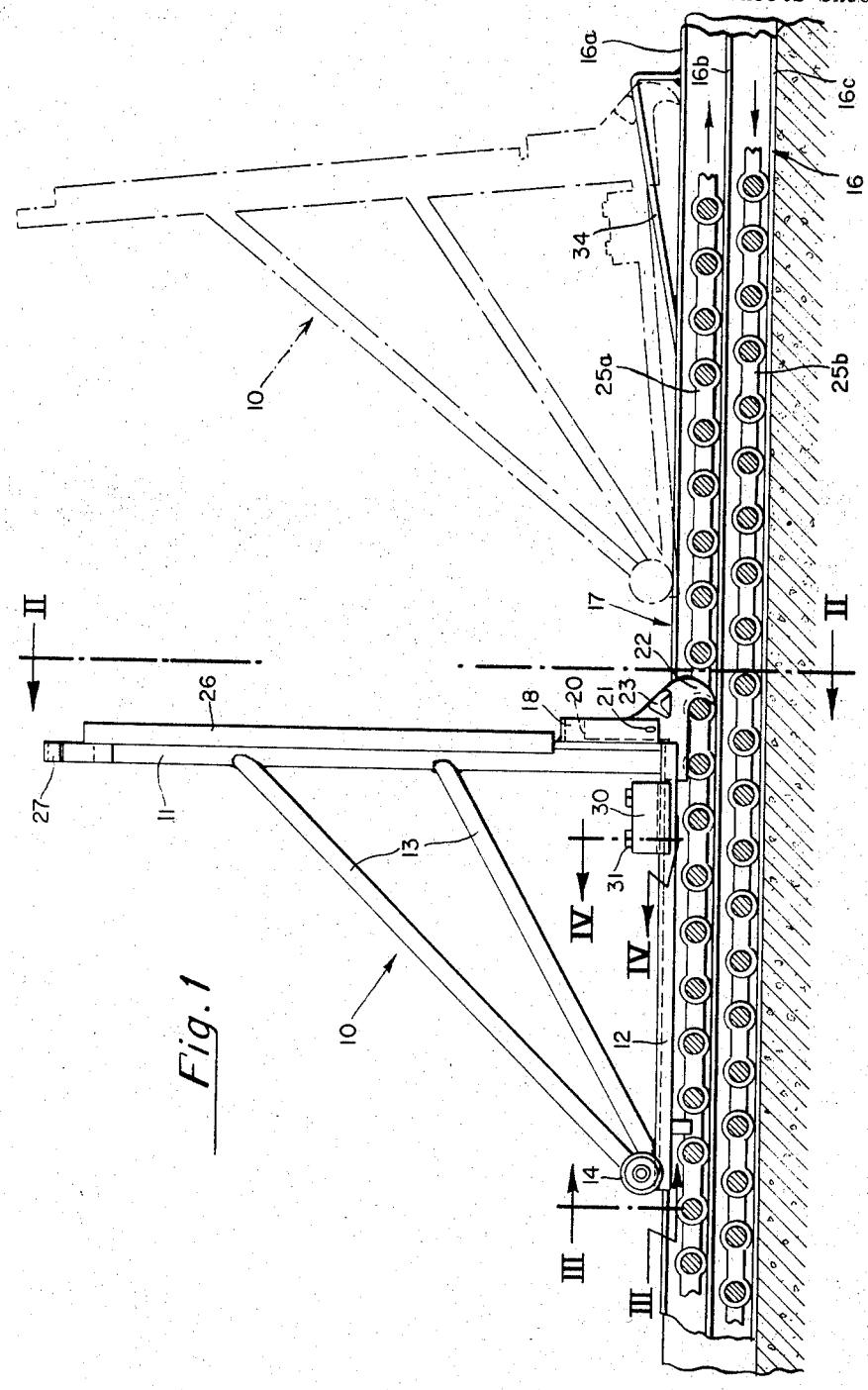


Fig. 1

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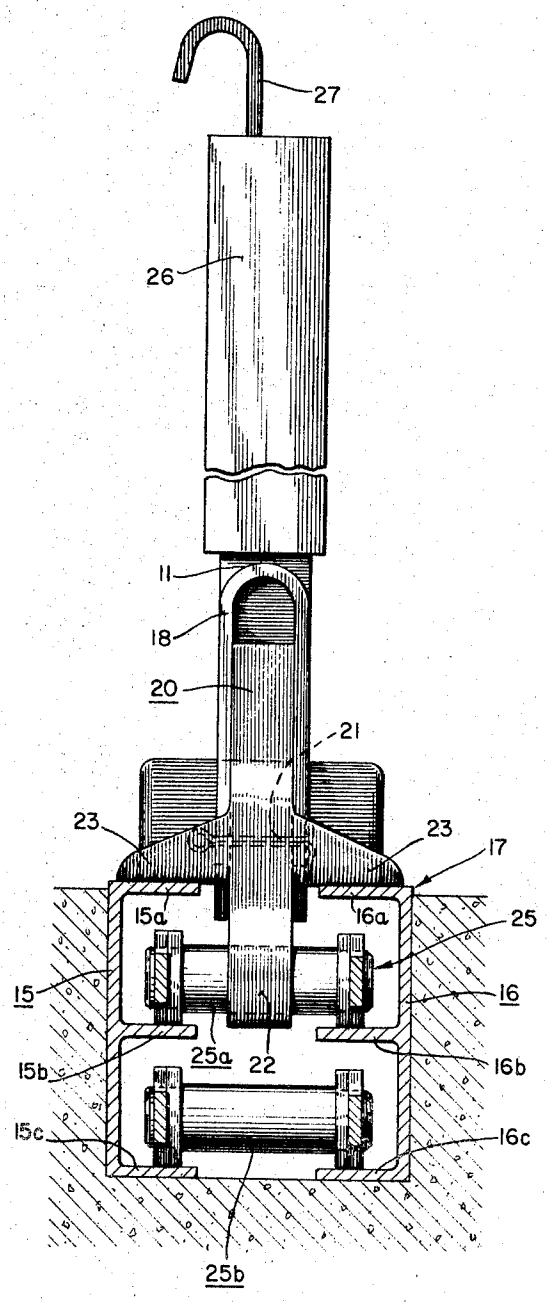


Fig. 2

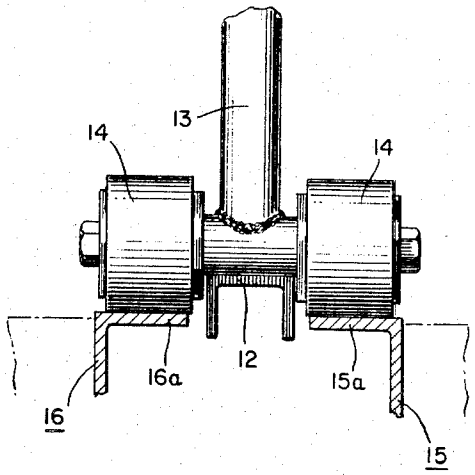


Fig. 3

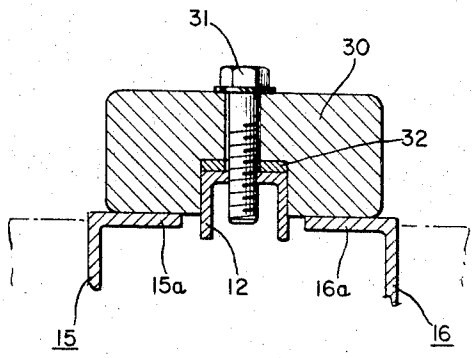


Fig. 4

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PUSHER ATTACHMENT FOR CHAIN CONVEYOR

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ABSTRACT OF THE DISCLOSURE

A car pusher bar is disclosed having at its forward end a hook which enters into the slot between the rails of the housing of the conveyor chain and engages the conveyor chain. A permanent magnet is provided at the forward end of the pusher bar to prevent the pusher bar from tilting over.

This invention relates to a device which is readily attachable to and readily removable from a moving chain conveyor. The device is intended to push along an object which is not otherwise coupled to or carried by the conveyor. A principal use of the device is in an automatic car-wash installation.

While other uses for the pusher device will occur to those interested, it will be convenient to illustrate and describe my improved device as a pusher of passenger cars or trucks through an automatic car wash installation.

The owner of an automatic car wash is well aware that the demand for his services is subject to wide variation. At one extreme is the rainy day in which virtually no one stops in to have his car washed. At the other extreme, for example, is a clear, cold weekend day, as in early Spring, following a slushy snow which has melted away leaving the average owner's car battered with slush and dirt. On such a day, several thousand or more car owners may drive up to the automatic car wash for service. It is obviously important to the owner that on such days as many cars as possible be put through with a minimum of delay. This requires, among other things, as little time as possible be lost between the washings of successive cars.

Two means of connecting the car to the moving chain conveyor have commonly been used. One is the puller hook and chain; the other is the pusher bar.

With the puller hook and chain, an attendant must reach down under the front of the car and attach the hook to some underpart. He then drops the dog, which is at the other end of the chain, into the track of moving conveyor. The dog is caught by one of the cross links of the moving chain and the car is by this means pulled through the car wash equipment. Since the conveyor chain is in continuous motion and the preceding car is moving steadily away, it is evident that if the attendant encounters difficulty in securing the hook to the underpart of the car, the distance between that car and the car ahead will be increased. This is obviously not desirable for efficient use of the car wash equipment on busy days. At the finish end, another attendant must uncouple the hook and chain from the car, and to do so he must move the car forward relative to the moving conveyor chain in order to put sufficient slack into the otherwise taut chain to allow him to remove the hook from the car.

The other means mentioned above for coupling the car to the moving conveyor chain is a pusher bar. A pusher bar is a device which the attendant attaches to the conveyor chain behind the car to be washed. The device has an upright member which, as the conveyor chain moves forward, engages the rear bumper of the car and pushes it forward. Because of the height of the pusher bar relative to its width, the device is unstable and there is a tendency for the device to tip over to one side or the other. If the

device tips over sufficiently to pass under the rear bumper of the car, it may engage and damage underparts of the car as it is carried relentlessly along by the conveyor chain. To prevent or reduce the tendency of the pusher bar to tip over, the prior art pusher bar is both hooked and wedged on to the conveyor chain. As a result, the step of quickly attaching the device to the moving chain requires some degree of skill on the part of the attendant. Unfortunately, car wash attendants do not ordinarily have much skill. As a consequence, it frequently happens that the attendant is unable quickly to attach the prior-art pusher bar to the moving conveyor chain and the distance between successive cars becomes greater than is desired for efficient operation of the car wash equipment, particularly on busy days.

The purpose of my present invention is to provide a pusher bar device which may be quickly and readily attached to the moving conveyor chain without requiring any degree of skill on the part of the attendant.

A further purpose is to provide means as above which may be automatically decoupled from the moving conveyor chain at the finish line.

A further purpose is to provide a pusher bar which does not have to be wedged into place on the moving conveyor chain in order to maintain its upright position.

Another purpose is to provide a pusher bar which may be merely lowered into the slot between the rails of the conveyor track to be engaged and carried along by the conveyor chain, which will nevertheless retain its upright position, and which will be automatically decoupled from the moving conveyor chain at the finish line.

The foregoing purposes and objects are achieved by providing a pusher bar device which is maintained in upright position by magnetic means, preferably by a permanent magnet.

The invention will be readily understood from the following description of a preferred embodiment illustrated in the drawings in which:

FIG 1 is a side elevational view of the pusher bar of the present invention shown attached to the moving conveyor chain, and illustrating in phantom an automatically decoupled pusher bar;

FIG. 2 is a front elevational view of the pusher bar, showing the conveyor track in section, looking in along line II—II of FIG. 1 in the direction of the arrows;

FIG. 3 is a rear view looking along the line III—III of FIG. 1 in the direction of the arrows, showing the pair of rollers at the rear end of the pusher bar; and

FIG. 4 is a view, in section, of the magnet looking along the line IV–IV of FIG. 1.

Referring now to the drawings, the pusher bar of the present invention is designated generally by the reference numeral **10** and is shown to comprise an upright member **11** secured to the forward end of a horizontal channel member **12** and braced thereto as by a pair of braces **13**. The parts **11**, **12** and **13** are preferably steel and the ends of the braces may be secured to the upright member **11** and to the horizontal channel member **12** by welding or by other suitable means.

Mounted for rotation at the rear end of the horizontal channel member **12** is a pair of rollers **14**, preferably made of nylon. The rollers **14** ride on the upper rails **15***a* and **16***a* of the conveyor track which is designated generally by reference numeral **17**.

The upright member **11** may preferably be a T-angle member with the cross member of the T covered with a protector covering **26**, preferably of plastic, so that abutting engagement with the rear bumper of the car to be pushed will not scratch the bumper. The protector covering **26** does not extend all the way down the upright T-angle member **11** and secured therebelow to the T-member **11** is a U-shaped member **18** between the legs of which is fitted a hook member **20**, as seen in FIG. 2.

The hook member **20** is preferably secured to the legs of U-member **18** by a sheer pin **21**, so that the hook member **20** may be torn loose by the force of the moving conveyor chain **25** in the event the car being pushed meets an obstruction which bars its further forward progress, thereby avoiding damage to the car. The hook member **20** has, at its lowermost forward portion, a depending hook **22** which is rearwardly directed, and, above the hook **22**, is a pair of lateral arms **23** which extend in opposing directions. The arms **23** ride slidingly along the upper pair of rails **15***a* and **16***a* of the conveyor track **17** as best seen in FIG. 2. The lateral arms **23** also serve to prevent the forward end portion of the pusher bar device from dropping down into the slot between the rails of the track **17** so deeply that the hook **22** becomes lodged between the cross links **25***b* of the returning portion of the conveyor chain **25**. For, if this occurs, the conveyor will jam and considerable damage to the equipment will be sustained, in addition to loss of revenue.

The upper end of the upright T-angle member **11** is provided with a hook **27**, seen best in FIG. 2. This hook **27** is used for hanging the pusher bar device **10** on an overhead return conveyor line for returning the pusher bar device from the finish end of the car wash equipment to the start end for re-use.

As seen best in the cross-sectional view of FIG. 2, the track **17** for the conveyor chain **25** consists essentially of two E-shaped steel members **15** and **16** which face each other, forming three pairs of rails at three levels. The top pair of rails **15***a* and **16***a* are located at about or just above the floor level of the car wash building, and on this pair of rails rides the pusher bar device **10**. The middle pair of rails **15***b* and **16***b* carries that part **25***a* of the conveyor chain **25** which is moving in the forward direction, i.e. from the start line to the finish line of the car wash. The bottom level of rails **15***c* and **16***c* carries that portion **25***b* of the chain conveyor **25** which is moving rearwardly, i.e., returning from the finish line to the start line. At spaced intervals, the spaced-apart rails of the middle pair of rails **15***b* and **16***b*, and the spaced-apart rails of the bottom pairs of rails **15***c* and **16***c* are connected by steel bracing strips, not shown.

In accordance with the present invention, the pusher bar device is stabilized against tilting to either side by a suitably strong permanent magnet **30**, which may preferably be of Alnico material and which is secured to the pusher bar device **10** near its forward end, preferably just behind the upright T-angle member **11**. While the magnet may be mounted and secured in any suitable manner, the magnet **30** is shown in the illustration as being secured to the horizontal channel member **12** by a pair of bolts **31**, placed into holes drilled in the magnet **30**. For the purpose of adjusting the vertical position of the magnet, one or more spacers **32** may be used. The north pole of the magnet **30** rides along in engagement with or just above one of the two top rails **15***a*, **16***a*, and the south pole of the magnet rides along the other rail of the pair. I have found that the magnetic force between the magnet legs and the rail is adequate to prevent sidewise tilting of the pusher bar device.

To attach the pusher bar device **10** to the moving conveyor chain **25**, the attendant may lower the hook **22** end of the pusher bar device **10** into the space between the top pair of rails **15***a*, **16***a*, until the lateral arms **23**, rest on the rails. In so lowering the hook **22** end of the device **10**, the attendant may hold channel member **12** at a slight inclination relative to the horizontal, with the rear rollers **14** slightly above the rails, until the hook **22** has entered the slot between the rails. Then the rear end of the device may be lowered. This method of slightly inclining the device **10** forwardly as he lowers it into the slot of the conveyor chain track is, however, not essential. The attendant may merely lower the device horizontally on to the rails of the track, i.e. with the member **12** horizontal, or substantially horizontal. He must, of course, so lower the

device that the hook **22** and the stabilization post **29** (later referred to) enter the slot between the rails.

When the device **10** is so positioned, by either of the methods referred to above, on to the track **17**, the hook **22** is engaged by the next cross link of the moving chain **25** to come along and is carried forward thereby.

In order to stabilize the device **10** against lateral motion, a depending post or projection **29** is provided on the underside of channel member **12** near the rear end. This projection **29** is so spaced from the hook **22** that the projection will fall between successive cross links of the chain **25**. In other words, the device **10** is not stabilized by a tight wedging action between one or more depending projections and the cross links of the chain, as is the case with the prior art pusher bar previously referred to.

At the finish end, the device **10** is automatically decoupled from the conveyor chain **25** by means of a short ramp **34** secured, as by welding, to the top rails **15***a*, **16***a* of track **17**. When the fore part of the device **10** reaches the ramp **34**, the pair of lateral arms **23** ride up the ramp, as indicated in phantom in FIG. 1, and the hook **22** is cammed up from the chain cross link with which it had been engaged. An attendant then removes the decoupled pusher bar device and places it, by means of its hanger hook **27**, on the return overhead conveyor chain, which is ordinarily located to the side of the main path, for return of the device **10** to the starting line for re-use.

It will be understood that when the pusher bar device **10** is coupled to the moving chain **25***a* and its upright member **11** is pushing a car through the car-wash equipment, the device tries to pivot about the hook **22** and a heavy force component in the downward direction is imposed on the rear end of the device. This downward force component is taken by the rollers **14** and rails **15***a*, **16***a*. So long as the car is being pushed there is little or no downward force component on the magnet **30** and little or none on the lateral arms **23**. However, at some point or points in the travel of the car through the car wash equipment, as for example, at the wheel wash point, where the wheels are spun, the reaction force of the car against the upright pusher bar is relieved, and a small spacing may appear between the pusher bar and the bumper. As a result, unless provision is made for stabilizing the pusher device against lateral tilting, the upright pusher bar will tilt over to one side or the other but without disengaging the hook **22** from the chain. Hence, there is the danger as the tilted pusher device is carried forward by the conveyor chain, the pusher bar will pass under the bumper and damage the underparts of the car. It is this sort of hazard which is prevented by the magnet **30**. For, when the reaction force of the car on the pusher is relieved, the forward part of the pusher device, which includes the magnet **30** and the arms **23**, settles down on the rails and the strength of the magnetic forces prevents lateral tilting of the device.

While the preferred embodiment of this invention has been described in some detail, it will be obvious to one skilled in the art that various modifications may be made without departing from the invention as hereinafter claimed.

What is claimed is:

1. In an automatic car wash installation, in combination; a conveyor track including a pair of rails with a slot therebetween and a conveyor chain in the slot; a pusher bar device for detachably coupling a motor vehicle to said conveyor chain; said device including: a horizontal member adapted to ride along said rails; an upright pusher bar mounted on and extending upwardly from said horizontal member for pushing engagement with the rear bumper of the motor vehicle; a hook disposed below the forward portion of said horizontal member and adapted to enter into said track slot for engagement with said conveyor chain; a stabilizing post disposed below the rearward portion of said horizontal member and adapted to

enter into said slot for stabilizing the device against lateral movement; and a permanent magnet so mounted on said device that one pole of said magnet is proximate to one rail of said pair of rails and the other pole of said magnet is proximate to the other rail for stabilizing said device against lateral tilting when not pushingly engaged.

2. In the combination according to claim 1 characterized in that said magnet is mounted on said horizontal member just behind said upright pusher bar.

3. In the combination according to claim 1 characterized in that the track rails are provided, at the finish end, with upwardly inclined ramp means for automatically camming the forward end of said device upward, thereby to automatically decouple the hook from the conveyor chain.

4. For use in an automatic car-wash installation; a pusher bar device for detachably coupling to a conveyor chain movable along a slotted housing, the upper surfaces of which form a pair of spaced-apart rails for said pusher bar device, said pusher bar device including: a horizontal member adapted to ride along said pair of rails; an upright push bar mounted on said horizontal member and adapted to pushingly engage the rear bumper of a motor vehicle; a hook disposed below said horizontal member and adapted to enter into the slot between said rails for engagement with said conveyor chain; and a permanent magnet mounted on said device and adapted to bridge

across said slot from one rail to the other for stabilizing said device against lateral tilting when not pushingly engaged.

5. A pusher bar device as claimed in claim 4 characterized in that a stabilizing post projects downwardly from the rearward portion of said horizontal member adapted to enter into the slot between said rails for stabilizing the rear portion of said device against lateral movement.

6. A pusher bar device as claimed in claim 5 further characterized in that the rear end portion of said horizontal member is provided with a pair of rollers adapted for rolling engagement along said pair of rails.

7. A pusher bar device as claimed in claim 6 further characterized in that the upper portion of the hook is provided with a pair of laterally extending arms adapted for sliding engagement along said rails and adapted for preventing the hook from dropping too deeply into said slot.

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