Aug. 23, 1966 E. M. ASBURY 3,268,052

ROADWAY SIGNAL DEVICE RETRIEVER

Filed Sept. 1, 1964 3 Sheets-Sheet 1

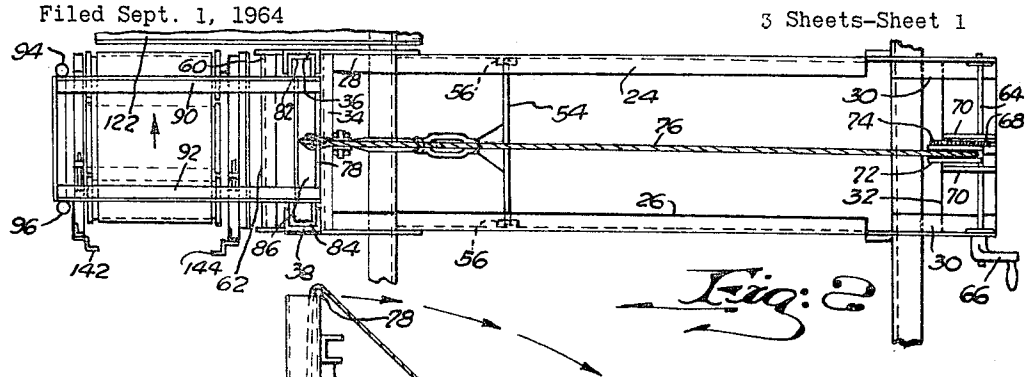


Fig. 2

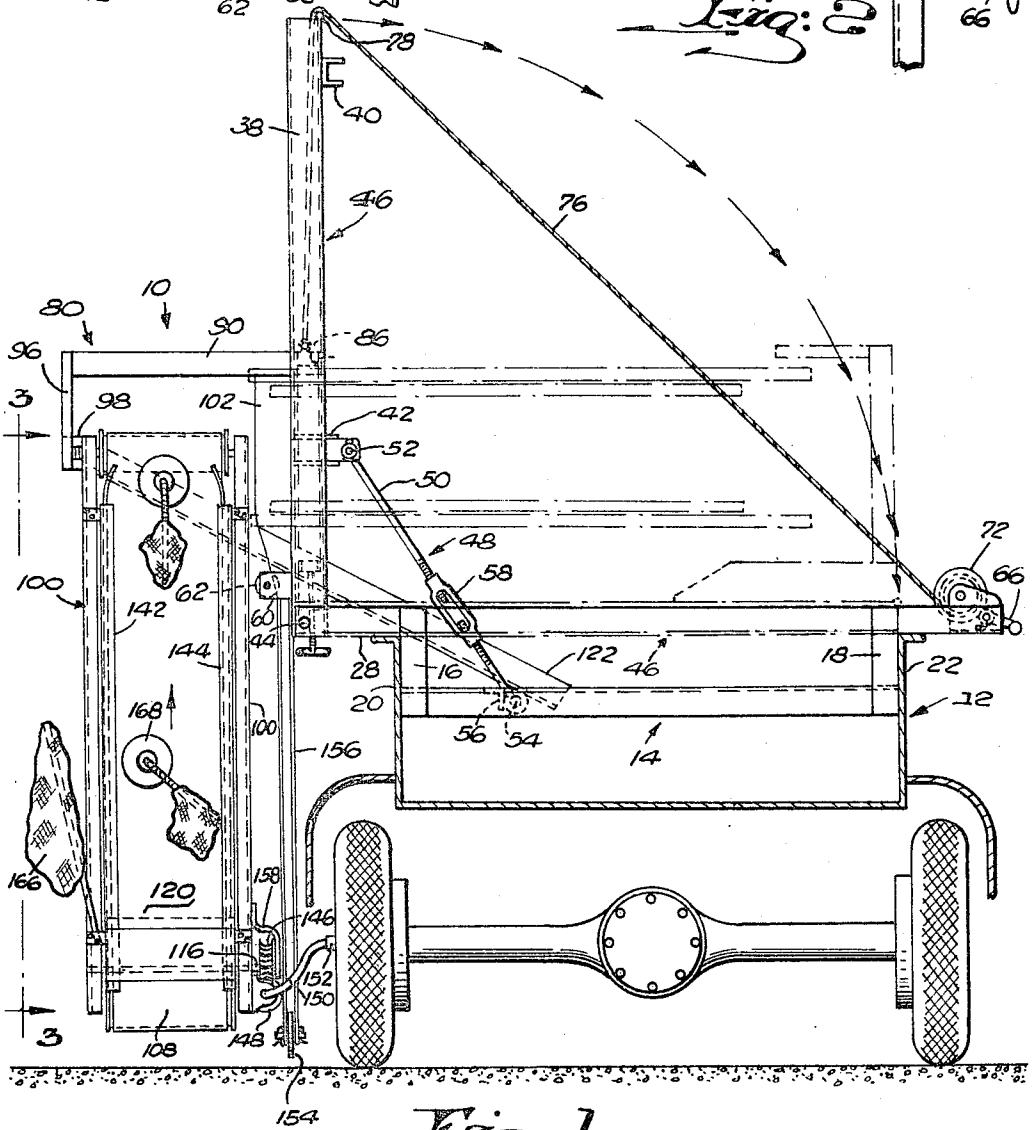


Fig. 1.

INVENTOR.
EDWARD M. ASBURY.
BY Stanley J. Price
his ATTORNEY.

Aug. 23, 1966 E. M. ASBURY 3,268,052

ROADWAY SIGNAL DEVICE RETRIEVER

Filed Sept. 1, 1964 3 Sheets-Sheet 2

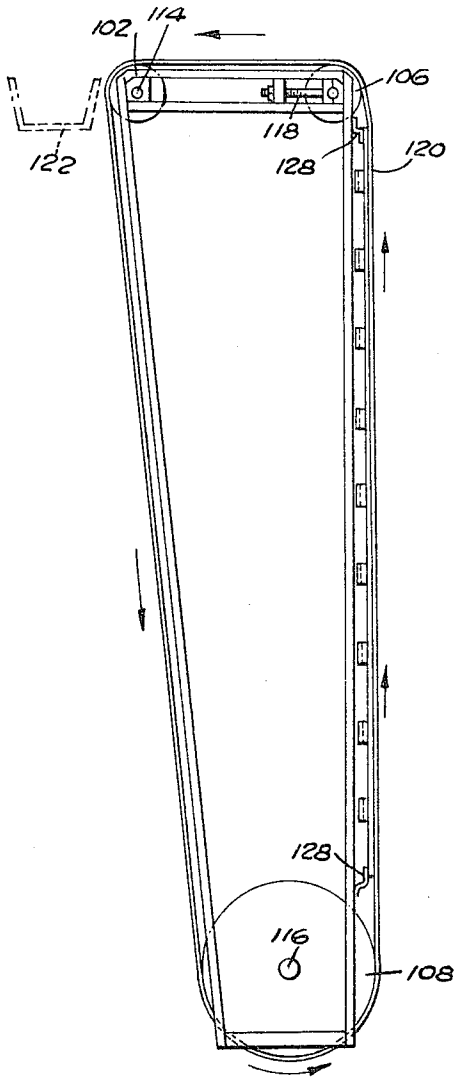


Fig. 3.

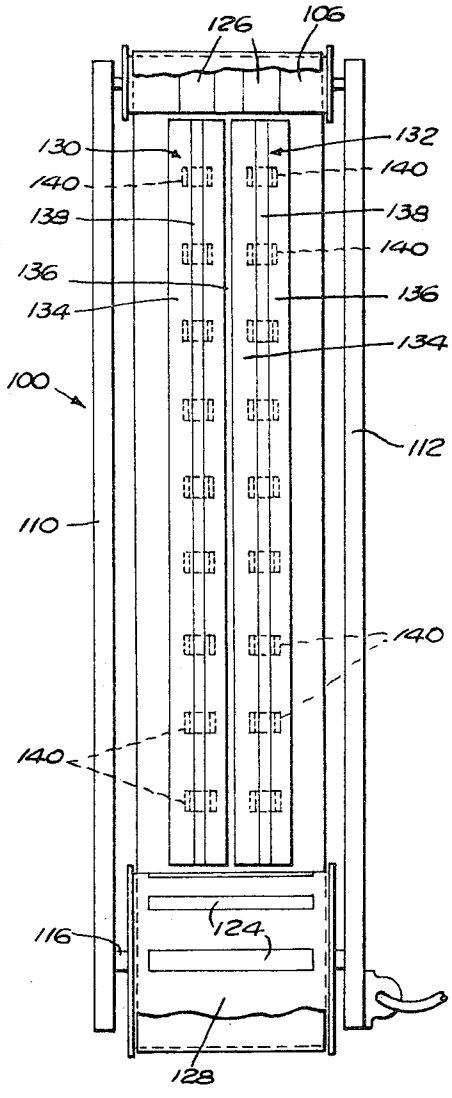


Fig. 4.

INVENTOR.
EDWARD M. ASBURY
BY Stanley J. Price
his ATTORNEY.

Aug. 23, 1966 E. M. ASBURY 3,268,052

ROADWAY SIGNAL DEVICE RETRIEVER

Filed Sept. 1, 1964 3 Sheets-Sheet 3

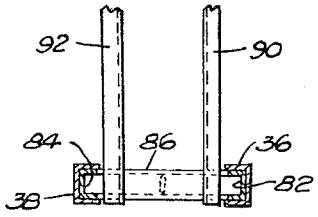
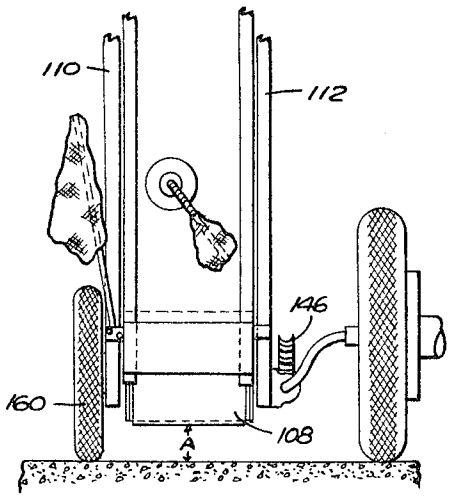


Fig. 5

Fig. 7.



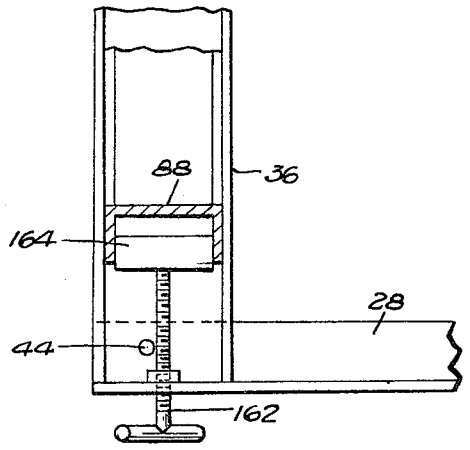


Fig. 6.

INVENTOR.
EDWARD M. ASBURY.
BY Stanley J. Price
HIS ATTORNEY.

United States Patent Office 3,268,052 Patented August 23, 1966

3,268,052

ROADWAY SIGNAL DEVICE RETRIEVER

Edward M. Asbury, 450 Burton Drive, Pittsburgh, Pa.

Filed Sept. 1, 1964, Ser. No. 393,659
14 Claims. (Cl. 198—7)

This invention relates to a retractable roadway signal device retriever and more particularly to a retractable metallic roadway signal device retriever positionable adjacent the side of a vehicle and operable to retrieve metallic roadway signal devices from the road surface and convey the signal devices to the haulage compartment of the vehicle.

This invention is an improvement of the roadway signal device retriever disclosed and claimed in copending United States application Serial No. 228,093, now Patent 3,157,267, entitled "Roadway Signal Device Retriever." In copending application Serial No. 228,093 there is disclosed a roadway signal device retriever that is connected to a haulage vehicle. The retriever includes a magnetic member adjacent the road surface that picks up the metallic signal devices and deposits them on an inclined endless conveyor belt. The endless conveyor belt conveys the signal devices to the haulage compartment of the vehicle for storage therein.

The improvement herein disclosed is directed to a compact signal device retriever that is retractable into the haulage compartment of the vehicle for storage therein so that the signal device retriever may be rapidly transported by the haulage vehicle to and from the painting site. The signal device retriever herein disclosed is arranged in its extended position to be operatively positioned adjacent a side portion of the vehicle so that the vehicle remains in its proper lane of traffic when the retriever is picking up metallic signal devices positioned adjacent newly painted lines on the roadway. The signal device retriever includes a magnetic drum positioned adjacent the roadway surface with an endless conveyor belt reeved therearound. Beneath the conveying reach magnetic members are positioned to maintain the metallic signal devices on the conveyor belt while they are conveyed upwardly to the haulage compartment of the vehicle.

The improved retriever device herein disclosed is especially suitable for use with metallic roadway signal devices as described in United States Patent #3,016,035, entitled "Signal Device," granted on January 9, 1962. It should be understood that, although the retriever device as herein described is illustrated retrieving signal devices of the type disclosed in United States Patent #3,016,035, the improved retriever device of the present invention is also suitable for use with other types of metallic roadway signal devices.

Accordingly, the principal object of this invention is to provide an improved signal device retriever that is compact and retractable into the haulage compartment of the vehicle for rapid transportation to and from the painting site.

Another object of this invention is to provide an improved retractable signal device retriever that is positionable adjacent the side portion of the vehicle so that the vehicle remains in its proper lane of traffic while signal devices are being retrieved from the roadway surface.

Another object of this invention is to provide an improved signal device retriever that is adjustable relative to the roadway surface.

A further object of this invention is to provide an improved metallic signal device retriever with a rotatable magnetic member that picks up the signal devices and positions them on an endless conveyor belt having other magnetic devices which maintain the metallic signal devices on the conveyor belt while they are conveyed to the haulage compartment of the vehicle.

The method and apparatus which comprises this invention accomplishes the foregoing and other functions in a novel way, as will now be explained. Further features, objects and advantages will either be specifically pointed out or become apparent when, for a better understanding of the invention, reference is made to the following written description, taken in conjunction with the accompanying drawings, which form a part hereof, and in which:

FIGURE 1 is a view in rear elevation of the haulage vehicle compartment having the improved signal device retriever operatively positioned adjacent a side portion of the vehicle. The phantom outline of the retriever indicates the retriever in its retracted position.

FIGURE 2 is a fragmentary top plan view of a portion of the haulage vehicle illustrating the retriever in its operative position and the apparatus for retracting the retriever device into the vehicle haulage compartment.

FIGURE 3 is a view in side elevation taken along the lines 3—3 of FIGURE 1 and illustrating in detail the endless conveyor belt employed to convey the metallic signal devices from the roadway surface to the vehicle haulage compartment.

FIGURE 4 is a view in rear elevation of the signal device retriever with a portion of the endless conveyor belt removed, illustrating the magnetic devices which maintain the metallic signal devices on the conveyor belt as the metallic signal devices are conveyed upwardly to the haulage compartment of the vehicle.

FIGURE 5 is a fragmentary view in plan of a portion of the signal device retriever illustrating the arrangement for slidably positioning a signal device retriever frame in the auxiliary support frame.

FIGURE 6 is another fragmentary section in elevation of the auxiliary support frame with the apparatus for adjusting the clearance between the road surface and the bottom portion of the retriever device.

FIGURE 7 is a fragmentary view in rear elevation illustrating another embodiment wherein an auxiliary wheel is connected to the retriever device.

Referring to the drawings, and particularly to FIGURES 1 and 2, there is illustrated my improved signal device retriever generally designated by the numeral **10** positioned in a vehicle haulage compartment **12**. The retriever **10** includes a frame section **14** that is positioned within the vehicle haulage compartment **12** and has upstanding portions **16** and **18** that abut the haulage compartment side walls **20** and **22** to fixedly position the frame **14** within the haulage compartment **12**. The frame **14** is preferably constructed of a pair of horizontal angle members **24** and **26** which are positioned within the haulage compartment **12**. Extending laterally from the upstanding portions **16** and **18** are pairs of horizontal extensions **28** and **30** which are preferably angular and form a receiver for the extendible portion of the retriever, as later described. The frame **14** has suitable cross members **32** and **34** which maintain the side members **24**, **26**, **28** and **30** in proper spaced relation to receive the extendible portion of the retriever **10**. The frame **14** is so constructed that it may be positioned within the vehicle haulage compartment **12** and suitably support the extendible portion of retriever **10** while in its operative extended position and further may be easily removed from the vehicle when desired.

A pair of vertical channels **36** and **38** are maintained in spaced relation to each other by channels **40** and **42** secured to their rear edge portion, as illustrated in FIGURE 1. The channels **36** and **38** are pivotally secured by means of pins **44** to the laterally extending angles **28**

of frame member 14 and form an auxiliary support frame that will hereinafter the designated generally by the numeral 46. The auxiliary support frame 46 is pivotable about the pins 44 from the vertical position illustrated in full lines in FIGURE 1 to the horizontal position illustrated by phantom lines in FIGURE 1 to position the retriever 10 within the haulage vehicle, as later described.

An adjustable stop member, generally designated by the numeral 48, has a rod 50 pivotally secured to the cross channel 42 by means of a pin 52 and is secured at its other end to a transverse rod 54. The rod 54 is positioned beneath the inwardly extending flanges of angles 24 and 26 (FIGURE 2) and is slidable thereunder. The angles 24 and 26 have stop members 56 extending downwardly therefrom that limit the lateral movement of transverse rod 54. With this arrangement the counterclockwise rotation of the auxiliary support frame 46 is limited by the transverse rod 54 abutting the stops 56. An adjusting device 58 is provided for rod 50 to permit adjustment of the effective length of the adjustable stop member 48 and thereby adjust the relative vertical position of auxiliary support frame 46.

Extending laterally from the auxiliary support frame 46 adjacent its pivot connections 44 are strap members 60 that rotatably support a rod or roller 62 therein. The rod 62 is arranged to support one end of the movable portion of the retriever device when the retriever device is in a retracted position. The laterally extending portions 30 on the opposite side of frame 14 rotatably support a shaft 64 which has a handle 66 secured to an end thereof. An intermediate portion of shaft 64 has a geared portion 66 of a ratchet mechanism secured thereto. The cross member 32 of frame 14 has a pair of spaced upstanding supports 70 that rotatably support a pulley 72. The pulley includes a geared portion 74 that meshes with the geared portion 68 so that upon rotation of crank handle 66 the pulley 72 rotates. A suitable stop member is included to lock the gear portions 66 and 74 in a fixed position.

A cable 76 is secured at one end to the pulley 72 and extends over a horizontal rod 78 secured to the top edge portions of the auxiliary support frame channels 36 and 38. The cable 76 extends downwardly between the channels 36, 38 and is secured to the movable portion of the retriever device 10. The movable portion of the retriever device 10 includes a laterally extending frame member generally designated by the numeral 80 that has a pair of vertical channels 82 and 84. The channels 82 and 84 are slidably positioned within the upright channels 36 and 38 of auxiliary support frame 46. A transverse channel 86 maintains the channels 82 and 84 in proper spaced relation within the channels 36 and 38. A transverse channel 88 (FIGURE 6) is also secured to the vertical channels 82 and 84. The cable 76 is secured to the channel 86 so that the laterally extending frame 80 is slidable within the auxiliary support frame 46. Thus, upon rotation of handle 66 to wind the cable 76 on pulley 72, the movable portion of the retriever 10 slides upwardly in the auxiliary support frame 46. Secured to and extending laterally from the channels 82 and 84 are pairs of angles 90 and 92. Depending downwardly from the angles 90 and 92 adjacent their end portions are tubular members 94 and 96 that are secured at their bottom portion to a transverse member 98 that is, in turn, secured to a conveyor frame 100. Also secured to and extending laterally from the channels 82 and 84 are vertical supports 102 that are secured to the opposite side of the conveyor frame 100 so that the conveyor frame 100 is supported by the frame 80 and depends downwardly therefrom.

The conveyor frame 100 is preferably fabricated of nonmagnetic material, such as aluminum or the like, and is illustrated in detail in FIGURES 3 and 4. The conveyor frame 100 rotatably supports a first idler pulley 104, an adjustable idler pulley 106 adjacent its top portion, and a large magnetic pulley 108 adjacent its lower portion. The conveyor frame 100 is formed of a pair of rectangular members 110 and 112 that have suitable means to support shafts 114 and 116 of idler pulleys 104 and 108. The frame 100 includes an adjustment means 118 for the idler pulley 106. Reeved about the pulleys 104, 106 and 108 is an endless conveyor belt 120 that is arranged to convey the metallic signal devices upwardly from the lower pulley 108 around the pulley 106 onto the horizontal section between pulleys 106 and 108 and discharge the metallic signal devices of pulley 104 into a chute 122 illustrated in FIGURES 1–3.

The pulley 108 has a plurality of bar magnets 124 secured to its peripheral surface in spaced parallel relation, and the pulley 106 has a pair of cylindrical magnets 126 in its peripheral surface, as illustrated in FIGURE 4. Suitably secured to the frame 100 by Z-shaped nonmagnetic supports 128 are a pair of vertical magnetic members 130 and 132. The magnetic members 130 and 132 each has a pair of vertical strips 134 and 136 spaced from each other and preferably separated by a nonmagnetic material 138. U-shaped magnets 140 are positioned across the member 138 and secured to the members 134 and 136 to thereby provide a pair of vertical magnets 130 and 132 beneath the conveyor belt 120. As is illustrated in FIGURES 1 and 2, the conveyor frame 100 has a pair of vertically spaced angles 142 and 144 secured thereto in overlying relation with the conveyor belt 120. The angles 142 and 144 serve as guides along the edges of the conveyor belt 120.

The magnetic pulley 108 has a shaft 116 secured thereto for rotation therewith. The shaft 116 is suitably supported in the conveyor frame 100 and has a gear 146 secured thereto (FIGURE 1). A worm type gear 148 meshes with the gear 146 and is suitably connected to a flexible shaft 150. The flexible shaft is arranged to be connected to the axle of the vehicle at connection 152. Thus, with this arrangement, upon rotation of the vehicle axle the flexible shaft 150 rotates gears 148 and 146 and thereby rotates the pulley or drum 108. The conveyor belt 120, suitably tensioned around the aforementioned pulleys, orbits around the pulleys upon rotation of the drum 108. It should be understood that other suitable means may be provided for propelling the conveyor belt 120, as, for example, a separate prime mover secured to the conveyor frame 100 and connected to the drum 108.

A guide wheel 154 is rotatably secured in a vertical standard 156 that is secured to the housing 158 that encloses the gears 146 and 148. The standard is also secured at its upper portion to the support 102. Thus the standard 156 is vertically movable with the conveyor frame 100. The function of the wheel 154 is to prevent the magnetic drum or pulley 108 from striking the ground as the vehicle progresses down the roadway and passes over uneven surfaces. An uneven surface in the road will cause the guide wheel 154 to move the conveyor from 100 and the frame 80 upwardly in the auxiliary support frame 46, thus preventing damage to the magnetic drum 108.

In FIGURE 7 there is illustrated another embodiment of the invention where an auxiliary wheel 160 is secured to the conveyor frame on the side opposite the gearing 146. In FIGURE 1 the guide wheel 154 is illustrated as spaced from the roadway surface and in FIGURE 7 the wheel 160 is illustrated as contacting the roadway surface. It should be understood that the primary functions of the guide wheel 154 and auxiliary wheel 160 is to protect the magnetic drum 108 from striking the roadway surface. It is preferred to maintain the periphery of the magnetic drum 108 spaced a distance between about 1½ to 2½ inches from the roadway surface for optimum retrieval of the metallic signal devices. This dimension is illustrated by the arrows in FIGURE 7 and by the letter A.

An adjustment means is provided to vary the dimension A indicated in FIGURE 7. This adjustment means is

illustrated in FIGURE 6. There is threadedly secured to the laterally extending angle **28** of frame **14** a vertical adjusting bolt **162** that abuts a block **164** secured to transverse channel **88** of frame **80**. Thus, to lower the drum **108** toward the roadway surface the bolt **162** is rotated to lower the block **164** and hence the frame **80** and conveyor frame **100** secured thereto. To elevate the drum **108** relative to the roadway surface, the reverse procedure is employed. Suitable receptacles are provided in the conveyor frame **100** for warning flags **166** to alert oncoming motorists to the presence of the retriever **10** positioned adjacent the side of the vehicle.

Operation

The retriever device previously described operates as follows. In FIGURE 1 the retriever device is illustrated in its extended operative position. As the vehicle progresses down the roadway, the metallic signal devices **168** pass beneath the drum **108** and are secured thereto by the bar magnets **124** extending longitudinally along the drum periphery. The drum **108** is rotated by means of the vehicle axle flexible shaft **150** and gears **148** and **146** to convey on the conveyor belt the metallic signal devices in the direction indicated by the arrows in FIGURES 1 and 3. As the metallic signal devices on the conveyor belt progress beyond the drum **108** and move vertically up the conveying reach of belt **120**, the metallic roadway signal devices **168** are retained on the conveyor belt **120** by means of the vertical magnetic strips **130** and **132**. As the portion of the conveyor belt with the metallic roadway signal devices adhering thereto progresses around the roller **106**, the magnets **126** hold the metallic roadway signal devices **168** on the conveyor belt **120**. The roadway devices **168** progress across the horizontal portion of the endless conveyor belt and over the roller **104** and are discharged into the chute **122** which slidably transports the metallic signal devices **168** into the vehicle haulage compartment **12**.

When it is desired to retract the signal device retriever **10**, the handle **66** is rotated to wind the cable **76** on the pulley **72**. The cable **76** reeved around rod **78** atop the auxiliary support frame **46** exerts an upward force on the laterally extending frame member **80** so that the channel portions **82** and **84** of frame **80** move upwardly in the channels **36** and **38** of auxiliary support frame **46**. As the frame member **80** with the conveyor frame **100** depending therefrom moves upwardly in the auxiliary support frame **46**, the center of gravity of the signal device retriever **10** moves upwardly so that further winding of cable **76** on pulley **72** pivots the auxiliary support **46** about pivot pins **44** to rotate the auxiliary frame **46** to the position indicated in phantom lines in FIGURE 1. After the auxiliary support frame **46** is positioned in abutting relation with the frame section angles **30**, continued rotation of handle **66** moves the frame **80** in the channels **36** and **38** of auxiliary support frame **46** until frame **80** assumes the position illustrated in phantom lines in FIGURE 1. This is the fully retracted position of the roadway signal device retriever **10**. During the pivoting action of auxiliary support frame **46**, the stop member transverse bar **54** slides beneath the extending portions of angles **24** and **26**. As the frame **100** moves relative to auxiliary support frame **46**, it is supported on the roller **60** extending laterally from the lower portion of auxiliary support frame **46**. In its fully retracted position the lower portion of the conveyor frame **100** is supported by the roller **62**.

To extend the signal device retriever **10**, the reverse procedure is followed and the frame **80** with the conveyor frame **100** extending therefrom is moved laterally toward the left as viewed in FIGURE 1 until the center of gravity of both the laterally extending frame **80** and conveyor frame **100** extends beyond the pivot pin **44** and exerts a counterclockwise force on the auxiliary support frame **46**. The extension of retriever **10** is then controlled by unwinding the cable **76**.

The signal device retriever **10** in its retracted position is removable from the vehicle haulage compartment **12** by lifting the retriever **10** by means of the frame **14** upwardly from the vehicle haulage compartment **12**.

According to the provisions of the patent statutes, I have explained the principle, preferred construction, and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiments. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A retractable roadway signal device retriever comprising,
- a base frame positioned in a vehicle haulage compartment,
- an auxiliary support frame pivotally secured to an end portion of said base frame,
- a conveyor frame having a portion slidably positioned in said auxiliary support frame,
- endless conveyor means carried by said conveyor frame and having a portion adjacent the road surface,
- magnetic means associated with said endless conveyor means and arranged to pick up said metallic roadway signal devices,
- said endless conveyor means arranged to convey said metallic roadway signal devices from said roadway surface into said vehicle haulage compartment.
- said conveyor frame arranged in an operative position to extend laterally of said vehicle haulage compartment with said endless conveyor means depending downwardly therefrom toward said roadway surface,
- said conveyor frame and said auxiliary support frame operable to pivot relative to said base frame, and
- said conveyor frame operable to slide in said auxiliary support frame to retract said conveyor frame into said vehicle haulage compartment.

2. A retractable roadway signal device retriever as set forth in claim **1** which includes,
- means to adjust said conveyor frame relative to said auxiliary support frame and thereby adjust the spacing between said portion of said endless conveyor means and said road surface.

3. A retractable roadway signal device retriever as set forth in claim **1** which includes,
- other support means for said conveyor frame operable to maintain said portion of said conveyor means in spaced relation with said road surface.

4. A retractable roadway signal device retriever as set forth in claim **1** which includes,
- drive means for said endless conveyor means.

5. A retractable roadway signal device retriever as set forth in claim **1** in which said magnetic means includes,
- a tail pulley for said conveying means having magnetic means arranged to pick up said metallic signal devices, and
- fixed magnetic means positioned beneath a portion of said endless conveyor means arranged to maintain said metallic roadway signal devices on a portion of said endless conveyor means while said metallic roadway signal devices are conveyed to the vehicle compartment.

6. A retractable roadway signal device retriever as set forth in claim **1** which includes,
- flexible means connected to said conveyor frame and extending around a portion of said auxiliary frame,
- said flexible means arranged to retract said conveyor frame in said auxiliary frame and pivot said auxiliary frame relative to said base frame.

7. A retractable roadway signal device retriever as set forth in claim **1** which includes,
- means connecting a rotatable portion of said vehicle

propelling means and said endless conveyor means for driving said endless conveyor means.

8. A retractable roadway signal device retriever comprising,

a base frame positioned in a vehicle haulage compartment in fixed relation thereto and in a substantially horizontal position,

an auxiliary support frame pivotally secured at one end to an end portion of said base frame and having a cross member adjacent the other end,

a stop member limiting the extended position of said auxiliary support frame to a substantially upright vertical position,

a conveyor frame supported by and extending laterally from said auxiliary support frame,

said conveyor frame slidably positioned in said auxiliary support frame,

a plurality of conveyor pulleys supported by said conveyor frame in spaced parallel relation to each other,

an endless conveyor belt reeved around said conveyor pulleys and arranged to convey roadway signal devices thereon from said roadway surface to said vehicle haulage compartment,

drive means for orbiting said endless conveyor belt around said conveyor pulleys,

said conveyor frame and said endless conveyor belt, in an operative position, arranged to extend laterally from said vehicle compartment and depend downwardly from said auxiliary support frame with one of said conveyor pulleys positioned adjacent the roadway surface, and

said conveyor frame arranged to slidingly move upwardly in said auxiliary frame and said auxiliary frame arranged to pivot relative to said base frame to thereby retract said conveyor frame and said endless conveyor belt into said vehicle haulage compartment.

9. A retractable roadway signal device retriever as set forth in claim **8** which includes,

a cable secured to said conveyor frame and extending around said auxiliary support cross member,

said cable connected to a ratchet mechanism secured to said base other end portion,

said cable operable to move said conveyor frame upwardly in said auxiliary frame and pivot said auxiliary frame relative to said base frame to retract said endless conveyor into said vehicle haulage compartment.

10. A retractable roadway signal device retriever as set forth in claim **8** which includes,

a second stop member limiting downward movement of said conveyor frame relative to said auxiliary support frame, and

mean to adjust said second stop member to thereby control the spacing between said conveyor pulley and said adjacent roadway surface.

11. A retractable roadway signal device retriever as set forth in claim **8** which includes,

a support member connected to said conveyor frame adjacent said roadway surface,

said support member arranged to move said conveyor frame upwardly so that said conveyor pulley does not strike obstacles in the roadway surface.

12. A retractable roadway signal device retriever as set forth in claim **8** in which:

said conveyor pulley adjacent said roadway surface includes magnetic means to pick up said signal devices from said roadway surface so that said endless conveyor belt is operable to convey said signal devices picked up by said magnetic means upwardly thereon to said haulage compartment.

13. A retractable roadway signal device retriever as set forth in claim **8** which includes,

fixed magnetic means positioned beneath a portion of said endless conveyor belt,

said conveyor pulley adjacent said roadway surface having rotatable magnetic means thereon operable to pick up said roadway signal devices from said roadway surface, and

said fixed magnetic means arranged to maintain said signal devices on said conveyor belt as said signal devices are conveyed upwardly to said vehicle haulage compartment.

14. A retractable roadway signal device retriever as set forth in claim **8** in which:

said plurality of conveyor pulleys include a tail pulley positioned adjacent the roadway surface and a pair of idler pulleys positioned thereabove,

said idler pulleys arranged in substantially the same horizontal plane so that the conveying reach of said endless conveyor belt has a substantially vertical portion between said tail pulley and one of said idler pulleys and a substantially horizontal portion between said pair of idler pulleys,

said tail pulley and said one idler pulley having rotatable magnetic means associated therewith to maintain said signal devices on said conveyor belt as said signal devices are picked up from said roadway surface and conveyed to said vehicle haulage compartment,

fixed magnetic means positioned beneath said endless conveyor belt between said tail pulley and said one idler pulley, and

said fixed magnetic means arranged to maintain said signal devices on said substantially vertical portion of said endless conveyor belt conveying reach as said signal devices are conveyed upwardly to said vehicle haulage compartment.

References Cited by the Examiner

UNITED STATES PATENTS

2,541,523	2/1951	Lang.	
3,204,788	9/1965	Kleinsorge	214—83.26

FOREIGN PATENTS

1,128,357	4/1962	Germany.

EVON C. BLUNK, *Primary Examiner.*

R. M. WALKER, *Assistant Examiner.*