Oct. 1, 1929. M. L. WENRICH 1,729,754

TRACK CLEANER

Filed April 17, 1926 2 Sheets-Sheet 1

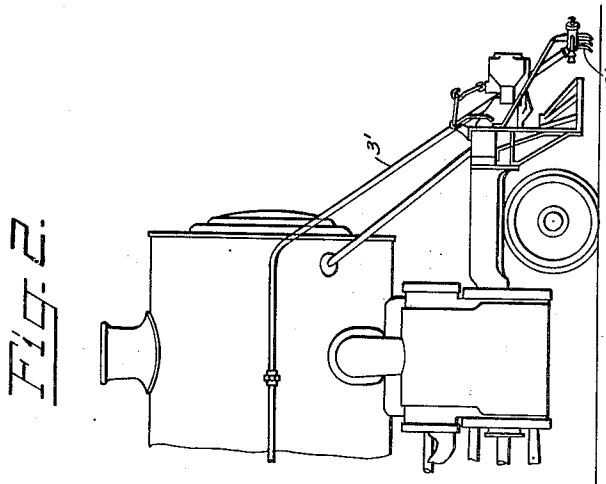

Fig. 2.

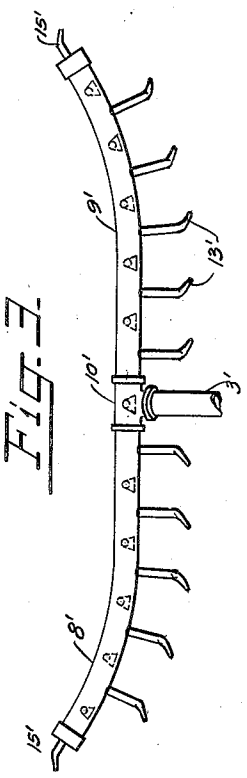

Fig. 3.

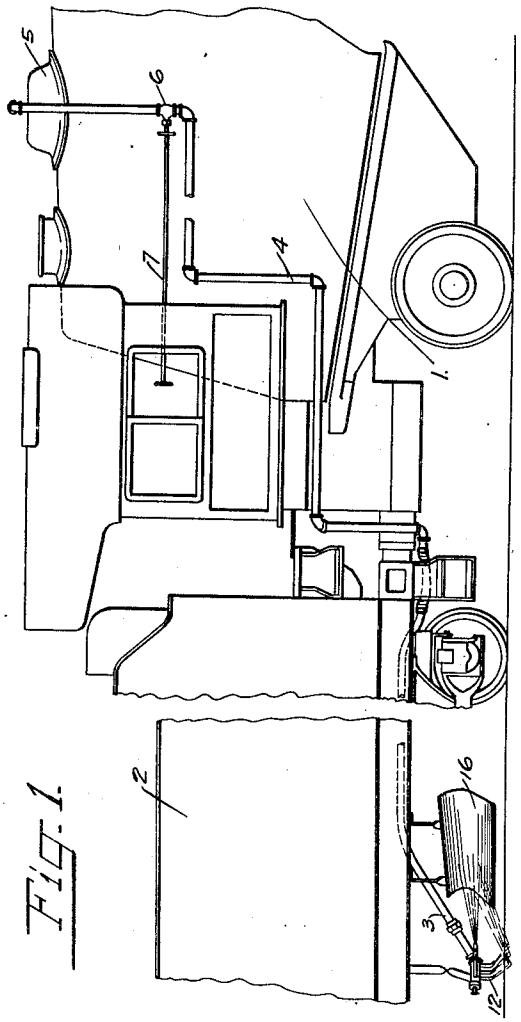

Fig. 1.

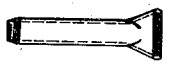

Fig. 7.

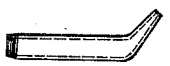

Fig. 6.

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Fig. 4.

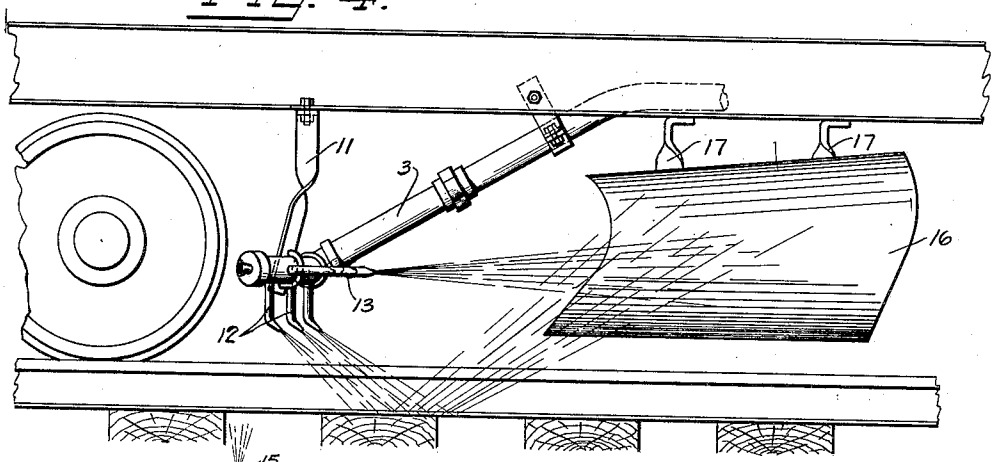
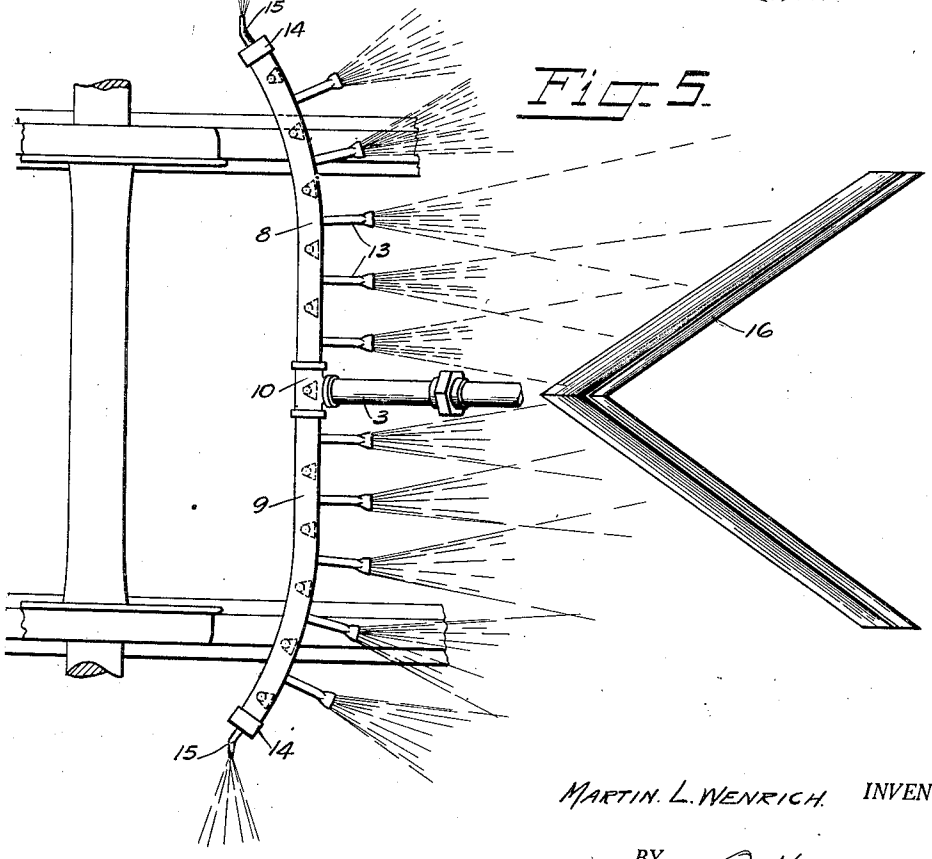


Fig. 5.



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Patented Oct. 1, 1929 1,729,754

UNITED STATES PATENT OFFICE

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TRACK CLEANER

Application filed April 17, 1926. Serial No. 102,691.

My invention relates to track cleaners and has particular reference to the removal of snow and ice from railroad and similar exposed tracks, particularly in terminals and yards where large numbers of switches and crossovers are employed.

One of the major difficulties encountered in railroad operation during the winter months is the removal of snow and ice from the tracks and many switches to be found at terminal and freight classification yards. It is vital that the switches and other mechanism for controlling traffic at these centers be kept clear and in working order at all times and heretofore this has been accomplished to some degree by steam-heating the switches. This method of keeping the tracks and switches clear of snow is, however, too expensive to be widely used, with the result that large areas must be kept clear by hand removal of snow—a slow, costly and unsatisfactory method.

In order to eliminate the difficulties heretofore encountered and to effect a rapid, thorough and economical cleaning of tracks and allied equipment, such as switches, frogs, crossovers, switch signal lights, etc., the present invention contemplates the provision of a steam jet cleaner which will, by virtue of a combined blowing and melting action, remove snow, ice and other accumulations of foreign material from the tracks. A further object of the invention is the provision of a cleaner of this nature which may be readily and quickly installed on or removed from railway rolling stock, such as locomotives, tenders or cars, or which may be installed as a permanent part of the equipment of a car used for cleaning purposes. A still further object of the invention is the provision of an apparatus which is simple and rugged in construction, inexpensive to manufacture and install, and requiring little, if any, repair or maintenance. Other and more detailed objects of the invention will appear in conjunction with the following detailed description of the invention.

For purposes of illustration, I have shown the invention as applied directly to a locomotive or its tender, and in the drawings, Fig. 1 is a fragmentary elevation of a locomotive and tender with my invention installed on the latter; Fig. 2 is a fragmentary elevation of the forward end of a locomotive with apparatus embodying my invention installed directly on the locomotive; Fig. 3 is an enlarged plan view of the blower illustrated in Fig. 2; Figs. 4 and 5 are respectively elevation and plan views on a larger scale of the blower apparatus illustrated in Fig. 1, parts being omitted for the sake of clearness, and Figs. 6 and 7 are enlarged detail views of one form of nozzle employed.

According to my invention, the primary step in the removal of snow or other material from the tracks to be cleaned consists in the dislodgment of such material from the track surface by the prying action of a plurality of steam jets directed toward the track surface at an angle to the horizontal of such degree that the steam jets are caused to rebound or ricochet and produce a strong lifting action on the loose material lying on the track. The angle at which the jets are directed toward the track surface is dependent upon the character and condition of the latter, but I have found that an angle of inclination of approximately forty-five degrees is satisfactory in the majority of instances. In this connection it is to be noted that in the removal of snow, and more particularly ice formations, from the tracks, the heat in the steam produces a melting action which is sufficient to loosen the adhering material so that the blast action of the steam jets issuing from the nozzles is able to lift it from the track.

The set of steam jets used to loosen and lift the material from the track is moved slowly over the area to be cleaned at a level a few inches above the track and in a direction in which the steam jets point. In order that the steam jets may penetrate between switch points and other track elements lying substantially parallel to the direction of the track, the jets are pointed in a generally forward direction with the result that the loose material raised from the track is thrown forward in the direction of motion of the jets. To prevent this material from again settling on the track ahead of the blower, a secondary step is performed in the cleaning operation,

which deflects the material raised laterally of the track so that it is finally deposited on either side of the area cleaned. The deflection of the material to the side of the track is accomplished by the provision of a set of substantially horizontally positioned nozzles having laterally directed tips and located so that the jets from these nozzles intersect the path of ricochet of the steam blast a short distance above the roadbed and deflect this steam, together with the material carried by it, laterally away from the track. Alternately, the second set of horizontal nozzles may be pointed directly forward to impinge upon a V-shaped deflecting shield, which serves to throw the material raised horizontally and laterally away from the track. In some cases where the nature of the material permits, the horizontal nozzles may be made considerably smaller than the angularly placed nozzles or even omitted, when the deflecting shield is used, as in some cases the steam blast rising from the tracks and carrying with it the material to be removed, will strike the deflecting shield with sufficient force to be carried thereâlong and thrown a considerable distance from the tracks without the aid of a second set of nozzles. Obviously, in the interest of steam economy, the horizontal deflecting nozzles should be made as small as is consistent with effective cleaning and, if possible, eliminated.

Referring now to Fig. 1, I have shown the form of apparatus employing a double set of nozzles and a deflecting shield as applied to a locomotive tender. In the figure, the locomotive is indicated generally at 1 and the tender at 2. The blower is mounted below the tender frame and receives steam through the supply pipe 3 connected by means of any suitable flexible connection with the steam pipe 4 leading from the steam dome 5, or other suitable source of dry steam. The supply of steam from dome 5 is controlled by means of valve 6, having an extended control member 7 located in the cab of the locomotive. As is shown more clearly in Figs. 4 and 5, the blower comprises a header formed by a pair of pipes 8 and 9 connected by means of the T 10 to the inlet pipe 3. The header is mounted transversely across the track a short distance thereabove by means of suitable brackets 11, which are attached to any convenient portion of the tender frame, preferably in a manner permitting of ready removal. A series of vertically disposed nozzles 12, are mounted in pipes 8 and 9, the nozzles being provided with angularly directed tips (see Figs. 6 and 7) disposed so that they throw the jets forwardly and in line with the track at an angle of about 45 degrees to the horizontal. A second set of horizontally disposed nozzles 13 is mounted in the pipes 8 and 9, these nozzles being preferably flattened to throw a horizontal fan-shaped jet directly forward, although, if desired, a nozzle throwing a cone-shaped jet may be employed. It will be noted from Fig. 5 that the outer ends of the pipes 8 and 9 are rearwardly bent. This form of construction provides a desirable outward divergence of the outer nozzles, but it will be obvious that, if desired, the pipes may be straight and the individual nozzles turned to the desired angle. It will also be obvious that many variations in the shape and form of the pipes and nozzles may be made while still maintaining the same relative position of the steam jets with respect to the track. Pipes 8 and 9 are closed at their outer ends by caps 14, in which are mounted nozzles 15, having their tips bent so that the jets from them are directed horizontally at right angles to the track.

In front of the blower there is mounted a deflector 16 comprising a pair of vertically curved plates joined to form a V. The deflector 16 is mounted above the track approximately the same distance as the blower, by means of suitable brackets 17, to any convenient portion of the tender frame, with the apex of the V located midway between the rails and pointing toward the blower.

It will be obvious from an inspection of Figs. 4 and 5 that the material lifted from the tracks by means of the steam jets from nozzles 12 will be directed horizontally by the jets from the nozzles 13 along the surfaces of the deflector 16, which will act to throw the material laterally away from the track. It will further be obvious from Fig. 4 that the material raised by the jets from nozzles 12 will, if the nozzles 13 are omitted, strike the deflecting plate and tend to be deflected outwardly thereby. At the same time the overhanging curved upper portion of the deflector 16 will tend to deflect the flow into a horizontal direction and for this reason the jets from nozzles 13 may be in many instances smaller than those issuing from nozzles 12, and may even be omitted entirely under certain conditions where the steam jets issuing from nozzles 12 are sufficiently powerful not only to raise the material from the track, but also to force it along the surfaces of the deflector 16 with sufficient force to throw it beyond the tracks.

Referring now to Figs. 2 and 3, I have illustrated the blower as applied to a locomotive, with the deflecting shield omitted. In this case where no deflector is used, the general arrangement of the pipes 8′ and 9′, attached to the inlet supply pipe 3′, is as previously described. The nozzles 12′ are located in the same position relative to the track as the vertical nozzles described in connection with the preceding form, but it is to be noted that in this case the nozzles are directed rearwardly with respect to the locomotive for a reason which will be explained later. The horizontal nozzles 13′ are of the form shown in de-

tail in Figs. 6 and 7, the same as that used for the vertical nozzles, but the horizontal nozzles are placed with the angular tips directed laterally away from the center line of the track. In this form the laterally directed horizontal jets form the sole means for blowing the material raised from the track laterally away from it.

The nozzles 15 (Fig. 5) and 15′ (Fig. 3) are provided for the purpose of clearing the switchlights adjacent to the tracks over which the cleaner is passed. The deflector, or the laterally disposed jets, throw large quantities of material to one side or other of the track and this material lodges upon and obscures switchlight and similar equipment, and this is subsequently cleared of the accumulation by the jets from the nozzles 15 or 15′, which impinge thereon after the passage of the main portion of the blower.

From the foregoing description, the operation of the device is obvious. Steam is admitted to the blower through the control valve 23 and the locomotive is then run slowly over the tracks to be cleared. Depending upon the depth and character of the snow or ice to be removed, the locomotive speed should be in the neighborhood of from 2 to 4 miles per hour. As the blower is moved over the road bed, the steam jets from the row of nozzles 12 or 12′, which are moving in the direction in which they are pointed, act not only to loosen snow and ice by melting, but also exert a powerful prying action, which tends to lift it from the track. In effect, the steam from these jets ricochets from the track surface and carries upwardly with it all loose material which may be lying on the road bed. The material thus thrown upward by the jets from nozzles 12 or 12′ is blown by the jets from nozzles 13 or 13′ from the center of the track outwardly and away from the road bed to be cleaned. It will be obvious that the nozzles 12 or 12′ located adjacent to the rail will direct powerful jets of steam into the switch points to thoroughly clean them, and the other jets will have the same effect on frogs and crossovers over which the locomotive may pass. Furthermore, in the case of fine, dry snow, which drifts readily, the action of the blower is more effective than hand cleaning, as the snow which is cleared from the road bed by means of the steam jets is moistened to a considerable degree by the condensation of the steam. This wet snow thrown out by the blower tends to pack and remain where it falls rather than drift back upon the tracks.

As previously stated, the locomotive should be run during the cleaning operation so that the nozzles 12 or 12′, as the case may be, are directed forwardly in the direction of motion. For this reason, the nozzles 12′ in the blower located at the forward end of the locomotive are placed with the jets directed toward the rear of the locomotive and in operation the locomotive is run backward. If the position of the nozzles were to be reversed and the locomotive run forward, the cleaning action would not be impaired, but the cloud of steam and snow raised by the blower is so great that the engineer's view would be seriously impaired and consequently the arrangement shown is used, and the locomotive run backward in order that the engineer may have a clear view in the direction of motion, with the cloud raised by the blower behind him. When the blower is located under the tender, the nozzles 12 are forwardly directed with respect to engine and tender and the engine is run forward in the normal manner, as in this case the cloud raised by the blower is behind the engine cab. As the direction of the nozzles with respect to the direction of motion is always forward, the term forwardly is to be understood as referring to direction of movement, irrespective of the direction in which the nozzles may be mounted with respect to the unit of rolling stock to which the blower may be attached.

Obviously, either of the forms of blower which I have described may be attached to a suitable unit of rolling stock wherever desired, and steam for the blower may be supplied either from the locomotive boiler or from other sources of steam supply. In the forms which I have shown for illustrative purposes, the blowers are attached by easily removable means so that they may be removed when not in actual use, but either form of blower may readily be attached to a special car adapted to be coupled to a locomotive when occasion arises to use the blower.

Many variations in the location and arrangement of the different forms of the apparatus may be made without departing from the spirit of the invention as defined in the appended claims.

I claim:

1. The method of cleaning railway road beds or the like, which consists in moving a plurality of downwardly and forwardly directed steam jets over said road bed to loosen and raise material therefrom in a forward and upward direction by the ricochet action of said jets, and thereafter forcing said material from the path of ricochet laterally away from said road bed.

2. The method of cleaning railway roadbeds or the like, which consists in moving a plurality of downwardly and forwardly directed steam jets over said roadbed to loosen and raise material therefrom in a forward and upward direction by the ricochet action of said jets, forcing said material laterally from the path of ricochet, and spreading and depositing it on the ground at both sides of said road bed.

3. The method of cleaning railway road-

beds or the like, which consists in moving a plurality of downwardly and forwardly directed steam jets over said roadbed to loosen and raise material therefrom, and thereafter deflecting said material from the area cleaned by the action of a plurality of substantially horizontal laterally directed steam jets.

4. The method of cleaning railway road beds or the like, which consists in moving a plurality of downwardly and forwardly directed steam jets over said road bed to loosen and raise material therefrom, forcing said material laterally and spreading and depositing it on the ground away from the area cleaned by the action of a plurality of substantially horizontal laterally directed steam jets.

5. The method of cleaning railway road beds or the like, which consists in moving a plurality of downwardly and forwardly directed steam jets over said road bed to loosen and raise material therefrom, forcing said material laterally and spreading and depositing it on the ground at both sides of said road bed by the action of a plurality of substantially horizontal laterally directed steam jets.

6. In apparatus of the class described the combination with a unit of rolling stock adapted to move over a roadbed; of a plurality of downwardly and forwardly directed jet-forming nozzles mounted on said unit transversely of said roadbed and adjacent thereto, means supplying fluid under pressure to said nozzles, whereby a plurality of fluid jets is caused to impinge upon and ricochet from said roadbed, and means intersecting the path of ricochet and deflecting said jets laterally of said road bed.

7. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a road bed, of a plurality of downwardly and forwardly directed jet-forming nozzles mounted on said unit transversely of said road bed and adjacent thereto, means supplying fluid under pressure to said nozzles whereby a plurality of fluid jets is caused to impinge upon and ricochet from said road bed, and other nozzles positioned to direct their discharge through the path of ricochet and laterally of said road bed.

8. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a road bed, of a plurality of downwardly and forwardly directed jet-forming nozzles mounted on said unit transversely of said road bed and adjacent thereto, means supplying fluid under pressure to said nozzles whereby a plurality of fluid jets is caused to impinge upon and ricochet from said road bed, and a shield mounted on said unit forwardly of said nozzles, said shield having a deflecting surface intersecting the path of said jets after they ricochet to deflect them laterally of said road bed.

9. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a road bed, of a plurality of downwardly and forwardly directed jet-forming nozzles mounted on said unit transversely of said road bed and adjacent thereto, means supplying fluid under pressure to said nozzles whereby a plurality of fluid jets is caused to impinge upon and ricochet from said road bed, a shield mounted on said unit forwardly of said nozzles, said shield having a deflecting surface intersecting the path of said jets after they ricochet to deflect them laterally of said road bed, and a second set of jet-forming nozzles adapted to discharge forwardly and substantially horizontally against said deflecting surface.

10. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a roadbed; of a plurality of downwardly and forwardly directed jet-forming nozzles mounted on said unit transversely of said roadbed and adjacent thereto, a set of laterally directed jet-forming nozzles located forwardly of and above said first named set of nozzles, and means supplying fluid under pressure to said sets of nozzles.

11. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a roadbed; of a header mounted on said unit transversely of said roadbed and adjacent thereto, a set of downwardly and forwardly directed jet-forming nozzles mounted in said header, a second set of forwardly and laterally directed jet-forming nozzles mounted in said header, and means for supplying fluid under pressure to said header.

12. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a roadbed; of a header mounted on said unit transversely of said roadbed and adjacent thereto, said header having end portions located rearwardly of the intermediate portion, a set of downwardly and forwardly directed jet-forming nozzles mounted in said header, a pair of laterally directed substantially horizontal jet-forming nozzles mounted in the ends of said header, and means for supplying fluid under pressure to said header.

13. In apparatus of the class described, the combination with a unit of rolling stock adapted to move over a road bed, of a set of downwardly and forwardly directed jet-forming nozzles mounted on said unit transversely of said road bed and adjacent thereto, means supplying fluid under pressure to said nozzles whereby a plurality of fluid jets is caused to impinge upon and ricochet from said road bed, a second set of laterally directed nozzles divided into two groups, one of

said groups of nozzles being positioned to direct the discharge therefrom through the path of ricochet to one side of said road bed, and the other of said groups being positioned to direct the discharge therefrom through the path of ricochet to the other side of said road bed.

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