Jan. 14, 1941. R. GADDIS 2,228,450

SCRAPER

Original Filed Jan. 28, 1937 2 Sheets-Sheet 1

Fig. 1

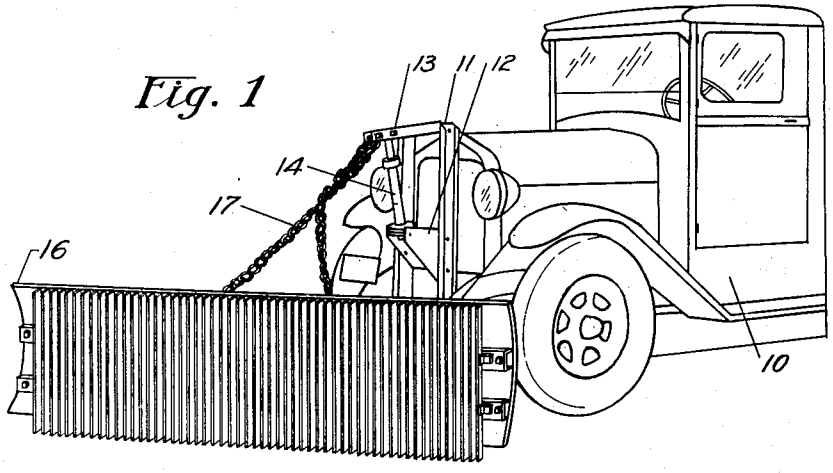
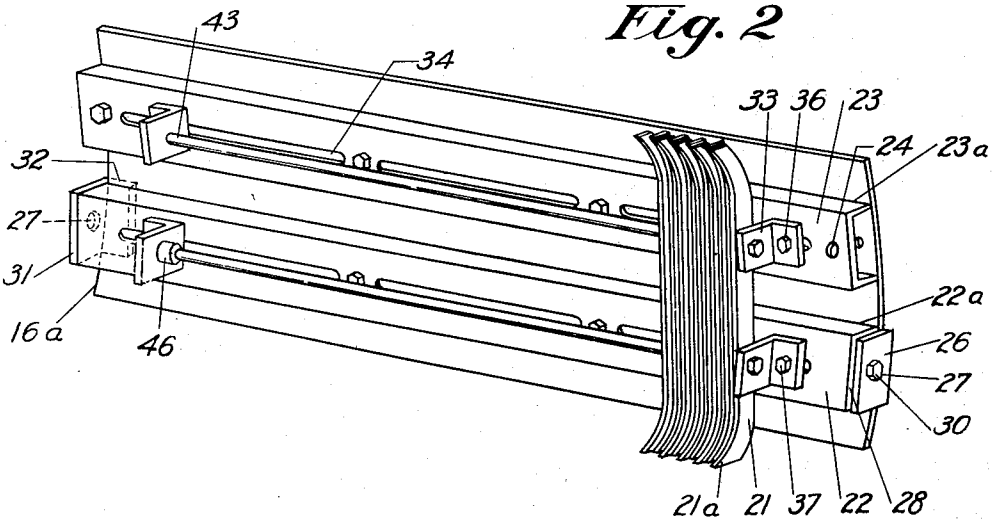


Fig. 2



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Fig. 3

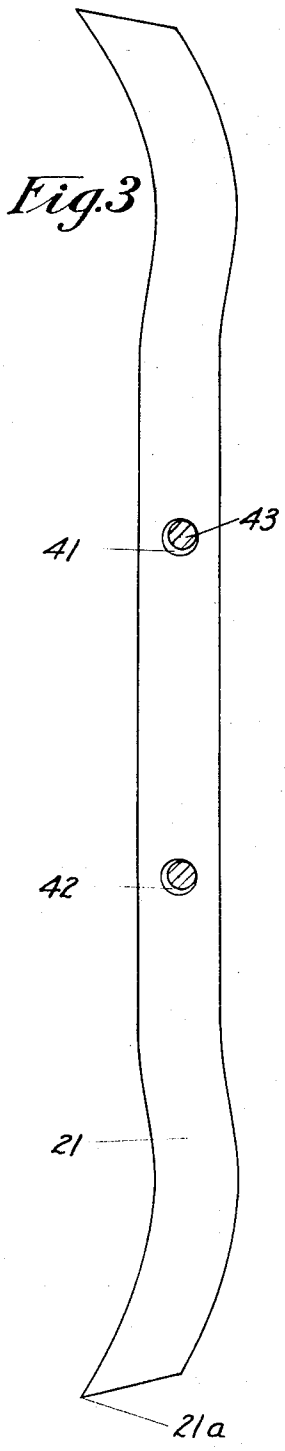


Fig. 4

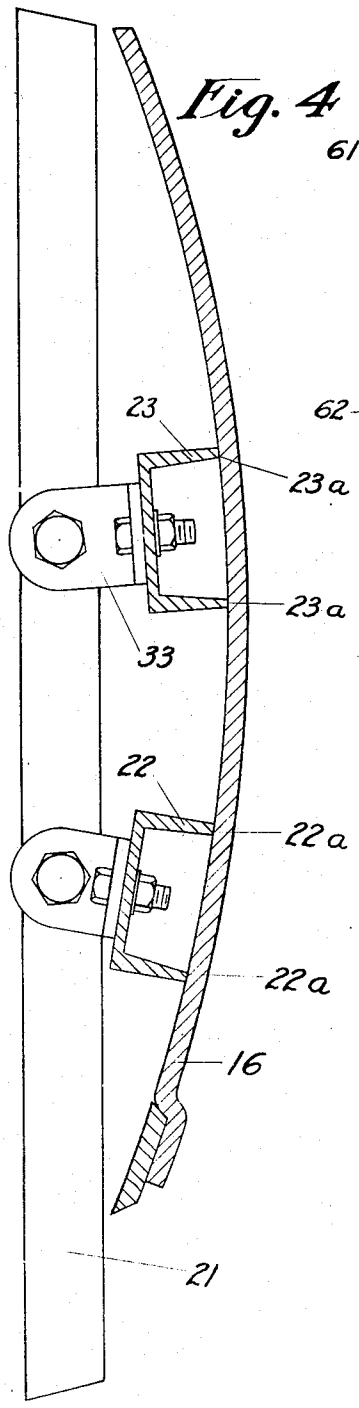
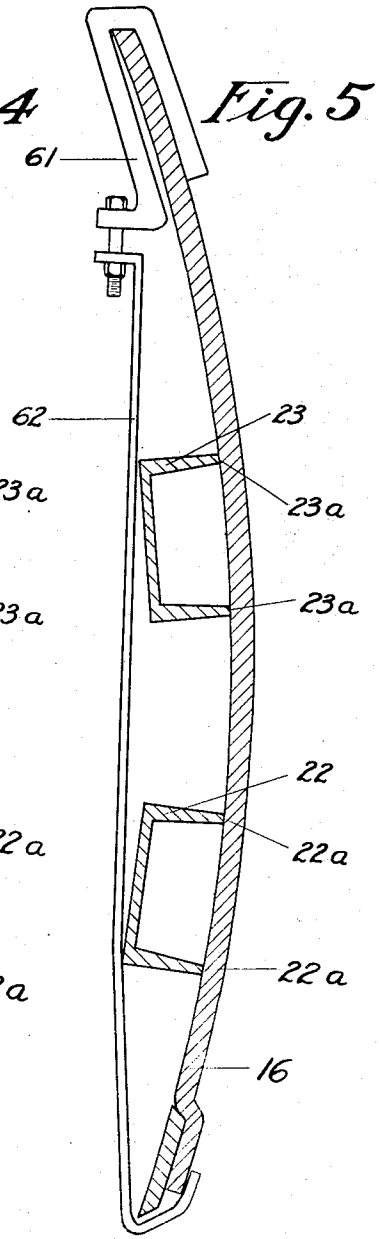


Fig. 5



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UNITED STATES PATENT OFFICE

2,228,450

SCRAPER

Roy Gaddis, Davenport, Iowa

Substitute for abandoned application Serial No. 122,782, January 28, 1937. This application February 24, 1940, Serial No. 320,676

10 Claims. (Cl. 37—42)

This invention relates to improvements in earth moving devices such as scrapers and the like and has particular relation to a device adapted for removing ice and snow.

It is the usual practice in removing snow and ice from roadways, streets, and the like, to employ scraper blades or plow blades, adapted to pick up the material from the roadway and roll it over and over until it is discharged from the end of the scraper blade.

However, such devices are not satisfactory for the reason that the cutting edge of the blade presents a relatively large area such that the tractor or truck or other prime mover cannot drive the cutting edge into the ice to break it away. Too much power would be required for doing this. The pressure applied in this manner is relatively even pressure which is readily resisted by the ice.

I have discovered that percussive force and successive blows on a plurality of sharp points may be applied to remove ice from roadways and the like with much greater facility and with the expenditure of only such power as the ordinary scraper requires.

It is a well known fact that in order to chip a cake of ice, the thin sharp pointed ice pick is much more effective than a blunt instrument such as a hatchet or hammer or instrument of like nature for the reason that the sharp-pointed, thin-sectioned instrument readily splits the ice in its planes of cleavage, whereas the edge of the broader faced instrument strikes a wider section of the plane, making splitting much more difficult.

In accordance with my invention the contact, between the ice removing devices and the ice is a series of relatively short, individually moving line contacts. These line contacting members act on the ice with rapidly varying pressures amounting at times to percussive blows and may move from side to side to seek the most ready line of cleavage.

In accordance with this theory I have devised means for applying percussive force in pointed instruments adapted to split the ice.

It is accordingly a general object of my invention to provide a new and improved ice and snow removing device.

A more specific object of my invention is to provide means for splitting or cracking the ice on a road surface to facilitate its removal.

Another object of my invention is to provide a percussive instrument for ice removal.

Another object of my invention is to provide, in an ice removing means, means for causing or permitting irregular application of force to the contacting instrument or cutting points whereby ice may readily be split off.

Another object of my invention is to provide means for attaching an ice removing device constructed according to my invention to a scraper blade or the like.

Another object of my invention is to provide an ice removing device which may be readily attached to cooperate with a scraper blade.

Another object of my invention is to provide means for splitting ice from a roadway such that the power of the prime mover is applied to the splitting instrument in a series of percussive blows of very short duration and at many points in succession whereby the full power of the prime mover will be applied at any particular instant at only a relatively few points.

Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the accompanying drawings and following specification, wherein are disclosed several embodiments of the invention, with the understanding, however, that such changes may be made therein as fall within the scope of the appended claims, without departing from the spirit of the invention.

In said drawings:

Figure 1 is a view in perspective of the front end of a truck, having a scraper blade pivotally engaged for vertical movement on the front of the truck, and of an ice removing device constructed according to one embodiment of my invention, attached to the scraper blade.

Figure 2 is a view in perspective of the scraper blade shown in Figure 1, but in enlarged relation.

Figure 3 is a view in elevation of a cracker or cutting bar constructed according to one embodiment of my invention.

Figure 4 is a view partly in elevation and partly in section of a cutting bar constructed according to another embodiment of my invention as it appears when mounted on a scraper blade, the blade being shown in section, and

Figure 5 is a view in elevation of a clamping means used for assisting in clamping and holding the channel members on the face of the mold board.

Referring now to Figure 1 there is shown at 10, generally, a vehicle such as truck on which a scaffold or framework 11 has been mounted in front of the radiator thereof. This scaffold is provided with a platform at 12, a lever 13 and a

hydraulic jack 14 for raising and lowering the lever 13.

A scraper blade or backing plate 16 is attached to a suitable framework at the front of the truck which permits adjustment up and down of the scraper blade to vary the depth of cut thereof. Vertical movement or adjustment of the scraper blade is secured by means of cables 17 engaged to the free end of the lever arm 13 and to the scraper blade.

In the preferred form of the invention I utilize an ice "cracker" bar 21 having a pointed end 21a, which is adapted, in use, to bear against the ice to crack it or split it from the ice on the roadway. I preferably use a plurality of these bars 21 and it is by the use of this plurality of splitting means that I am enabled to continuously split or remove an appreciable section of ice from a roadway or the like which cannot be removed with ordinary methods. Obviously, any pointed instrumentality such as a bar, round in section and tapered to a point, or like splitting means, may be employed, but I have found that the bar shape here shown is most suitable or desirable for the purpose.

Obviously, the splitting instrumentality here shown may be supported in any suitable framework in front of, below or behind a vehicle, such as a tractor, a truck, an automobile, a railroad locomotive, a street car, or the like, but a preferred mounting is that disclosed in the drawings and consisting of means for attaching the cracker bar to a scraper blade, such as that commonly employed for snow and ice removal work.

In the embodiment of the invention here shown, the scraper blade or mold board is represented by the numeral 16 and to this blade I preferably attach two channel members such as indicated at 22 and 23. These channel members are so positioned on the mold board or scraper blade 16 that the edges 22a and 23a bear against the front face of the mold board.

Obviously, the channel members 22 and 23 may be secured to the face of the mold board in several different ways. A preferred method is illustrated in the upper portion of Figure 2 and consists in providing the channel 23 with a plurality of openings 24 across the face thereof and drilling and tapping the face of the mold board 16 to receive bolts which are passed through the opening 24. The bolts are drawn up tightly to hold the channel against the face of the mold board.

Another method of securing the channel 22 to the mold board is illustrated at the lower portion of Figure 2.

In this method of securing the channel 22 to the mold board I employ a plate 26 welded or otherwise secured to the end of the mold board and this plate 26 is provided with an opening at 27 therethrough to receive the shank of a bolt. The end of the channel member 22 is closed off by means of a cap 28 and this cap is centrally apertured to also receive the shank of the bolt which passes through the aperture 27. The length of the channel member 22 is preferably so chosen that it is slightly shorter than the length of the face of the mold board and so that there is a slight space between the end of the member 22 and the plate 26 to permit drawing up the end of the channel member against the plate 26 to afford a tight connection between the channel and the mold board, the bolt acting to draw the channel across the face of the mold board to tighten the hooked connection at the other end of the channel which I am about to describe.

The hooked connection at the other end of the channel 22 is very simple and amounts, in a preferred embodiment of the invention, to nothing more than a plate 31 over the end of the channel member 22 having a hook 32 at the inner edge thereof adapted to be hooked over the edge of the mold board 16. When the end of the channel 22 is drawn against the plate 26 by the bolt 30 this hook 32 will be drawn against the opposite edge of the mold board, indicated at 16a, to make a hard and fast connection between the channel and the mold board.

In securing the cracker or cutter bars 21 to the faces of the channels 22 I preferably employ a plurality of angle members indicated at 33. I preferably slot the front face of the channel member 22 and 23 as indicated at 34 and the angle members 33 are provided with openings 36 therein and bolts 37 pass through the openings 36 and through the slots 34 to secure the flange members or angle members 33 to the face of the channel members 22 and 33. I may, of course, provide as many of these angle members as necessary to afford a strong, stiff connection for the cracker or cutter bars 21 and it is desirable to use several of these angle members and six or more are usually employed.

The cracker bars 21 are provided with openings 41 and 42 therethrough and are adapted to be held in place by means of long rods 43 passed through suitable openings in the angle 33 and through openings 41 and 42. The openings 41 and 42 are preferably relatively larger than the diameter of the bar 43 to afford a loose connection between the cracker bars and the rod 43 to permit considerable front and rear as well as tilting movement of the cracker bars. This freedom of movement is very desirable for the reason that it permits the points 21a of the cracker bar to spring back and forth, that is front and rear, and also to move from side to side whereby the points 21a of the cracker bars can readily seek the most desirable lines or planes of cleavage of the ice sheets and it is to this permissible movement of the cracker bar points to which I ascribe the superior operation of my device over those known to the art.

It is apparent that, at a given instant, the point of one of the cracker bars may have just split away the piece of ice with which it has been in contact so that the pressure on one of the bars is entirely relieved, whereas the bar beside may be just beginning to receive the full thrust of the prime mover by reason of the resistance of the ice in front of it. The reactive force set up in the last named bar will act to push the bar backwardly against the face of the mold board which causes the bar to bounce or rebound to deliver a blow of tremendous force to the point of the cracker bar which will split off the ice in front of it. I may facilitate this successive irregular application of force to a plurality of points by staggering the bars, placing one point to the rear of its neighbor, thus providing a series of bars with one point advanced, the next one retarded and the next adjacent bar advanced, the next retarded and so on. This will be found to be of material assistance in assisting to split the ice from the roadway, since it facilitates the application of the force of the prime mover to still fewer points.

Obviously, the points of the cracker bars may be made of very hard metal such as molybdenum

alloys, stellite and the like and such points can be readily replaced by welding or in any other suitable manner.

I have found it most desirable that the points of the cracker bars be approximately 1 to 3 inches below the cutting edge of the scraper blade, depending upon conditions, for ice removal work and 6 to 8 and 10 inches for snow removal work.

I may use a series of these cracker bars entirely across the front of the mold board, or at spaced intervals along the face of the mold board. These may be spaced in any desirable manner but I preferably employ a pipe such as illustrated at 46 which is disposed between one of the flanges 33 and the adjacent cracker bar. For instance, under severe conditions it might be that only 5 or 6 of the cracker bars would be employed. Under other conditions ½ of the mold board might be provided with cracker bars.

If desired, an additional clamping means 61 and 62 may be employed to assist in clamping the channels 22 and 23 to the face of the mold board 16. Certain of the cracker bars may be longer than others for the purpose of removing ice from the grooves of street car and railroad car tracks.

Although a preferred device has been described as a means for splitting ice and the like from the roadways, it is quite apparent that it might readily be used in smoothing gravel roads or leveling asphalt and like uses. Likewise, a device constructed according to my invention might be used for removing ice or packed snow from the depressed portions of the street car rails which the ordinary and usual scraper blade cannot do. While the crackers are shown and described as being mounted on a scraper blade, it is apparent that any suitable backing plate would accomplish the purpose of backing up and "bouncing" the crackers. Of course a tractor, a locomotive or the like may be used instead of the truck shown.

I preferably make the cracker bars 21 double-ended so that, as one point becomes worn, the bar or rod 43 may be removed and the cracker bar reversed to present a new point. The cracker bars may be curved at their ends as illustrated in Figure 3 or may be straight as illustrated in Figure 4, for other types of snow and ice removal work.

This application is a substitute for my former application S. N. 122,782, filed January 28, 1937 and abandoned December 2, 1938.

Although I have described specific embodiments of my invention it is apparent that modifications thereof may be made by those skilled in the art without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim as my invention:

1. In a grading means, a truck, a backing plate mounted on the front of the truck, and a plurality of relatively short cutting means loosely secured in front of the backing plate for bouncing movement with reference thereto.

2. In a grading means, a truck, a supporting means attached to the truck, and a plurality of cracker bars loosely mounted on the supporting means to permit independent movement of the cracker bars with reference to one another to act to split ice from road surfaces.

3. In a grading means, a truck, a supporting means attached to the truck, and a plurality of splitting means loosely mounted on the supporting means for movement with respect to the truck and so positioned with reference to the supporting means that varying degrees of pressure are applied to the splitting means while in use.

4. In a grading means, a truck, a support on the truck, and pointed instrumentalities loosely affixed to the support and acting independently of one another to apply varying pressures at varying angles to material being graded.

5. In a surface cutting means including a truck, a scraper blade supported by the truck, and a plurality of cracker bars loosely mounted on the scraper blade and projecting below the cutting edge thereof and forward therefrom, the cracker bars being loosely held on the scraper blade whereby they are permitted certain freedom of movement to assist in splitting ice or the like from the surface of a roadway.

6. In a grading device, a truck, a scraper blade supported by the truck, a plurality of cutter bars and means for loosely attaching the cutter bars to the surface of the scraper blade with the bars projecting below the cutting edge thereof.

7. In a grading device, a truck, a scraper blade supported by the truck, a plurality of cutter bars and means for loosely attaching the cutter bars to the surface of the scraper blade with the bars projecting below the cutting edge thereof, said means including a pair of channels extending across the face of the scaper blade and means for securing these channels to the scraper blade.

8. In a grading device, a truck, a scraper blade supported by the truck, a plurality of cutter bars and means for loosely attaching the cutter bars to the surface of the scraper blade with the bars projecting below the cutting edge thereof, said means including a pair of channels extending across the face of the scraper blade and means for securing these channels to the scraper blade, and means for securing the cutter bars on the channels comprising angles secured to the faces of the channels and movable lengthwise with respect thereto, and a rod passing through the angles and through the cutting bars.

9. In a grading means, a supporting means, and a plurality of cracker bars loosely mounted on the supporting means to permit independent movement of the cracker bars with reference to one another.

10. In a grading means, a supporting means, a scraper blade attached to the supporting means, and a plurality of cracker bars loosely attached on the scraper blade and projecting below the cutting edge thereof and forward therefrom, said cracker bars thereby being allowed a certain amount of independent motion, thereby permitting each bar to take the line of least resistance during the operation of splitting ice or the like from the surface of the roadway.

ROY GADDIS.