Sept. 16, 1969 A. KAHLBACHER 3,466,766

SNOWPLOW ACCESSORY

Filed Aug. 15, 1967 5 Sheets-Sheet 1

Fig.1

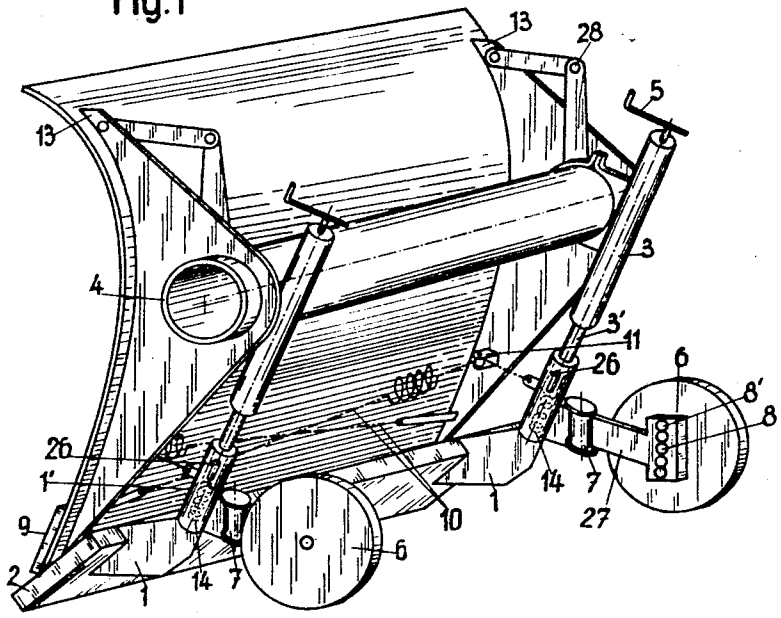


Fig.3

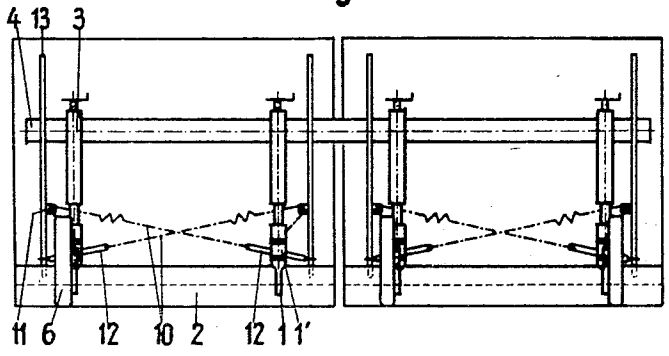


Fig.11

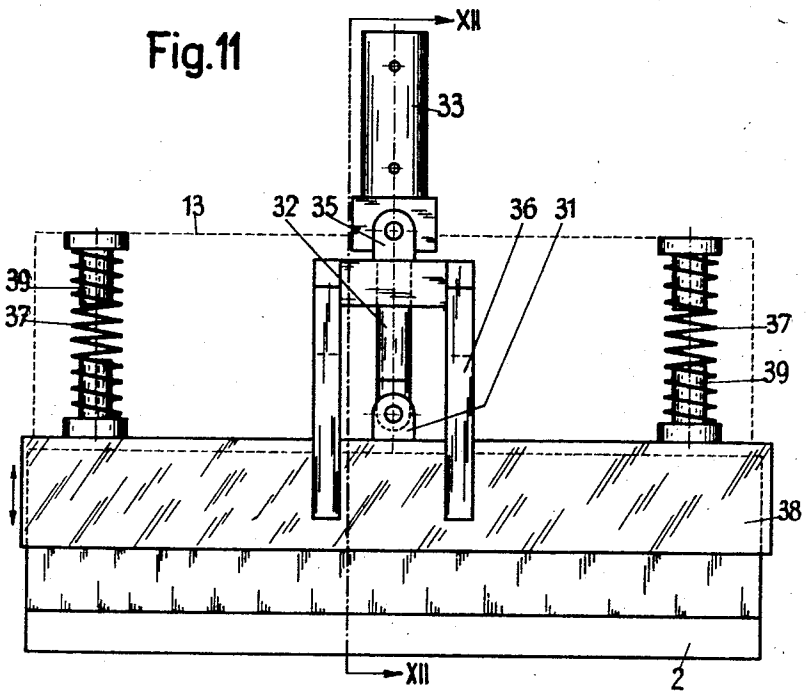


Fig.2

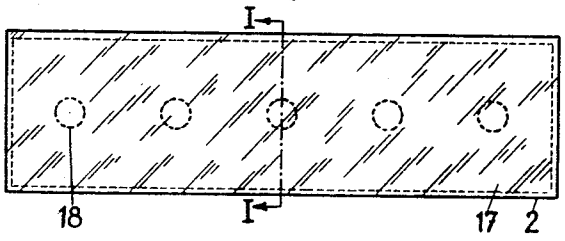
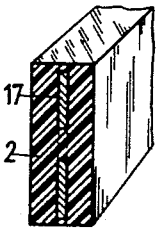


Fig.8



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Fig. 4

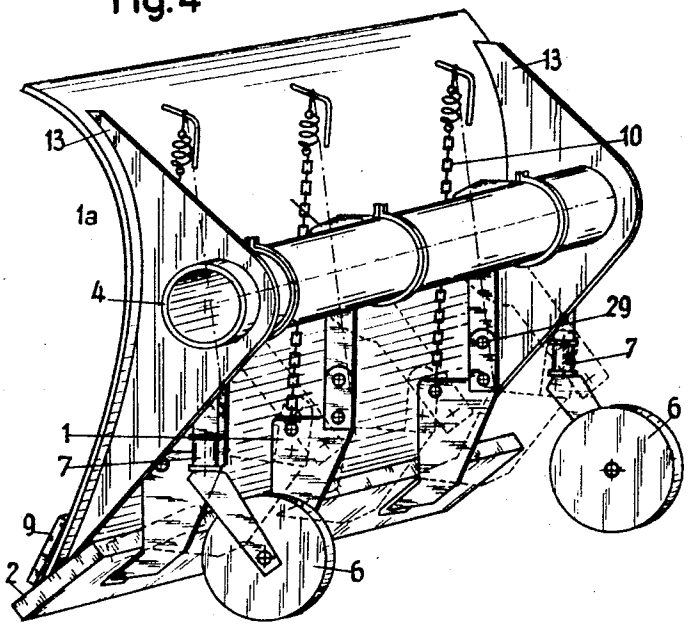


Fig. 5

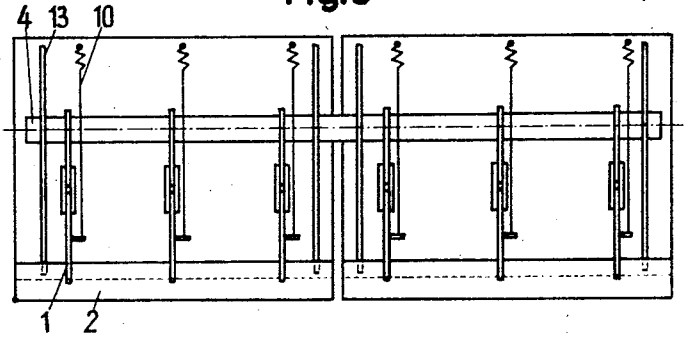


Fig.6

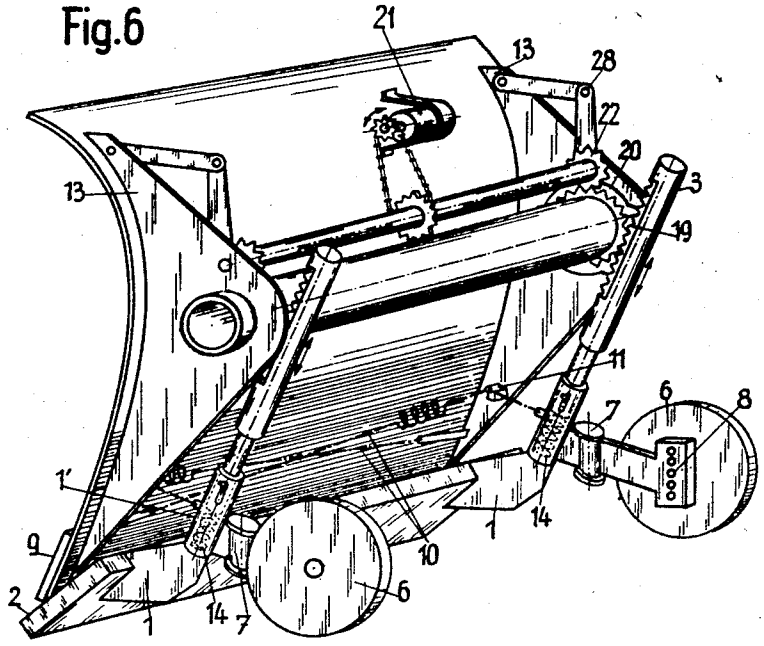
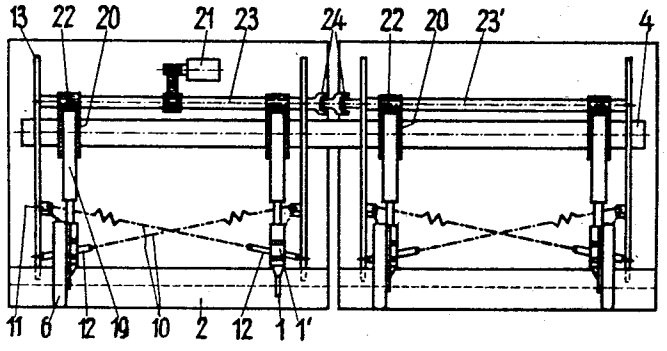

21
13
28
22
20
3
19
13
11
6
8
7
1'
9
2
1
14
7
10
6
1
14

Fig.7


13
22
20
21
23
24
22
20
23'
4
11
6
12
19
10
2
12
1
1'

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Fig.12

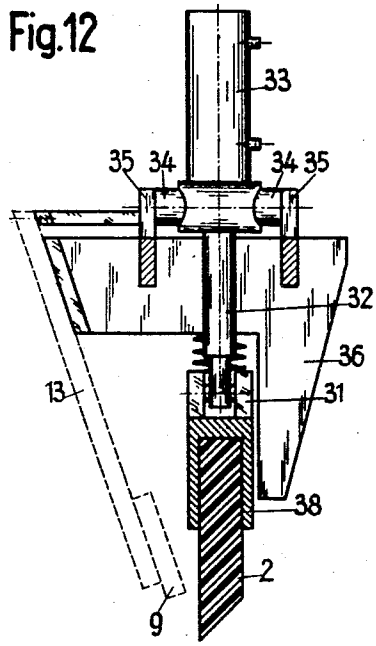


Fig.9

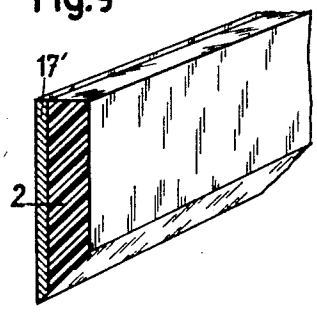
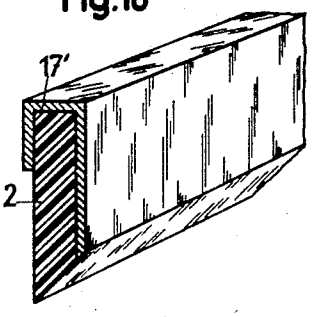


Fig.10



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3,466,766

SNOWPLOW ACCESSORY

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Int. Cl. E01h 5/06; A47l 13/02
U.S. Cl. 37—41 14 Claims

ABSTRACT OF THE DISCLOSURE

A snowplow accessory comprising a scraper resiliently suspended behind a snow removal blade for being selectively moved into a working position beneath the snow removal blade for the removal of slush and into an inoperative position above the snow removal blade, the slush removal scrape blade being elastically urged against the rear surface of the snow removal blade.

The invention relates to a snowplow accessory having a resiliently suspended scraper for the removal of snow slush.

In the interest of traffic safety in winter, it is desirable to effect thorough removal of snow, i.e. the snow lying on the roadway is removed down to the surface of the road. In this case, heavy snowplows having steel scrapers which additionally are provided with hydraulic devices for the purpose of pressing the scraper to the road, often damage the same. Moreover, as they wear out after a relatively short period, they are not then applied so as completely to remove the now. The small quantity of snow remaining on the road often makes it dangerously slippery, when the snow has become compressed by the vehicles driving on the road and adheres thereto. When temperatures are near the melting point or when thawing sets in, slush is formed which makes the road surface particularly slippery; moreover, passengers and house walls are splashed and made dirty by vehicles passing by.

In order to remove any snow remaining on the road after the usual removal, it has proved convenient to thaw the snow by spreading salt to preclude ice formation. Thus, snow slush is formed which has to be removed because it imperils traffic safety and splashes passengers, as indicated above. Devices of a special construction have been proposed for this purpose which are provided with plastic scrapers in order to avoid damage to the road and which are merely suitable for a removal at the two sides of the road. Not only are these devices expensive in construction, but they can only be used relatively infrequently because they are suitable only for the special purpose of removing slush.

It is therefore one object of the present invention to provided an economical device for the removal of slush which may be added to known snowplows and does not impede the application of the latter, when out of service.

According to the invention a solution is proposed wherein the resiliently suspended scraper for the removal of slush—provided in addition to the scraper proper of the snowplow—may be swung away or lifted up, when out of use.

According to one embodiment of the invention, the device is provided on a supporting frame which—together with the scraper for the removal of slush—is rotatable about a bracing tube of the supporting frame, is pressed against the rear side of the scraper by spring or elastic means and is resiliently secured to the latter. In order to lift up the device, a casing is preferably provided on the bracing tube comprising an adjustable spindle the end of

which is adjustable in a casing of the supporting frame and may be fixed by means of a stop. A screw thread is provided on the spindle by means of which the latter is adjustable in the corresponding screw thread of the casing by the action of the handle provided at the end of the spindle, the latter thus raising the removal scraper. A rack may be provided on the surface of the casing which is in mesh with a gear wheel fixed on the bracing tube, a reversible motor, for example an electric, hydraulic or pneumatic motor, driving the gear wheel through a gearing, thus adjusting the height of the casing through the gear wheel. If several plowshare segments are used, shafts connected by cardan joints are applied to raise or lower the slush removal scraper fixed to each segment.

A preferable embodiment of the invention consists in that a pressure spring is provided between the bottom of the casing and the end of the spindle movable in the latter, by which the supporting frame is resiliently supported on the end of the spindle, a bolt fixed to the spindle and sliding in a supporting frame and the spindle.

An especially convenient embodiment of the invention—which may preferably be added to side snow removal devices, but also to wedge snowplows—consists in that the resiliently suspended scraper for the removal of slush—provided in addition to the scraper of the snowplow—is flexibly connected with the piston rod of a double acting hydraulic cylinder located midway between its ends by means of supports, said hydraulic cylinder being swingable in mountings of a slide device rigidly connected with the supporting frame by means of pins fixed on the hydraulic cylinder.

According to another preferred embodiment of the invention the resilient suspension of the scraper for the removal of slush may consist of at least one anchored spring coupling provided between the upper edge of the mounting of the removal scraper on the one hand and the plow frame on the other. The spring coupling may consist of helical springs which encircle anchoring bolts on the mounting of the removal scraper and the plow frame. The scraper for the removal of slush itself consists of polymeric plastic material or the like in order to preclude damage to the road as far as possible.

Further details of the invention are hereinafter described by way of example with reference to the accompanying drawing without being limited to them. In the drawing:

FIGURE 1 is a side view of the device for the removal of slush according to the invention, wherein the device is lifted up and lowered by means of a handle.

FIGURE 2 is a front view of a slush removal scraper.

FIGURE 3 is a rear view of two segments of a divided snowplow comprising the device for the removal of slush according to the invention.

FIGURE 4 is another embodiment of the snowplow accessory.

FIGURE 5 is a rear view of the device according to the invention provided on two segments of a known snowplow;

FIGURE 6 is a side view of the machine-control of the device;

FIGURE 7 is a rear view of the device provided on two segments of a divided plowshare;

FIGURE 8 is a section through a scraper along line I—I of FIGURE 2;

FIGURES 9 and 10 are side views of other embodiments of removal scrapers;

FIGURE 11 illustrates in front view another embodiment of a snowplow accessory according to the invention;

FIGURE 12 illustrates this embodiment in side view, taken on line II—II of FIGURE 11.

According to the embodiment illustrated in FIGURES 1–3, the snowplow accessory consists of a supporting frame **1** comprising a removal scraper **2**, which preferably consists of polymeric plastic material, but may also be fabricated of other material. The supporting frame **1** is rotatably fixed to the bracing tube **4** of the snowplow through a casing **3** in which a spindle **3'** is adjustable by means of a handle **5** and the end of which is adjustable in a casing **1'** of the supporting frame **1**. A pressure spring **14** is provided between the bottom of the casing **1'** and the end of the spindle **3'** mounted in the latter, in such manner that the spindle **3'** is resiliently adjustable in the casing **1'**; the clearance of the spindle **3'** is given by the size of a slot **25** in the casing **1'**, in which a bolt **26** rigidly connected with the spindle **3'** is guided, the latter preventing the spindle **3'** from being completely withdrawn from the casing **1'**.

A runner **6** is swingably connected with the frame **1** by which the distance of the removal scraper **2** from the ground is determined. As the edge of the removal scraper **2** is continuously worn away during service, the axis **8** of the runner **6** may be set in different mountings **8'** and may be adjusted according to the degree of wear of the removal scraper **2**.

At the end of an offset arm **27** the mounting of the runner **6** is provided with a bearing **7** which is rotatable about a bearing pin rigidly connected with the frame **1**. Thus the runner **6** may easily be adapted to each change of direction of the snowplow.

As the device according to the invention is not independent, but must be added to existing snowplows, the removal scraper **2** must lie close against the scraper **9** of the frame **13**.

Moreover, in the case of an unexpected obstruction, the removal scraper **2** must be able to turn aside in order to prevent damage to the device. This is attained by applying two resiliently mounted chains **10** or the like (FIGURES 1 and 3), which are fastened to the supporting frame **1** are connected with the plow frame **13** through guide rollers **11** and draw the supporting frame **1** in the direction of the plowshare, firmly pressing the removal scraper **2** towards the scraper **9**. In order to adjust the strength of the spring tension, tightening screws **12** are inserted in the chains **10**. By this arrangement the removal scraper **2**—as desired—is firmly held against the scraper **9** of the snowplow; in case of an obstruction, however, it may swing back and return to its prior position after overcoming the resistance of the obstruction. Should the swing for overcoming the obstruction be insufficient, a known form of protection by means of a shear pin **28** would become operative by shearing off the pin in case of an overstrain, in such manner that the plowshare including the removal scraper **2** may swing further rearwardly.

FIGURE 3 illustrates—in rear view—two segments of a divided snowplow according to an an embodiment of the snowplow accessory as shown in FIGURE 1. A device according to the invention is suspended on each segment on the continuous bracing tube **4** of the snowplow. It is important to emphasize that the resilient mounting permits lifting up of the removal scraper **2** by means of the pressure spring **14** in case of small obstacles. It is convenient to select the strength of the spring **14** and the tension of the chains **10** in such manner that, in case of small obstructions, the removal scraper **2** is lifted up to rest closely against the scraper **9**, and is only moved away from the scraper **9** and swings back in case of severe obstructions.

If the snowplow accessory is to be put out of service, it is lifted by means of the spindle **3'** driven by the handle **5**, which is screwed up in the casing **3** by means of its thread. A rotation of the handle in opposite direction lowers the device, thus putting the latter into service.

FIGURES 6 and 7 show another embodiment which—in principle—is similar to that of FIGURES 1 and 3, wherein the device is lifted up and lowered by an impulse

provided by the motor **21**. It may for example be an electric, hydraulic or pneumatic motor.

On the surface of the casing **3**, a rack **19** is provided which is in mesh with a gear wheel **20** fixed on the bracing tube **4**. A reversible motor **21** drives the gear wheel **20** by means of a step-down gearing **22**, thus lifting up or lowering the casing **3**. The removal scraper **2** connected with the casing **3** through the supporting frame **1** and the runner **6** through the rack **19** are thus lifted or lowered.

If two or more plowshare segments (FIGURE 7) are provided with the snowplow accessory, shafts **23**, **23'** are applied which are connected by known cardan joints **24** or the like. Thus, only one motor **21** is required to lift up or to lower the device, and the construction is thus economically advantageous.

In FIGURES 4 and 5 another embodiment is represented. The supporting frame consists of two parts **1**, **1*a*** connected by a rotating bolt **29**, the part **1*a*** being swingably suspended on the bracing tube **4**. Resiliently mounted chains **10** or the like, acting on the part **1** of the supporting frame and on the upper part of the plow frame **13** press the slush removal scraper **2** against the rear side of the snow scraper **9** of the plowshare.

If the removal scraper **2** strikes an obstruction, the part **1** of the supporting frame is pushed back and the parts **1** and **1*a*** are cranked relatively to one another about the bolt **29**, the removal scraper thus being lifted from the bottom. Moreover, the part **1*a*** is tilted about the bracing tube **4**. An adjustment of the tension of the chains may also be provided in this embodiment, but is not represented in the drawings.

As the snowplow accessory is preferably applied for the removal of slush, caused for example by spreading salt or other chemical substances to effect thorough removal of snow, the material of the removal scraper **2** may be polymeric plastic material, which simultaneously presents the advantage that it is not corroded by chemical substances. In order to increase elasticity and to reinforce the scraper **2**, the latter may be provided with a steel lamination **17**; in FIGURE 2 and in the corresponding FIGURE 8, which illustrate this embodiment in section along line I—I, said lamination is cast in the plastic material, openings **18** in the steel lamination **17** permitting the plastic material to pass through during the casting or pressing operation and firmly to embrace the lamination.

In FIGURES 9 and 10 two removal scrapers **2** are represented in section, wherein the lamination **17'** is arranged externally, covering only the front as shown in FIGURE 9, and partially embracing the plastic material as shown in FIGURE 10.

In the embodiment according to FIGURES 11 and 12, the removal scraper **2** consisting for example of plastic material is inserted in a mounting **38**, which is U-shaped in section, and which is provided on its upper edge with a central positioned support **31**. It is swingably connected with the latter through a bolt with the piston rod **32** of a double acting hydraulic cylinder **33**.

The hydraulic cylinder **33** is provided with two trunnions **34** which rotate in a mounting **35** of the slide device **36**. The slide device **36**—and thus the slush removal scraper **2**—is rigidly connected with the plow frame **13**.

At the upper end of the mounting **38** of the slush removal scraper, near its outer edges, locking bolts **39** are provided to which locking bolts **39** on the plow frame **13** correspond. Anchored coupling springs **37** encircle these locking bolts **39**.

The slush removal scraper **2** according to this embodiment adapts well to irregularities of the road. As the hydraulic cylinder **33** is controlled by a control element from the cabin of the snowplow, the slush removal scraper **2** may simply be drawn in if hard material is to be removed, so that the snow scraper proper **9** of steel, arranged on the plowshare is put into action.

Because of the snowplow accessory according to the invention, a snowplow provided with the latter may not only be applied to remove usual or hard snow, but also to remove slush. The costs of this accessory are relatively low; it is not difficult to add it to usual snowplows and it is immediately available, if necessary. Thus, it is not necessary to provide expensive devices exclusively specialized in the removal of slush, which makes the removal operation—a usually expensive operation—much more economical. It is especially emphasized that this accessory may also be applied to remove other materials such as earth, sand, mud or the like.

What I claim is:

1. A snowplow accessory comprising a frame, a resiliently suspended scraper supported on said frame for being selectively moved into a working position for the removal of slush and into an inoperative position, said scraper including a slush removal scrape blade, said frame including a bracing tube for supporting a snow removal blade in front of said scrape blade and elastic means secured to said frame and acting on said scrape blade to urge the latter resiliently against the rear surface of the snow removal blade.

2. A snowplow accessory according to claim **1** comprising means between said frame and scrape blade for lifting the scrape blade, the latter means comprising a casing on the bracing tube and an adjustable spindle mounted in the tube and having an end engaging said scrape blade.

3. A snowplow accessory according to claim **2**, wherein said spindle is provided with a screw thread which is engaged threadably in a corresponding screw thread provided in the casing and a handle on the spindle for raising the scrape blade.

4. A snowplow accessory according to claim **2** comprising a spring between the casing and the spindle by which said scrape blade is resiliently supported on the spindle and a bolt slidably supported in a slot provided in said casing for limiting the movement between said supporting frame and said spindle.

5. A snowplow accessory according to claim **1**, wherein said scrape blade is provided with a working edge at its upper and lower sides, one of which is put into action by tilting said blade by 180°.

6. A snowplow accessory according to claim **1**, wherein said scrape blade consists of polymeric plastic material with a steel lamination at least partly encasing the blade.

7. A snowplow accessory according to claim **1** comprising a toothed rack on said casing, a gear wheel fixed on said bracing tube, a reversible drive means coupled to said gear wheel for adjusting the height of said casing and the scrape blade through the rack.

8. A snowplow accessory according to claim **7**, wherein said snow removal blade comprises several plowshare segments each associated with a corresponding scrape blade, and shafts connected by cardan joints and driven from said drive means for lifting or lowering the scrape blades conjointly.

9. A snowplow accessory according to claim **2**, wherein the elastic means comprises resiliently mounted tension elements connected to said scrape blade and said casing.

10. A snowplow accessory according to claim **9** comprising tightening elements coupled to said resilient elements for adjusting the tension thereof.

11. A snowplow accessory according to claim **1** comprising means between said frame and scrape blade for raising and lowering the scrape blade between said operative and inoperative positions and including a piston rod of a double acting hydraulic cylinder connected to said scrape blade at the mid-length thereof, and a slide device rigidly connected with the frame and pivotably supporting said cylinder.

12. A snowplow accessory according to claim **11**, wherein said elastic means for the suspension of said scrape blade comprises several anchored coupling springs between the upper edge of the scrape blade and the frame.

13. A snowplow accessory according to claim **12**, wherein said elastic means comprises helical springs which encircle anchoring bolts between said scrape blade and the frame.

14. A snowplow accessory according to claim **1**, wherein said frame comprises two parts connected by a swivel bolt and resiliently mounted chains connected to said snow removal blade and said parts for urging said parts against the rear of said scrape blade whereby said blade is supported by said parts and urged against the snow removal blade.

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15—236; 37—50, 53