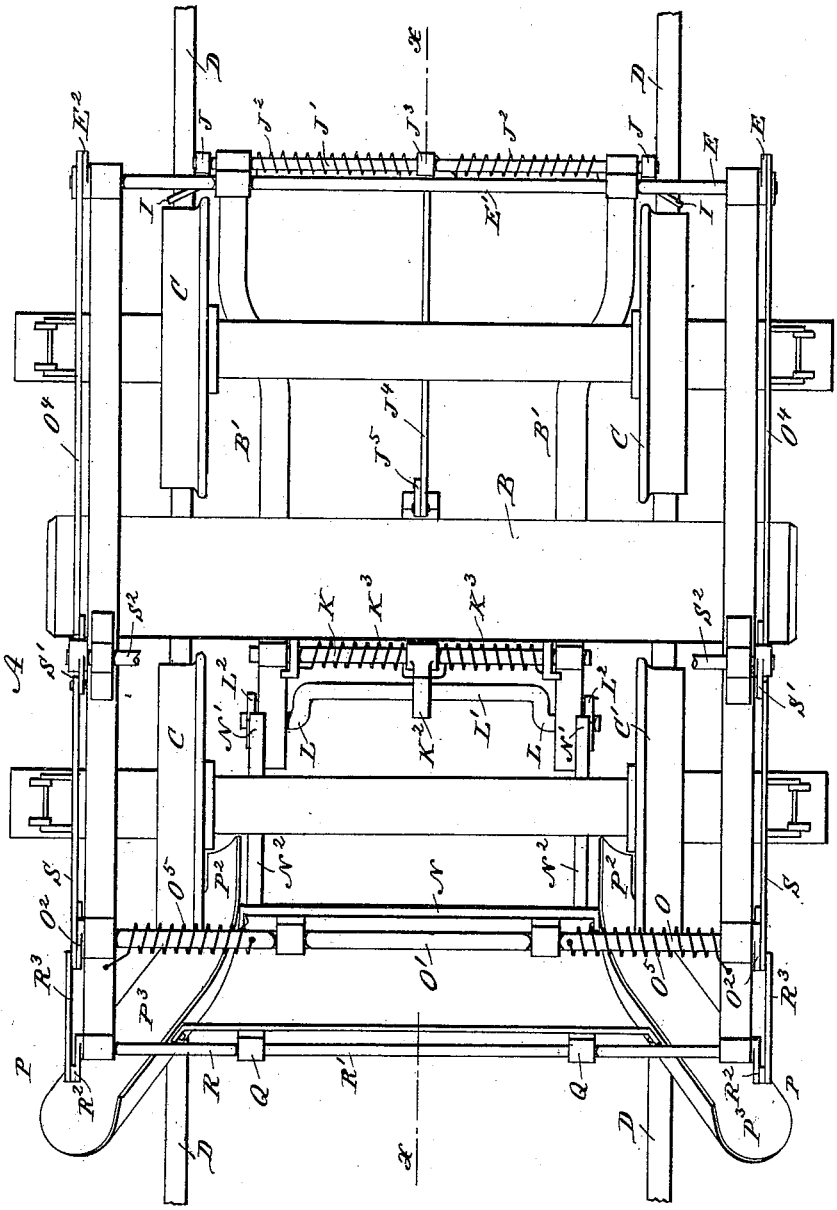
(No Model.) 4 Sheets—Sheet 1.

E. LESLIE.

ICE PLOW AND FLANGER FOR RAILROAD TRACKS.

No. 419,335. Patented Jan. 14, 1890.

Fig. 1.



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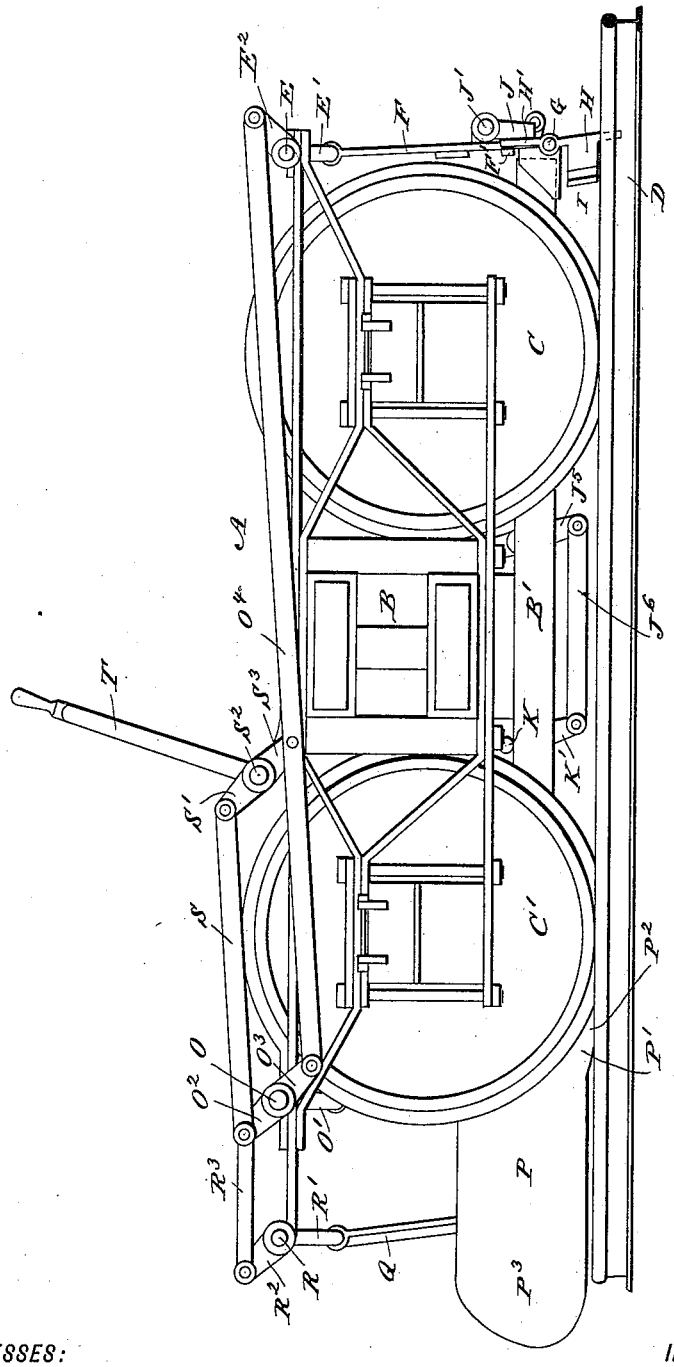
ICE PLOW AND FLANGER FOR RAILROAD TRACKS.

No. 419,335. Patented Jan. 14, 1890.

Fig. 2.



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ICE PLOW AND FLANGER FOR RAILROAD TRACKS.

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Fig. 3.

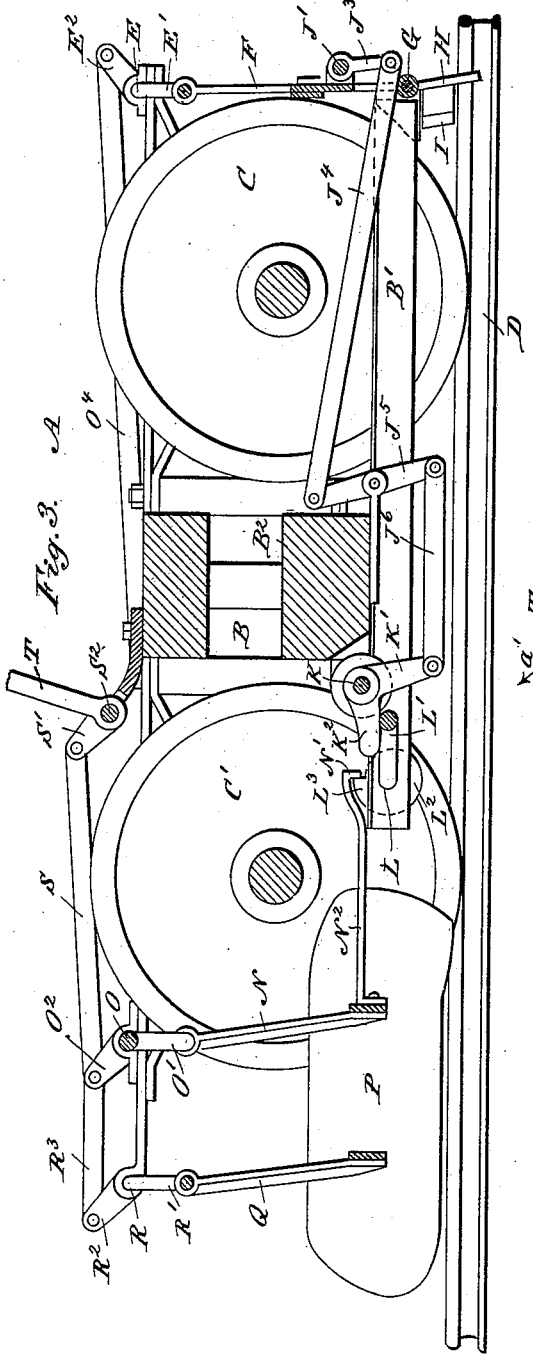
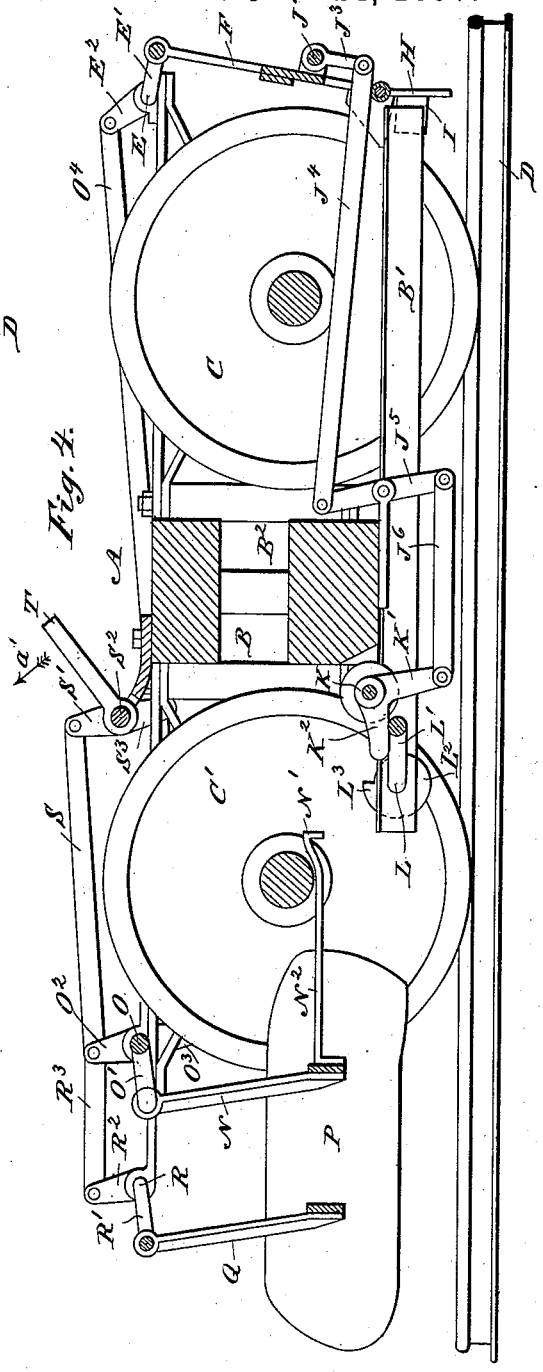


Fig. 4.



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No. 419,335. Patented Jan. 14, 1890.

Fig. 5.

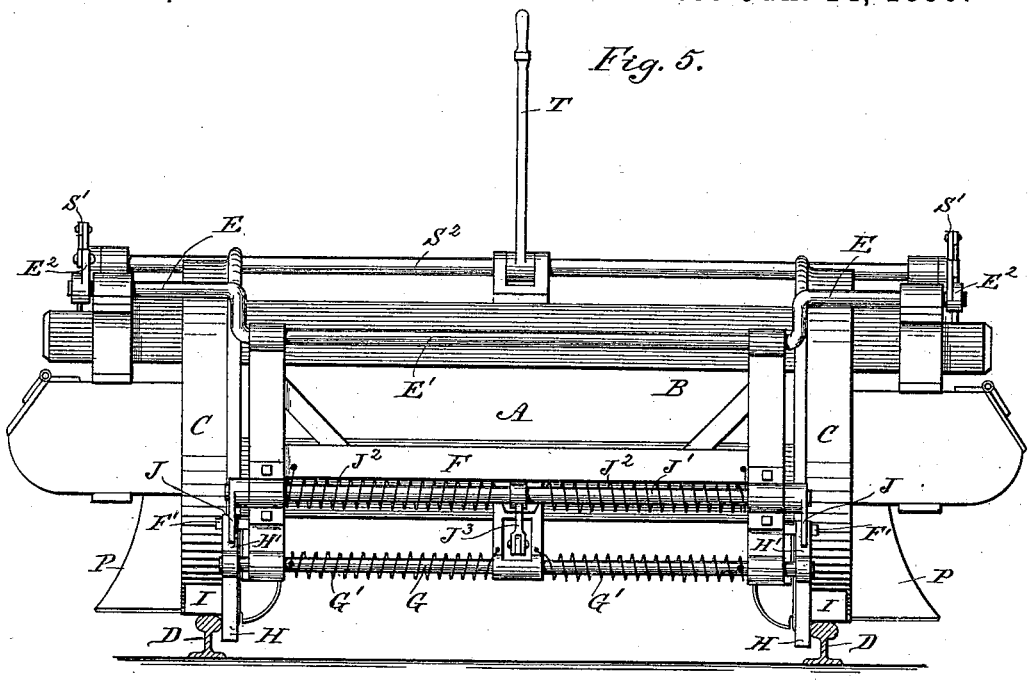


Fig. 6.

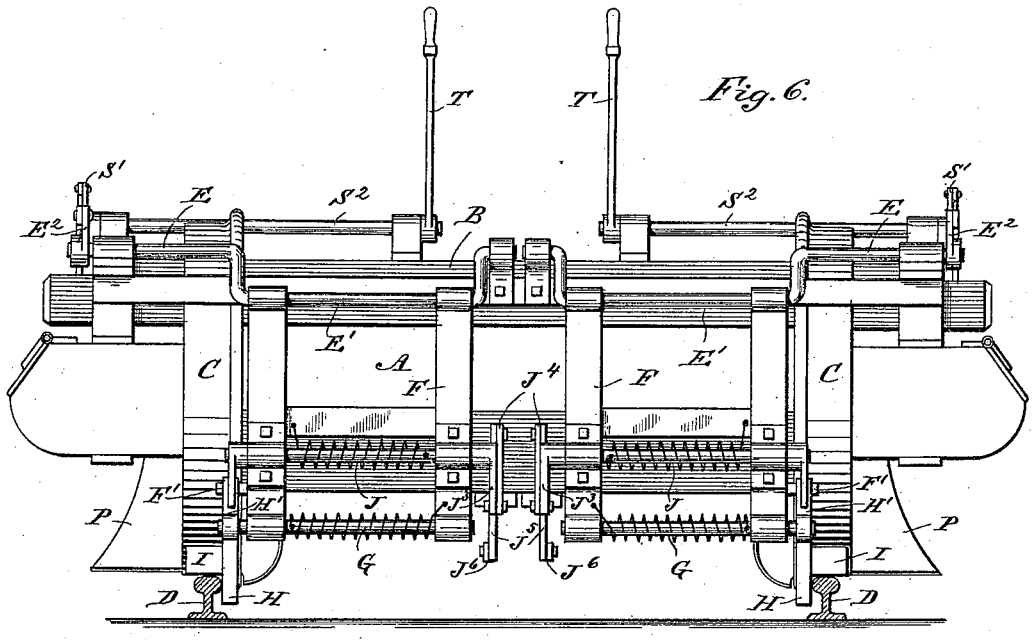
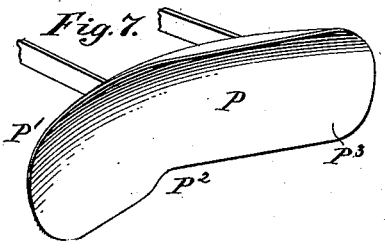


Fig. 7.



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UNITED STATES PATENT OFFICE.

EDWARD LESLIE, OF ORANGEVILLE, ONTARIO, CANADA.

ICE-PLOW AND FLANGER FOR RAILROAD-TRACKS.

SPECIFICATION forming part of Letters Patent No. 419,335, dated January 14, 1890.

Application filed June 11, 1888. Renewed June 27, 1889. Serial No. 315,833. (No model.)

To all whom it may concern:

Be it known that I, EDWARD LESLIE, of Orangeville, in the county of Dufferin, Province of Ontario, and Dominion of Canada, have invented a new and Improved Ice-Plow and Flanger for Railroad-Tracks, of which the following is a full, clear, and exact description.

The invention relates to improvements in ice and snow plows for railroad-tracks, such as shown and described in Patent No. 380,042, granted to me March 27, 1888.

The object of the invention is to provide a new and improved ice-plow and flanger specially adapted for loosening the hardened snow or ice on the insides of the rails and removing the loose snow and ice from between the track-rails to a suitable distance on the outsides of the rails.

The invention consists of an ice-plow and a flanger adapted to be raised and lowered automatically and simultaneously when the plow strikes an obstruction—such as a switch—in the track.

The invention further consists in the special construction of the flanger, and also in certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Hitherto track-clearing devices have been mounted on spring-supports, which would enable them to yield when an obstruction was met.

My invention broadly consists of track-clearing devices carried by a wheeled frame, and when in the operative position are under the strain of suitable springs, the force of which is resisted by catches, and which spring or springs are of sufficient power to automatically raise the track-clearing devices, which are automatic in their construction, when the catches are freed from their holdings by an abnormal obstruction.

I believe myself to be the first person to have constructed track-clearing mechanisms arranged to automatically elevate themselves by the power previously stored up in a spring or springs when a resistance—such as a switch, guard-rail, railroad-crossing, or other like fixture connected with the road-bed—is encountered.

I have shown my invention as carried out in the best form; but it is manifest that many changes can be made therein and still embody the broad feature of my invention—to wit, track-clearers which will automatically elevate themselves by a stored-up force—such as that of a spring—when an obstruction of the nature above referred to is encountered.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal sectional elevation of the improvement on the line of $x\,x$ of Fig. 1. Fig. 4 is a similar view of the same, showing the ice-plow and flanger in a raised position. Fig. 5 is an end elevation of the improvement. Fig. 6 is a similar view of a modified form of the same, and Fig. 7 is a perspective view of one of the flangers.

The improved ice-plow and flanger is mounted on a railroad-truck A, of any approved construction, and provided with the usual frame B and the front and rear wheels C and C′, respectively traveling on the rails D D. On the front end of the truck-frame B is mounted to turn in suitable bearings the shaft E, provided with a crank-arm E′, carrying a vertical frame F, of suitable construction, its inner side resting against the longitudinal beams B′ of the truck-frame B.

In the lower end of the frame F is journaled, in suitable bearings, a shaft G, provided on each end with a snow-plow H, which plows H extend downward in close proximity to the insides of the rails D. From each snow-plow H extends upward and rearward a scraper I, the lower edge of which reaches across the head of the respective rails D, so as to scrape off any ice accumulating on top of the said rail. Each snow-plow H is further provided with an upwardly-extending arm H′, the rear of which rests against a projection or lug F′, formed on the frame F, the front of the said arm H′ resting against a lug J, said lugs J being secured to the outer ends of the shaft J′, mounted to turn in suitable bearings on the frame F and located directly above the shaft G. One or more springs G′ are coiled on the shaft G and serve to hold the arms H′ of the plows H in

contact with the lugs F′. Similar coil-springs J^2 are held on the shaft J′, so as to hold the lugs J in contact with the fronts of the arms H′ of the plows H.

To the middle of the shaft J′ is secured an arm J^3, connected by a rearwardly-extending link J^4 with one end of a lever J^5, fulcrumed in its middle on a suitable pivot secured to the longitudinal beams B′ of the truck-frame B. The other end of the lever J^5 is pivotally connected by a link J^6 with an arm K′, secured to the transverse shaft K, mounted to turn in suitable bearings on the longitudinal beams of the truck-frame B. On the shaft K is also secured an arm K^2, extending nearly at right angles to the arm K′ and resting on the top of a crank-arm L′, formed on a shaft L, mounted to turn in suitable bearings secured to the longitudinal beams B′. On the ends of the shaft L are secured the disks L^2, each provided with a shoulder L^3, adapted to be engaged by a hook N′, formed on one end of an arm N^2, secured by its other end on a vertical frame N, hung on a crank-arm O′, formed on a shaft O, mounted transversely in suitable bearings on the truck-frame B. The frame N supports at each lower end a flanger P, plainly shown in perspective in Fig. 7, and consisting of the curved part P′, having a downwardly-extending flange P^2, reaching on the inside of the rail, and from the part P′ extends upwardly and outwardly the similarly-curved part P^3, so as to form the scoop of the flanger. The inner part P′ extends almost parallel with the track-rails D, while the rear outer part P^3 extends at an angle of about forty-five degrees from the said inner part P′ and the rails D. The flangers P are also supported near their outer ends P^3 by a frame Q, hung on a crank-arm R′, formed on a transverse shaft R, mounted to turn in suitable bearings on the main truck-frame B. On each end of the shaft R is secured an arm R^2, pivotally connected by a link R^3 with an arm O^2, which arms O^2 are secured to the outer ends of the shaft O and held parallel with the arms R^2 on the shaft R. Thus when the arms O^2 are moved the other arms R^2 are moved simultaneously in the same direction. From the ends of the shaft O also extend the arms O^3 in an opposite direction to the arms O^2, and the said arms O^3 are pivotally connected by the links O^4 with the arms E^2, secured on the outer ends of the transverse shaft E, mounted on the front of the truck-frame B. The arms O^2 are pivotally connected by the links S with the arms S′, secured on the ends of a shaft S^2, mounted to turn in suitable bearings formed on top of the main frame B. The arms S′ extend parallel to the arms O^2, and opposite the said arms S′ extend from the shaft S^2 the arms S^3, pivotally connected with the links O^4. Thus when the shaft S^2 is moved the arms O^3 and S^3 are moved simultaneously and impart a forward or backward movement to the link O^4. On the shaft S^2 is secured a lever T, which extends upward and is either connected with suitable machinery for actuating the said lever T or may be operated by hand. On the shaft O are coiled one or more springs O^5, acting on the said shaft in such a manner that the crank-arms O′ are pressed rearward, thus holding the hooks N′ of the arms N^2, secured to the frame N, in firm contact with the shoulders L^3 of the disks L^2, secured on the ends of the shaft L. In consequence of this the crank-arm L′ of the said shaft L is pressed upward against the arm K^2 of the shaft K, and the latter is provided with coiled springs K^3, for counteracting this upward pressure on the arm K^2 by pressing the latter downward. Similar coiled springs may be placed on the shafts R and E.

In the modification shown in Fig. 6 the two plows H are hung on separate frames, each provided with the same mechanism as above described in reference to the frame F. The modification is the same in all respects as the one above described, each side of the truck being a duplicate of the other and having, consequently, an independent movement.

Any suitable means may be employed to regulate the tension of the springs.

The operation is as follows: When the ice-plow and flanger is in the position shown in Fig. 3, the plows H loosen any snow adhering to the insides of the rails D D, and the scrapers I, secured to the said plows H, remove all snow or ice on top of the rail and discharge the loosened snow to the outside of the rail. Each flanger P gathers up all the snow loosened by the plow H and a considerable portion of the snow or ice remaining on the inside of each rail D by its flange P^2, extending downward and inward from the rails D. The snow scooped up by the flangers P travels from the inner part P′ to the outer inclined part P^3, and is finally landed at a suitable distance on the outside of each rail. The snow or ice gathered up by each flanger P does not pass above the upper edge and again fall on the inside of the track, as the said flanger P is curved, as is plainly shown in Fig. 7, but travels in the curved part of the flanger to the outsides of the rails. When the ice-plow and flanger is in the position shown in Fig. 3 and the truck A is pushed forward and either or both of the ice-plows H strike an obstruction in the track—such as a switch, for instance—the momentum of the truck causes the ice-plows H to swing rearwardly a short distance, so that their upwardly-extending arms H′ press against the arms J, whereby the latter are swung forward and turn the shaft J′, which imparts an upwardly-swinging motion to the arm J^3, pivotally connected with the lever J^5, which, by the link J^6, imparts a swinging motion to the arms K′ and K^2 on the shaft K, so that the arm K^2 swings upward and permits the turning of the shaft L, whereby the hooks N′ of the arms N^2 are disengaged from the shoulders L^3 of the disks L^2 on the said shaft L.

The springs O^5 on the shaft O then cause the latter to swing the crank-arm O′ rearward and upward very suddenly, thus raising the frames N and Q and moving the flangers P in the same direction until they assume the position shown in Fig. 4. The rearward and upward swinging motion of the frames N and Q causes a similar motion of the frame F in front of the truck A on account of the link O^4 being connected by the arm O^3 with the shaft O, supporting the said frame N by its crank-arm O′, and thus, when the shaft O turns by the action of the springs O^5, a rearward swinging motion is imparted to the arms E^2 by the said links O^4 and the arms O^3, whereby the shaft E is turned in its bearings and causes a forward and upward swinging motion of the crank-arms E′, thus raising the frame F, carrying along the plows H and the scrapers I. The plows H, the scrapers I, and the flangers P are then suddenly and simultaneously moved upward automatically out of contact with the obstruction in the track. When the obstruction is passed, the operator throws the lever T rearward in the direction of the arrow *a*′, whereby the shaft S^2 is turned and imparts a turning motion to the shafts O, R, and E by the respective connections with the said shaft S^2. The arms O′ and R′ of the shafts O and R are thus again swung downward and forward, so that the flangers P swing downward and forward until they assume their former positions and the hooks N′ again engage the shoulders L^3 of the disks L^2. At the same time the shaft E causes its crank-arm E′ to swing downward and rearward, so that the frame F slides downward and the ice-plows H and scrapers I again pass in close proximity to the rails, as before described. The shaft L, its disks L^2, and its crank-arm L′ assume their normal positions soon after the ice-plows and scrapers are raised when the former strikes an obstruction in the track, as the springs J^2 on the shaft J′ and the springs G′ on the shaft G cause the ice-plows H and the arms J to assume their normal positions after the hooks N^2 of the frame N are released from the shoulders L^3 of the disks L. The action of the said springs J^2 and G′ causes the arm J^3 to assume its former position, whereby the lever J^5 and the arms K′ and K^2 are moved to their former positions, and the arms K^2, acting on the crank-arms L′, cause the shaft L to turn until the shoulders L^3 on the disks L^2 have assumed their former positions—that is, so as to be ready to receive the hooks N′ when the lever T is turned, as above described. The arrangement of the plow H between the rails is such that the tripping action which will result in an automatic elevation of the flangers and an accompanying elevation of the plows and scrapers will take place ordinarily only when an abnormal resistance is met with below the level of the tops of the rails, and anything—such as a log, stone, or other like obstruction—will be removed from the track without causing the devices to be elevated. The reason of this is that ordinary obstructions lying above the rail-level are so close to the fulcrum of the plow H that unless they amount to an obstruction in the nature of a fixture they will not trip and let free the elevating mechanism.

In the modification shown in Fig. 6 the plows H H are hung on separate frames F, so that when one of the plows strikes an obstruction in the track it and its respective flanger P are raised out of contact with the said obstruction in the same manner as above described in reference to the plows and flangers shown in Figs. 1 to 5, inclusive. The tension of the springs J^2 and G′ is such as to hold the ice-plows H, when in their lowermost positions, against the snow or ice between the tracks; but when the ice-plows strike an obstruction—such as a switch—the momentum of the truck causes a rearward swinging motion of the plows H against the tension of the springs J^2 and G′. In case the ice-plow should miss the obstacle in the track and the inner end of the flanger strike it, then the pull on the flanger turns the shaft L and its crank-arm L′ against the force of the spring K^3 on the shaft K. The hook N′ is thus disengaged from the shoulder L^3 of the locking-plate L^2, and the force of the spring O^5 causes the frame N to swing upward and rearward, thereby raising the flangers in the same direction without injuring the flangers as the latter move away from the obstacle.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a wheeled frame, a rail-clearing mechanism carried by the said wheeled frame, and springs under tension adapted to automatically raise said rail-clearing mechanism, substantially as shown and described.

2. The combination of track-clearing devices carried by a suitable wheeled frame and springs under tension adapted to raise the track-clearing devices when an abnormal obstruction is met, substantially as described.

3. The combination of two sets of track-clearing devices, one set preceding and the other set following a wheeled truck, and springs under tension adapted to raise the track-clearing devices when an abnormal obstruction is met, substantially as described.

4. The combination, with a wheeled frame and track-clearing devices, of springs under tension adapted to raise such track-clearing devices and catches adapted to hold the said devices down when in working position and arranged to free the same, so that the springs may be operative when an abnormal obstruction is met, substantially as described.

5. The combination of a wheeled frame, leading and following track-clearing devices, springs under tension, and catches so arranged that the leading track-clearing devices first free the following track-clearing devices, which are raised by the springs, and they in

their turn raise the leading track-clearing devices, substantially as described.

6. The combination of a wheeled frame, leading and following rail-clearing devices, springs under tension, and catches so arranged that the leading track-clearing devices trip and pass over an abnormal obstruction, at the same time tripping the flanger on the rear of the truck, allowing it to be raised by the springs before it reaches the obstruction, and in rising at the same time elevating the leading track-clearing devices, substantially as described.

7. The combination, with a truck, of a frame mounted to slide vertically on the said truck and an ice-plow held on the said frame and mounted to turn on the same, substantially as shown and described.

8. The combination, with a truck, of a frame mounted to slide vertically on the said truck, an ice-plow held on the said frame and mounted to turn on the same, and a spring for holding the ice-plow in place in relation to the rails and against the snow or ice to be loosened, substantially as shown and described.

9. The combination, with a truck, of a frame mounted to slide vertically on the said truck, an ice-plow held on the said frame and mounted to turn on the same, springs for holding the ice-plow in place in relation to the rails and against the snow or ice to be loosened, and means, substantially as described, for causing the said frame to slide vertically when the said plow strikes a solid obstruction in the track, as set forth.

10. The combination, with a truck, of a frame held to slide vertically on the front end of the said truck, a shaft mounted to turn on the said frame, an ice-plow secured on the said shaft, and springs acting on the said shaft to hold said plow in position, substantially as shown and described.

11. An ice-plow, a shaft carrying the said ice-plow, and a spring held on the said shaft, in combination with a second shaft carrying a spring and serving to hold the said ice-plow in place by suitable arms until the ice-plow receives an abnormal strain, which causes the ice-plow to swing rearwardly, the said first-named spring returning the ice-plow to its normal position after the plow is released from the abnormal strain, and the spring on the second shaft returning it and its arm to their normal position, and thereby locking the ice-plow in its normal position, substantially as described.

12. An ice-plow, a shaft carrying the said ice-plow, a spring held on the said shaft, and an arm secured on the said shaft, in combination with a second shaft provided with an arm engaging the first-named shaft and a spring held on the said second shaft, which holds with its arm the ice-plow until the latter receives an abnormal strain, which swings the ice-plow rearwardly, the said first-named spring returning the ice-plow to its normal position after being relieved from the abnormal strain, substantially as described.

13. The combination, with a frame mounted to slide vertically on the truck, of a shaft mounted to turn on the said frame, an ice-plow held on the said shaft, and a spring for holding the said shaft and plow in place against the snow or ice on the track and until the plow strikes a solid obstruction in the track, substantially as shown and described.

14. The combination, with an ice-plow, of a flanger located in the rear of the said ice-plow and controlled by the same, substantially as shown and described.

15. The combination, with an ice-plow mounted to turn and to slide vertically, of a flanger located in the rear of the ice-plow and controlled by the same when the plow strikes a solid obstruction in the track, so as to raise the said flanger above the track, substantially as shown and described.

16. The combination, with a truck, of an ice-plow mounted to slide vertically in the front of the said truck and a flanger located at the rear of the said truck and controlled by the said ice-plow, substantially as shown and described.

17. The combination, with a truck, of a frame mounted to slide vertically on the front of the said truck, an ice-plow mounted to turn on the said frame, a second frame mounted to slide vertically on the rear of the said truck, and flangers supported by the said rear frame and controlled by the said ice-plow, substantially as shown and described.

18. The combination, with a truck, of a frame mounted to slide vertically on the front of the said truck, a shaft mounted to turn on the said frame, ice-plows secured on the ends of the said shaft, springs holding the said ice-plows in position on the said frame, a second frame mounted to slide vertically on the rear of the said truck, and flangers supported by the said rear frame and controlled by the said ice-plows, substantially as shown and described.

19. The combination, with a truck, of a frame mounted to slide vertically on the front of the said truck, a shaft mounted to turn on the said frame, ice-plows secured on the ends of the said shaft, springs holding the said ice-plows in position on the said frame, a second frame mounted to slide vertically on the rear of the said truck, flangers supported by the said rear frame and controlled by the said ice-plows, and means, substantially as described, for raising and lowering said frames on the front and rear of the truck simultaneously, as set forth.

20. The combination, with a truck, of a frame mounted to slide vertically on the rear of the said truck, flangers supported on the said frame, and a lock for locking the said flangers in their lowermost position, substantially as shown and described.

21. The combination, with a truck, of a frame mounted to slide vertically on the rear of the said truck, flangers supported on the said frame, a lock for locking the said flangers in their lowermost position, and an ice-plow connected with the said lock to unlock it whenever the plow strikes an obstruction in the track, substantially as shown and described.

22. The combination, with a truck, of a frame mounted to slide vertically on the rear of the said truck, flangers supported on the said frame, a lock for locking the said flangers in their lowermost positions, and means, substantially as described, for unlocking the said lock automatically, as set forth.

23. The combination, with a truck, of a shaft mounted on the rear of said truck and provided with a crank-arm, a frame hung on the said crank-arm, flangers secured on the lower ends of the said frame, and a spring acting on the said shaft to raise the said frame when the flangers are unlocked, substantially as shown and described.

24. The combination, with a truck and locking-plates mounted to turn on the said truck, of a frame mounted to swing vertically on the rear of the said truck, flangers supported by the said frame, and a hook engaging the said locking-plates to hold the said flangers in a locked position, substantially as shown and described.

25. The combination, with a truck and locking-plates mounted to turn on the said truck by the action of the ice-plow, of a shaft mounted to turn on the rear of the said truck and provided with a crank-arm, a spring acting on the said shaft, a frame hung on the said crank-arm, and flangers fastened at the lower ends of the said frames and provided with a hook engaging the said locking-plates, substantially as shown and described.

26. The combination, with a shaft provided with locking-plates and a crank-arm formed on the said shaft, of an arm acting on the said crank-arm, a shaft carrying the said arm and provided with a second arm receiving a forward swinging motion, and a spring coiled on the said shaft to cause a return motion of the latter when acted on by the said second arm, substantially as shown and described.

27. The combination, with a frame mounted to swing vertically on the front of the truck, of a shaft mounted to turn on the said frame and carrying the ice-plow and scrapers, springs acting on the said shaft to hold the ice-plow in position on the said frame, a second shaft mounted on the said frame and provided with an arm engaging an arm on the said ice-plow, a spring coiled on the said shaft, and a third shaft located in the rear of the said first two shafts and connected with the second shaft, said third shaft controlling the unlocking of the flangers, substantially as shown and described.

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