Aug. 9, 1938. H. S. JANDUS 2,126,392

LEVER CONSTRUCTION

Filed Jan. 30, 1937 2 Sheets-Sheet 1

Fig. 1

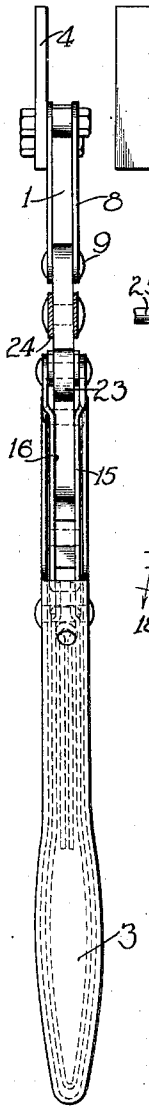


Fig. 2

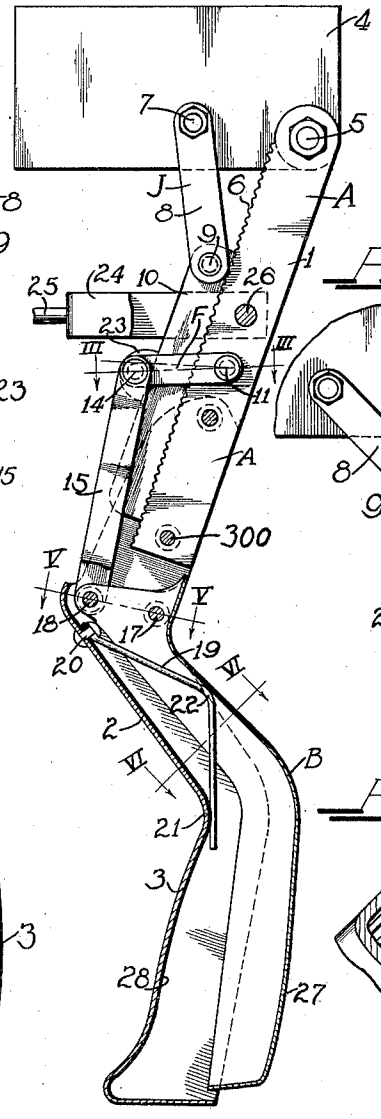


Fig. 3

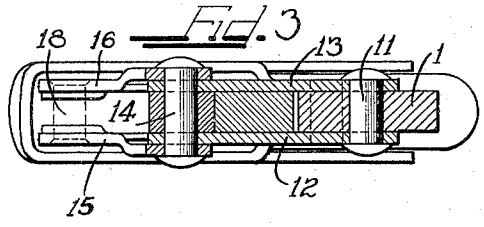


Fig. 4

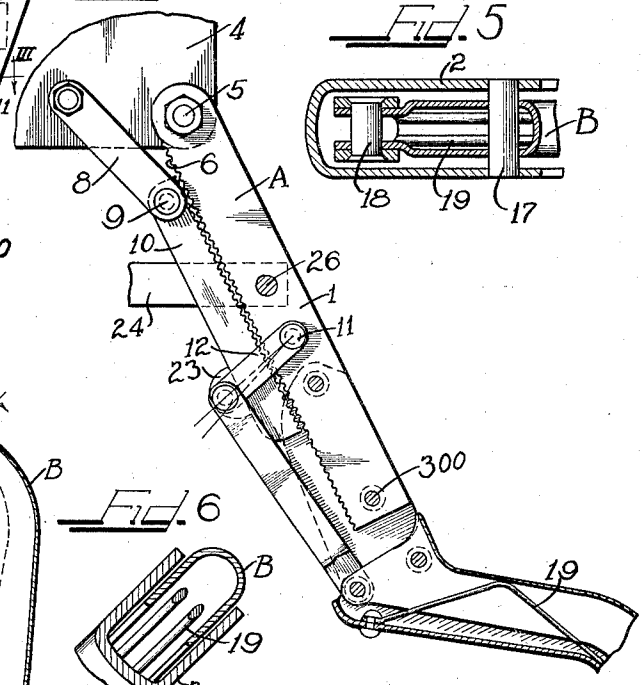
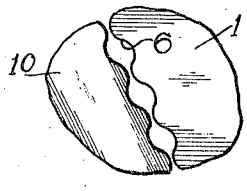


Fig. 5

Fig. 6

Fig. 7



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LEVER CONSTRUCTION

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Fig. 8

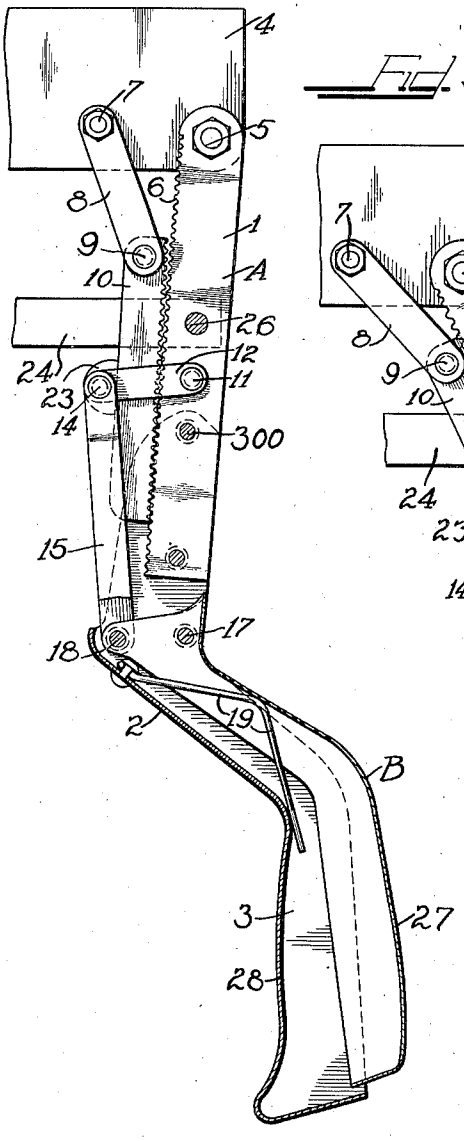


Fig. 9

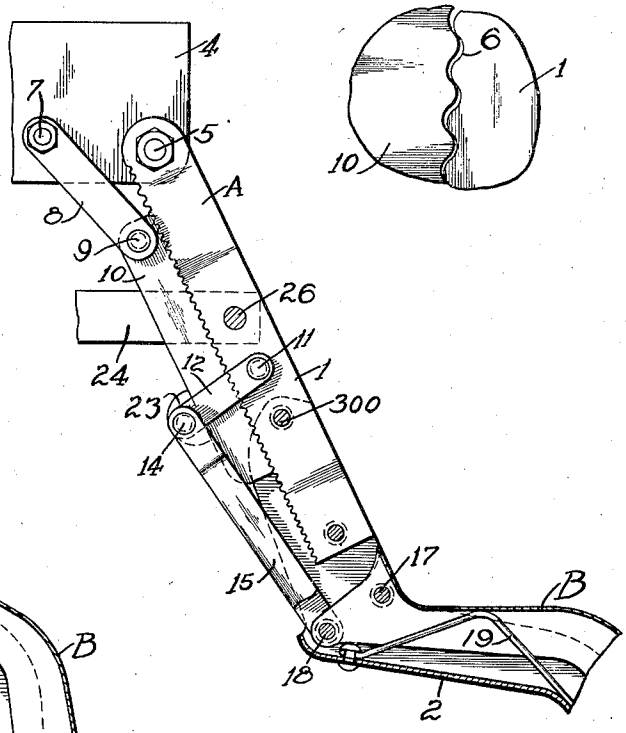


Fig. 10

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LEVER CONSTRUCTION

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Application January 30, 1937, Serial No. 123,163

18 Claims. (Cl. 74—540)

The present invention relates to lever constructions and will, for convenience, herein be described as relating to hand brake lever constructions used for automotive vehicles, although the use of the levers of the present invention is not limited to such constructions.

An object of the present invention is to provide a novel lever construction.

Another object of the present invention is to provide a lever construction wherein the lever is held against retrograde movement due to pull of connected parts by a floating element having a tortuous surface which interlocks with a complementarily tortuous surface on the lever.

A further object of the present invention is to provide a lever construction having a lever pivoted to swing and provided with a tortuous surface, together with a floating element having a complementarily shaped tortuous surface to interlock with that of the lever, together with means for selectively holding the element against the lever to interlock the tortuous surfaces.

A still further object of the present invention is to provide a lever construction wherein the lever is held against retrograde movement, due to pull of connected parts, by a latching bar or dog forming part of a toggle, and which dog is maintained in latching engagement with the lever by toggle action.

The invention has for another object the provision of a lever construction wherein a lever is mounted to swing about a pivot, together with a floating element, the lever and said element having complemental tortuous surfaces, and releasable means for normally holding said element in locked engagement with the lever, in which the construction of the tortuous surface is such that the lever may be swung in one direction about its pivot without release of said means.

The invention has for still a further object the provision of a lever construction including a pivoted lever and a floating element, which lever and element are provided with complementarily shaped tortuous surfaces for interlock, which surfaces are of such contour as to prevent relative movement between the element and lever when the element is in full engagement with the tortuous surface of the lever and permit relative movement when some portion of the tortuous surface of the element is free of the tortuous portion of the lever.

The above, other and further objects of the present invention will be apparent from the following description and accompanying drawings.

An embodiment of the present invention is illustrated in the accompanying drawings, and the views thereof are as follows:

Figure 1 is an edge elevational view of a lever constructed in accordance with the principles of the present invention, illustrating a hand brake lever of the dash type.

Figure 2 is a view, partially in elevation and partially in longitudinal section, of the lever of Figure 1, showing the relationship of the parts when the lever is in its "off" or normal position.

Figure 3 is an enlarged sectional view taken substantially in the plane indicated by the line III—III of Figure 2.

Figure 4 is a fragmental view, partially in elevation and partially in section, of the lever of Figure 2, in "set" position, with the floating element or bar released from latching engagement with the lever to enable return of the lever to "off" position.

Figure 5 is an enlarged sectional view taken substantially in the plane indicated by the line V—V of Figure 2.

Figure 6 is an enlarged sectional view taken substantially in the plane indicated by the line VI—VI of Figure 2.

Figure 7 is an enlarged fragmental view of portions of the tortuous surfaces of the lever and floating element, with the floating element separated or spaced from the lever, as it is shown in Figure 4.

Figure 8 is a view, partially in side elevation and partially in longitudinal section, of the lever of Figure 2, showing the same in the position it assumes when moved from "off" towards "set" position, without utilizing the release means to disengage the floating element from the lever, and showing the floating element or bar in the position it assumes as the lever is moved as mentioned.

Figure 9 is a fragmental view, partially in elevation and partially in longitudinal section, showing the lever latched or locked in "set" position.

Figure 10 is a view similar to Figure 7, showing the relative positions of the floating element and lever when the element is in an intermediate position, such, for example, as the position shown in Figure 8, that is, a position in which the lever may be moved from "off" position to "set" position, enabling the tail end of the float-

ing element or bar to bounce over the tortuous surface on the lever.

The drawings will now be explained.

It is to be observed, at the outset, that the illustration and description of the embodiment of the present invention in a hand brake lever is not by way of limitation, but for convenience, as the lever construction of the present invention is capable of other uses than for hand brake levers for automotive vehicles.

The illustrated form of lever A comprises a shank portion 1 formed of bar steel of rectangular cross-section, and handle portion 2, the latter being fashioned from flat sheet metal into channel shape and bent in side elevation to form an inclined neck and a grip portion 3. The handle portion 2 is fastened to the shank portion 1 by means of rivets or bolts 300 passing through registering apertures in the handle portion and shank portion.

A bracket, designated generally at 4, is attached in any suitable manner in place. When the lever of the present invention is utilized as a dash type lever for automotive vehicles, the bracket is attached behind the instrument board of a vehicle. To this bracket is pivoted an end of the lever A, by means of a pivot bolt 5 passing through an aperture in the upper end of the shank portion 1 and a corresponding aperture in the bracket 4.

One edge margin of the shank 1 of the lever is provided with a tortuous surface constituting a rack 6. The tortuous surface of the lever extends substantially the length of the shank portion 1 of the same.

Pivoted to the bracket 4 by a bolt or pin 7, is a link 8 which hangs from its pivot. The lower end of the link 8 is pivoted as at 9 to the upper end of a floating element or bar 10, which is preferably of the same thickness as the shank 1 of the lever, and which has its adjacent margin provided with a tortuous surface complementarily shaped with respect to the rack 6 of the lever, to make latching engagement with the lever under certain conditions.

The pivot 7 of the link 8 is spaced with reference to the pivot 5 of the lever and, in the illustrated form of the invention, is such that when the lever is in "off" position, the shank portion 1 thereof is inclined with respect to one side of a vertical line through the lever pivot, and the floating element or bar 10 lies along the shank portion 1 of the lever at the same inclination. The lower end of the floating element or bar 10 is free.

The link 8 and the floating element or bar 10 constitute what is herein sometimes referred to as a toggle.

Pivoted at 11 to the shank portion 1 of the lever, are links 12 and 13 which straddle the floating element or bar 10. The outer ends of the links 12 and 13 are pivoted at 14 to the upper ends of links 15 and 16.

Within the channel shaped handle portion 2 of the lever is an actuating member B, formed from flat stock into substantially channel shape, which is pivoted at 17 to the handle portion of the lever adjacent the lower end of the shank portion 1, with its web 27 in opposition to the web 28 of the handle portion 2 of the lever. The lower ends of the links 15 and 16 are pivoted at 18 to the actuating member B.

In order to maintain the actuating member B and the floating element or bar 10 in one position, i. e., in latched engagement with the rack 6, spring means, such as the hairpin shaped spring 19, are employed. The spring 19 is fastened at one end, as by means of rivet 20 passing through the ends of the legs of the spring, and arranged with an intermediate portion of the spring against the actuating member B, and the other end of the spring against a curve 21 at the junction of the grip portion 3 of the handle and the neck, constituting a fulcrum for the spring. The intermediate portion of the spring 19 which bears against the web of the actuating member B is designated at 22.

When the lever construction of the present invention is arranged as a hand brake lever of the dash type, such as herein illustrated, then when the lever is in "off" position, as shown in Figure 2, the floating element or bar 10 rests against the rack 6 of the lever, which is the "up" side of the lever, inclined in the same direction as the lever, with its tortuous surface in mesh with the rack 6. The position of the floating member or bar 10 just described is assumed, when the lever is in "off" position, because of the arrangement of the parts and the particular support of the floating element 10 in pendant position as described.

On the pivot 14, connecting the links 12 and 13 with the links 15 and 16, is a shoe 23 constituting an abutment. The pivot 14 forms a knee joint between the links 12—13 and 15—16, respectively. The links 12—13 and 15—16 therefore constitute a second toggle. By reason of the construction and arrangement of the parts, the spring 19 becomes effective to maintain the shoe or abutment 23 against the floating element or bar 10, thus normally holding the floating element in latched engagement with the rack 6 of the lever.

The lever A may be moved from its "off" position, which is that of Figure 2, to its "set" position, which is that of Figure 9, in either of two ways. One way of moving the lever is for the operator to grasp the handle 3 of the lever, and without actuation of the release member B, swing the lever in counter-clockwise direction, as viewed in Figure 2. Because of the described support of the floating element or bar 10 by the link 8, with the link and bar arranged as a toggle, imparting such movement of the lever causes the link 8 to tend to straighten the toggle, thus moving the pivoted end of the floating element away from the rack 6. Because of the contours of the tortuous surfaces of the floating element and rack 6, when one end of the element 10 is moved out of mesh with a portion of the rack 6, the other end of the element 10 rides along the rack 6 free of latching engagement, so that the lever may thus be moved from its "off" position to "set" position without actuating the release member B.

Another way to move the lever from its "off" position to "set" position is to actuate the release member B, squeezing its handle portion towards the handle portion 3 of the lever which thus moves the abutment or shoe 23 away from the floating element 10, whereupon because of the contours of the tortuous surfaces of the element and rack 6, and the mounting of the floating element, is such as to enable swinging movement of the lever with the floating element 10 riding over the tortuous surface or rack 6 of the lever without restraint.

When the lever reaches its "set" position, the operator releases his hand from the handle portion 3 of the lever, whereupon the pull occasioned

by the connected parts, which are connected to the lever by means of a yoke 24 pivoted to the lever at 26, a tendency occurs for the lever to swing in retrograde movement. Because the spring 19 functions to urge the shoe 23 against the floating element 10, the moment such retrograde movement of the lever occurs, the pivoted end of the floating element will be urged into mesh with the rack 6, thus bringing the tortuous surface of the floating element into full latching engagement with the rack 6, and thus preventing relative movement between the floating element and the lever, thus locking the lever against retrograde movement.

To move the lever from "set" position to "off" position, the operator actuates the release member B to move the shoe or abutment 23 away from engagement with the floating element or bar 10, whereupon the lever may be swung in reverse direction, without effecting interlocking engagement between the floating member and the lever.

Figure 8 shows the relationship of the floating element 10 and the shank 1 of the lever while the lever is being moved towards "set" position without actuation of the release member B, showing the pivoted end of the floating element 10 spaced from the rack 6 of the lever, and with the tail end of the floating element 10 out of mesh with the rack 6.

Figure 10 shows the relative relationship of the tortuous surface of the floating element 10 with respect to the rack 6 of the lever during such movement.

The spring 19 is so designed as to permit movement of the floating element 10 in the manner just described, that is, to permit movement of its pivoted end away from the rack 6 of the lever when the handle portion of the lever is grasped to swing it in counter-clockwise direction to "set" position. However, the strength of the spring 19 is such as to normally maintain the floating element 10 in latched engagement with the rack 6 of the lever to thus lock the lever in desired angular position.

It will be observed that a lever construction of the present invention, when utilized as a hand brake lever of the dash type, when moved to "set" position, the heretofore "up" side has now become the "down" side, with the floating element underneath such side, as may be readily observed in Figures 4 and 9. Thus, when in "set" position, the release member B is actuated, the abutment or shoe 23 is moved away from the floating element, whereupon this element falls away from the rack 6, thus disengaging the tortuous surfaces on the floating element and lever and permitting the return of the lever to "off" position. During such movement, the release member B is maintained in squeezed relation, and because of the contour of the tortuous surfaces on the floating element and lever, the tail end of the floating element passes over the rack 6 without latching with the rack, until such time as the release member B is released by the operator, whereupon the spring 19 becomes effective to move the floating element into interlocked engagement with the rack 6 of the lever.

When the lever construction of the present invention is utilized as a hand brake lever for automotive vehicles, it is to be understood that there is at all times some tension imposed on the lever through the connected parts between it and the brake mechanism of the vehicle, so that such pull aids in effecting full latching engagement of the floating element 10 and the rack 6 of the lever, thereby locking the lever in any angular position to which it may be moved in service.

The lever construction of the present invention works equally well in the position illustrated in the drawings, that is, with the lever hanging from its pivotal connection to its bracket, or arranged with the lever extending upwardly from its bracket, or with the lever projecting substantially horizontally from its bracket, like a throttle valve lever.

The contour of the tortuous surfaces of the floating element and the lever is such as to readily allow relative movement between the element and lever when the pivoted end of the floating element is displaced with respect to the rack 6 of the lever, that is, displaced sufficiently to unlatch the floating element from the lever and permit such of the corrugations in the tail end of the element to ride over the rack 6 without effecting latching engagement with the rack.

The contours of the tortuous surfaces of the floating element and lever are herein shown as sinuous to readily allow relative movement except when the element 10 is held tightly against the rack of the lever A by the clamping means. It is desirable that the contours of the tortuous surfaces of these cooperating elements should be such as to allow relative movement when one end of the bar 10 is displaced from the rack, under which conditions the tail end of the bar travels along the rack without effecting latching action. The bar 10 dangles against the rack of the lever A and is subject to gravital action.

It will be observed that the lever construction of the present invention provides a floating element which is arranged along the lever, with the element and lever provided with complementarily fashioned tortuous surfaces for effecting latching or interlocking engagement between the element and lever to latch the lever against movement in one direction. The construction of the tortuous surfaces is such as to permit movement of the lever in the opposite direction when a part of the floating element is displaced with respect to its latching position with the lever.

The floating element is so mounted as to fall away from the lever by gravity action, under certain circumstances, to permit relative movement between the element and lever. The construction embodies also releasable means for normally holding the floating element against the lever with the tortuous surfaces interlocked to prevent movement of the lever in one direction, but which permits movement of the lever in the opposite direction without release of such means.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrangement and proportion of parts, and equivalents may be substituted, without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A lever construction including a bracket, a lever pivoted to said bracket to swing, a link pivoted at one end to said bracket in laterally spaced relation to the lever pivot, a bar pivoted at one end to the other end of said link and lying with an edge along an edge of said lever, the adjacent edges of said lever and bar being provided with tortuous surfaces for latching engagement of the lever and bar, the tortuous surface of said

lever constituting a rack, spring actuated means for normally holding said bar in latched relation with said rack, the action of said spring holding means causing said bar and link to assume obtuse angular relationship and act with toggle action, said spring actuated means being effective to prevent said bar and link from assuming straight line position thus maintaining said bar and link in toggle relation, the construction being such that movement of said lever in a direction to straighten said toggle causes the pivoted end of said bar to move away from said rack thus unlatching said bar from said rack and permitting lever movement in said direction with the other end of the bar riding over the rack without making latching engagement with the same, a load connected to said lever, the connection of said load to said lever tending to move said lever in retrograde movement when force moving said lever in said mentioned direction is released, said tendency to retrograde movement moving said bar in a direction to decrease the obtuseness of the angle between said bar and its link to thereby cause the pivoted end of said bar to move into latching engagement said rack and hold said lever in its then angular position.

2. A lever construction including a bracket, a lever pivoted to said bracket to swing, a bar supported along said lever, the adjacent faces of said lever and bar having complementarily shaped tortuous surfaces for effecting latching engagement between them, a link pivoted at one end to said bracket in spaced relation to said lever pivot and at its other end pivoted to the end of said bar which is nearer said lever pivot, means engageable against said bar for normally holding it in latched engagement with said lever, means for releasing said first mentioned means from holding position, the spaced pivotal connection of said link to said bracket causing said link to lie at an obtuse angle with respect to the bar when the bar is in latched engagement with the lever, the construction being such that on actuation of said second mentioned means to release said first mentioned means the lever may be swung about its pivot and relatively to said bar without occurrence of latching engagement of said bar and lever.

3. A lever construction including a bracket, a lever pivoted to said bracket to swing, a link pivoted at one end to said bracket in spaced relation to the lever pivot, a bar pivoted to said link and arranged to contact and lie along said lever, the adjacent faces of said lever and bar being formed with complementarily shaped tortuous surfaces to provide for latching engagement between them, means carried by said lever and engaging said bar for normally holding said bar in latched engagement with said lever, and means carried by said lever for rendering said holding means ineffective to thereby unlatch said bar and permit lever movement about its pivot and with respect to said bar.

4. In a lever construction, a lever having a tortuous surface along one side margin, a bar having a complemental surface and disposed adjacent and along said lever, releasable means holding said bar against said lever with said tortuous surfaces interlocked to prevent movement of said lever in one direction but adapted to permit such movement on release of said means, said tortuous surfaces being such as to permit movement of said lever in the opposite direction without release of said means.

5. In a lever construction, a bracket, a lever pivoted to said bracket to swing, said lever having a tortuous surface along one side margin, a bar pivotally supported from said bracket in spaced relation to the lever pivot, said bar having a complemental tortuous surface and disposed adjacent and along said lever, releasable means holding said bar against said lever with said tortuous surfaces interlocked to prevent movement of said lever in one direction but adapted to permit such movement on release of said means, said tortuous surfaces being such as to permit movement of said lever in the opposite direction without release of said means.

6. In a lever construction, a bracket, a lever pivoted to said bracket to swing, said lever having a tortuous surface along one side margin constituting a rack, a bar pivotally supported from said bracket in spaced relation with respect to the lever pivot, the other end of said bar riding free, said bar having a complemental tortuous surface and disposed adjacent and along said lever, releasable means holding said bar against said lever with said tortuous surfaces interlocked to prevent movement of said lever in one direction but adapted to permit such movement on release of said means, said tortuous surfaces being such as to permit movement of said lever in the opposite direction without release of said means.

7. In a construction of the character described, a lever pivoted at one end, said lever having a tortuous surface along one side margin, a floating element disposed adjacent and along said lever and having a complemental tortuous surface, and clamping means to selectively hold said element against said lever to interlock said tortuous surfaces.

8. In a construction of the character described, a lever pivoted at one end, said lever having a tortuous surface along one side margin, a floating element disposed adjacent and along said lever and having a complemental tortuous surface, and clamping means to selectively hold said element against said lever to interlock said tortuous surfaces and hold said lever against movement in one direction, said surfaces being such as to permit movement of the lever in the other direction against the action of said clamping means.

9. In a construction of the character described, a lever pivoted at one end, said lever having a tortuous surface, a floating element disposed adjacent said lever and having a complemental tortuous surface, and clamping means to selectively hold said element against said lever to interlock said tortuous surfaces, said floating element falling away from said lever by gravity when said lever is mounted in inverted position and on release of said means.

10. A dash type brake lever construction including a supporting bracket, a brake lever pivoted to said bracket to swing in a substantially vertical plane, a rack along said lever extending in the direction of its length, an elongated latch bar movable along said lever and engageable with said rack, means pivoted to the upper end of said latch bar for pendantly supporting it from said bracket, abutment means carried by said lever and acting against said latch member, spring means cooperating with said abutment means for normally holding said member in latched engagement with said rack, and manually operable means operative to move said abutment means away from normal holding position of said member to thereby enable said member to move away from said rack sufficiently to allow relative movement between said member and lever.

11. A lever construction including a rack and a cooperating bar for latching the lever in desired position, said rack and bar having complementarily shaped tortuous surfaces, said bar being pivotally supported from its upper end, means connected to said lever providing a knee joint with the hinge thereof acting against said bar as an abutment, a spring cooperating to normally hold said abutment against said bar to maintain it in latched engagement with said rack, the mounting of said lever being such that when it is in "off" position, the rack constitutes a part of the "up" side of the lever and lies in a position inclined with respect to a vertical line through the lever pivot and with said bar along said rack and in latched engagement therewith, movement of the lever toward "set" position causing said rack and bar to approach and pass said vertical line, said movement causing the upper end of said bar to move away from said rack and permit relative longitudinal movement between said rack and bar with the lower end of the bar riding over the rack teeth without making latching engagement with said rack.

12. A lever construction including a lever pivoted to a bracket to swing, a rack fixed to said lever, an elongated bar movable along said rack and adapted for latching engagement with the rack, a link pivoted to said bracket in spaced relation to the lever pivot and pivotally connected to the upper end of the bar thus pendantly supporting the bar, spring urged means for normally maintaining said bar in latched engagement with said rack, and manually operable means on said lever for releasing said spring urged means from holding said bar in latched engagement with said lever.

13. A lever construction including a supporting bracket, a lever pivoted to said bracket to swing, a rack on said lever, an elongated bar movable with respect to said lever and extending in the direction of its length and having a part for making latching engagement with said rack, means supporting said bar from said bracket, means on said lever for normally maintaining said bar in latched engagement with said rack, means on said lever for operating said last mentioned means to unlatch said bar from said rack, the construction being such that as the lever is swung from "off" position to "set" position the supported end of said bar moves away from said rack to unlatch the bar and allow movement of the lever without requiring operation of the unlatching means.

14. A brake lever construction including a bracket, a lever pivoted to said bracket to swing from inclined "off" position to inclined "set" position, the margin of the lever which is the upper margin of the lever when the lever is in inclined "off" position being corrugated, a hanging link pivoted at one end to said bracket in laterally spaced relation with respect to the lever pivot, a bar pivoted at its upper end to the other end of said link, the pivotal relation of the link and lever being such that when the lever is in inclined "off" position, the adjacent margin of said bar rests against and along the then upper margin of the lever, the contacting margin of said bar being corrugated to provide latching engagement of the lever and bar, means for maintaining said bar against said corrugations on said lever when said lever is swung to "set" position, and means for rendering said last mentioned means ineffective to thereby enable return of said lever to "off" position.

15. A brake lever construction including a bracket, a lever pivoted to said bracket to swing, said lever having one edge margin corrugated forming a rack, a bar having a complementarily corrugated portion pendantly supported from said bracket by a link pivoted to the bar adjacent its upper end, the pivotal connection of said link to said bracket being laterally spaced from the lever pivot in such manner that when said bar is along said rack said bar and link form a toggle with the bar against and assuming the inclined position of the lever, latch release means pivoted to said lever, a link pivoted at one end to said means, another link pivoted at one end to said lever, said last two links being pivoted together at their other ends and constituting a second toggle having a knee joint and so disposed that the knee joint bears against said bar as an abutment, spring means acting against said latch release means to maintain it in one position and the abutment against said bar to hold said bar in latched engagement with said rack, movement of said lever from "off" position to "set" position without manual operation of the latch release means being effected by tendency of the bar and link to straighten when the lever is swung in said direction and thus displace the pivoted end of the bar from the rack, the contours of the corrugations being such as to allow the tail end of the bar to ride over the rack without restraint as the tail end of said bar is held against said rack by said second toggle.

16. A hand brake lever of the dash type comprising in combination, a bracket, a lever pivoted to said bracket to swing, a link pivoted to and pendantly supported from said bracket with its pivot in spaced relation to the lever pivot, a bar pivoted to said link and pendantly lying along and in contact with said lever, the contacting surfaces of said lever and bar being corrugated for latching engagement of the bar and lever, the construction being such that when the lever is in its "off" position, the corrugated surface thereof constitutes the "up" side of the lever when the lever is in "off" position, and the "down" side when the lever is in "set" position, the construction being such that the tendency of said bar when the lever is in "off" position is to make latching engagement with the lever, and when the lever is in "set" position, to drop away from the lever in unlatched relation, and means normally effective to bear against said bar for holding it in latched engagement with said lever regardless of the angular position of the lever, and manually operable means for actuating said last mentioned means to release said latch means from holding position with respect to the bar to enable relative movement of the lever and bar.

17. A dash-type brake lever construction, including a lever member having a rack along its length, a dangling latch bar supported along said rack in a manner tending to gravitally stand away from said rack, spring urged means on said lever member adapted to normally urge said latch bar into latching engagement with said rack, a link supporting said latch bar in dangling position, said bar and link being normally maintained in obtuse angular relationship, the construction being such that on movement of the lever member from "off" to "set" position the bar and its link will gravitally tend to straighten the obtuse angular relationship thereof moving the pivoted end of the bar away from the rack to unlatch the bar from the rack.

18. In a lever construction of the character described, a lever member pivoted at one end and depending from its pivot, a floating element disposed in depending position adjacent and along

said lever, the facing margins of said lever member and said floating element being provided with complemental tortuous surfaces of sinuous form and of uniform depth and pitch and requiring full surface engagement of the floating element with the lever member to latch the lever member against swinging movement and permitting relative movement of the element and lever member when some of the tortuous surfaces are out of full surface engagement.

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