C. W. ROBINSON & E. BASEMAN.

LEVER CONTROL SYSTEM.

APPLICATION FILED MAY 3, 1915.

1,250,355. **Patented Dec. 18, 1917.**

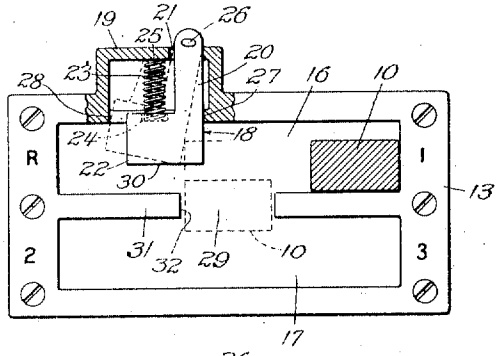

Fig. 1.

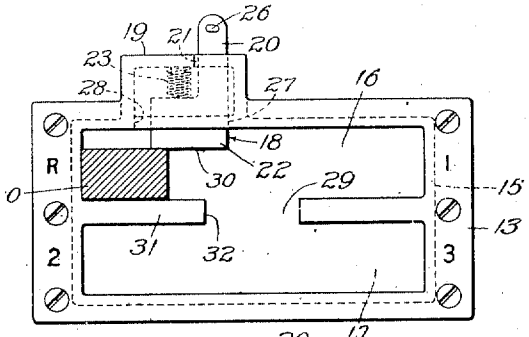

Fig. 2.

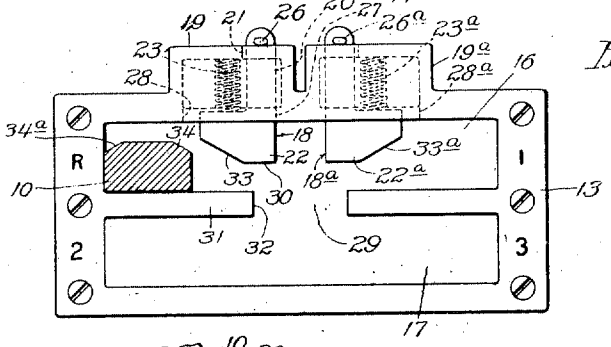

Fig. 4.

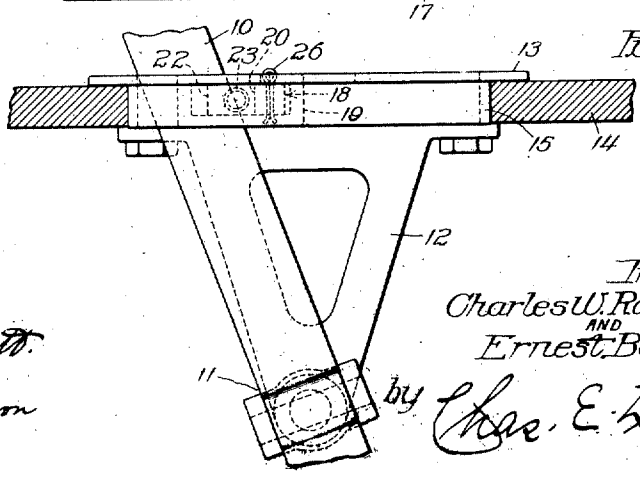

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES W. ROBINSON AND ERNEST BASEMAN, OF HAMILTON, ONTARIO, CANADA, ASSIGNORS, BY MESNE ASSIGNMENTS, TO INTERNATIONAL HARVESTER CORPORATION, A CORPORATION OF NEW JERSEY.

LEVER-CONTROL SYSTEM.

1,250,355. Specification of Letters Patent. Patented Dec. 18, 1917.

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To all whom it may concern:

Be it known that we, CHARLES W. ROBINSON and ERNEST BASEMAN, citizens of the United States, and residents, respectively, of Hamilton, in the county of Wentworth, Province of Ontario, Dominion of Canada, and of Hamilton, in the county of Wentworth, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Lever-Control Systems, of which the following is a full, clear, and exact specification.

This invention relates to lever control systems, and more particularly to fool-proof means therefor.

In the operation of motor vehicles and of variable speed power installations of various descriptions, it is a well-known fact that serious damage may be done to motors and transmission systems if some precaution is not taken in shifting the gears for changing the speed and going to and from reverse movement connections. We are aware of the fact that many safety devices have been provided to prevent accidental or reckless shifting of gears for changing speed and reversing. Many of these devices are unnecessarily complex and inefficient.

It, therefore, is the main object of our present invention to simplify and improve such safety devices for lever control systems to render the same more fool-proof.

A further object is to improve the coöperative action between a suitable control member and a safety stop member associated therewith.

These and other objects are accomplished by providing in a lever control system a lever movable from one position to another for controlling purposes, and means normally in the path of movement of said lever for preventing said lever from being accidentally or recklessly thrown to an operative position; said means including a yieldably mounted guiding member for causing the lever to assume a neutral position in its movement from one operative position to another.

The invention is illustrated on the accompanying sheet of drawings, in which—

Figure 1 is a plan view, parts including the control lever being in section, of a lever control system embodying our invention;

Fig. 2 is a similar view showing the control lever in a different operative position from that shown in Fig. 1;

Fig. 3 is a fragmentary side elevation of the lever control system with the parts arranged as shown in Fig. 2; and

Fig. 4 is a plan view, parts being in section, showing a modification of our invention.

The various novel features of our invention will be apparent from the following description and drawings, and will be particularly pointed out in the appended claims.

We have chosen to illustrate our invention in connection with a lever control system particularly adapted for use in connection with a motor vehicle. However, its use is not necessarily so limited, for it may find application in connection with any power installation where it is necessary to shift a part or parts from one position to another for speed control and reversing purposes.

Referring particularly to auto vehicles, it is well-known that a great deal of damage may be done to the operating parts, including the motor and transmission system, by recklessly changing the gear connections from one position to another; for instance, in changing the speed connections from a certain speed forward to one in which the vehicle will be given a backward or reverse motion. These speed and direction changes are usually made through the actuation of a control lever, such as a control lever 10 shown in the figures of the drawings. This control lever 10 is pivotally mounted for universal movement at 11 in any well-known standard manner to a depending frame 12 suitably secured adjacent an H-plate 13, which may be supported in any approved manner by a member 14 having an opening for receiving downwardly extending flange portions 15 of the H-plate 13. This H-shaped control plate is standard in so far as it includes two longitudinally extending parallel passageways 16 and 17, the right-hand end of the passageway 16 being the position taken by the control lever 10 when the speed changing gearing is in the first or low speed forward position; the left-hand end of the passageway 16 being the one in which the lever 10 is located when the gearing takes a position to cause reverse or backward movement of the vehicle. When the

lever 10 is in the left-hand end of the passageway 17 the gears are in a position corresponding to second or intermediate speed forward, and when the lever is in the right-hand end of the passageway 17 the gears are in a position corresponding to third or high speed forward. First, second and third speeds forward and the reverse are indicated, respectively, by numerals 1, 2 and 3 and letter R in the proper positions on the plate 13.

As shown in Fig. 1 of the drawings, the control lever 10 is in a position corresponding to the first speed forward. If it is desired to change the gear connections so that the direction of movement of the vehicle is reversed, the same may be accomplished by throwing the lever from position 1 to position R. As above set forth, a great deal of damage may be done to the motor and transmission parts if the lever is accidentally or recklessly thrown from first speed forward position to the reverse movement position. To prevent any disastrous results in changing the gearing connections through the operation of the hand control lever 10, we have provided means lying normally in the path of movement of the lever 10 when it is operated in a manner to change the gearing connections from first speed forward to a position corresponding to reverse movement of the vehicle.

This safety or fool-proof means includes a stop member 18 slidably mounted in an offset pocket portion 19 formed in the H-plate 13, the laterally extending restricted leg portion 20 of the stop member 18 being slidable through an opening 21 in the offset portion 19. An enlarged head portion 22 of the stop member 18 normally lies in the path of movement of the control lever 10 as it passes from position 1 to reverse motion position, and is yieldingly held in such path of movement by a resilient member or spring 23, one end of said spring engaging a socket portion 24 in the head 22, and the other end of the spring being fitted over a projection 25 formed on the inner side of the offset portion 19 of the H-plate. This spring 23 normally forces the head 22 inwardly with respect to the passageway 16 to a limit controlled by suitable means, such as a cotter pin 26 which passes vertically through the outside end of the leg 20 and engages the outside of the offset portion 19. The spring 23 also normally holds the stop member against the shoulder 27 of the H-plate 13.

When the lever is thrown from its right-hand position in the passageway 16 toward the reverse position, the lever passes into engagement with the head 22 of the stop member in a manner to force the stop member against the action of the spring 23, to the dotted line position shown in Fig. 1, in which it will be noted that the left-hand side of the head 22 engages another portion 28 of the H-plate 13. If further force is applied to the lever 10 at this time in the same direction, said control lever will follow inwardly along the right-hand surface of the head 22 and be guided into a central neutral position 29, as shown in dotted line position in Fig. 1. When the lever has passed out of engagement with the stop member 18 and into the neutral position 29, the stop member 18 assumes its normal position under the action of the spring 23. The movement of the control lever 10 may now be continued from its neutral position toward the reverse movement position by moving the said control lever toward and against the head 22 of the stop member 18, causing said stop member 18 to be moved laterally and outwardly against the action of the spring 23 until the head 22 has passed into the pocket a sufficient amount to permit the control lever 10 to pass onwardly to the left and into the reverse movement position. The control lever 10 is shown in such reverse movement position in Fig. 2, and it will be noted that the stop member is retained in the position to which it has been forced due to the fact that the lever 10 does not pass out of engagement with the inside surface 30 of the stop member. It is clear, furthermore, that the right-hand movement of the lever 10 may be readily accomplished, but it is to be noted that the stop member, through the action of the compressed spring 23, forces the lever 10 against the wall 31 of the H-plate in a manner such that when the end 32 of the wall is reached the spring 23 will have a tendency to force the control lever back into a neutral position. The lever 10 may then be thrown back into the first speed forward position by pushing the lever sidewardly against the action of the spring 23, and then to the right in the passageway 16.

It is to be noted that this stop member 18 not only stops the progressive movement of the lever 10 from moving directly from one operative position to another, but also acts to guide the control lever 10 into a central neutral position. The movement of the stop member itself is compound in effect in that it has a backward and forward movement as well as a lateral movement. It might be said that it partakes of a pivotal movement without actually being pivoted.

In Fig. 4 we have shown a modification of our invention, having two offsets or pockets 19 and 19a, in which are mounted oppositely arranged stop members 18 and 18a, the heads of which are provided, respectively, with the tapered or cam portions 33 and 33a. The control lever 10 is provided with oppositely disposed tapered or cam portions 34 and 34a adapted to coöperate,

respectively, with the cam portions 33 and 33ª of the stop members.

When the lever is thrown from its left-hand position in the passageway 16 toward the first speed forward position, the cam portion 34 of the lever will engage the co-operating cam portion 32 of the stop member 18, causing said stop member to move laterally against the action of the spring 23 and out of the path of movement of the lever, thus permitting the latter to pass on to a point where it will be forced into the neutral position 29 by the action of the spring 23, upon the head 22, which at such time will bear against the outer face of the lever. In case the lever were moved very rapidly to the right, and under certain conditions, the spring 23 might not be sufficiently active to force it into the neutral position, to eliminate which possibility the oppositely arranged stop member 18ª is provided. In the event that such a circumstance exists, the right-hand side of the control lever will engage the left-hand side of the head 22ª of the stop member 18ª in a manner to swing the latter from its normal position against the action of the spring 23ª until the right-hand side of the head engages a portion 28ª of the H-plate, at which time the said member will act not only as a stop to arrest further progress of the lever along the passageway 16, but also as means for guiding said lever into the neutral position when further force is applied thereto, assisted by the action of the spring 23. When the lever has passed out of engagement with the stop member 18ª and into the neutral position, the stop member assumes its normal position under the action of the spring 23ª. The movement of the control lever 10 may now be continued from its neutral position toward the first speed forward position by moving said control lever toward and against the heads 22 and 22ª of the stop members 18 and 18ª, respectively, causing said stop members to be moved laterally and outwardly against the action of the springs 23 and 23ª, respectively, until the heads 22 and 22ª have passed into the pockets 19 and 19ª a sufficient amount to permit the control lever 10 to pass onwardly to the right and into the first speed forward position.

It will be observed that the converse to this operation will accompany the movement of the control lever in the opposite direction; that is, from the first speed forward position to the reverse position. This modification finds particular application where the passage way 16 is of such length and the stop members 18 and 18ª and lever 10 are of such dimensions that the lever passes beyond the stop members when said lever is in either the reverse movement position or the first speed forward position, the form of the stop members and coöperating parts being such as to positively guide and move the control lever into the neutral position whenever the said lever is moved in either direction along the passageway 16.

By means of the arrangement herein disclosed, we have provided a simple, inexpensive and efficient fool-proof device for use in connection with a control lever, which may be effective in connection with changing speeds and direction of movement of a motor vehicle or operative parts of a power plant. It is evident that there may be various modifications of our invention other than those herein particularly shown and described, and it is our intention to cover all such modifications which do not involve a departure from its spirit and scope.

What we claim as new and desire to secure by Letters Patent is:

1. A lever control system comprising a lever movable from one position to another, and means normally in the path of movement of said lever for causing said lever to assume a neutral position in its movement from one operative position to another.

2. A lever control system comprising a lever movable from one position to another, and yieldably mounted means normally in the path of movement of said lever for causing said lever to assume a neutral position in its movement from one operative position to another.

3. A lever control system comprising a lever movable from one position to another, and spring-pressed laterally movable means normally in the path of movement of said lever for causing said lever to assume a neutral position in its movement from one operative position to another.

4. A lever control system comprising a lever movable from one position to another for controlling purposes, and means associated with the reverse position normally in the path of movement of said lever for causing said lever to pass into a neutral position before said lever can pass into said reverse position.

5. A lever control system comprising a lever movable from one position to another for controlling purposes, and a stop member normally in the path of movement of said lever for interrupting the movement of said lever and guiding it into a neutral position.

6. A lever control system comprising a lever movable from one position to another for controlling purposes, a stop member normally in the path of movement of said lever for interrupting the movement of said lever and guiding it into a neutral position, and means by which said stop member may be forced laterally to permit said lever to move into an operative position.

7. A lever control system comprising a le-

ver movable from one position to another for controlling purposes, and cam means normally in the path of movement of said lever for causing it to assume a neutral position in its movement from one operative position to another.

8. A lever control system comprising a lever movable from one position to another for controlling purposes, and a spring-pressed slidably mounted member for causing said control lever to pass into a neutral position in its movement from one operative position to another.

9. A lever control system comprising a lever movable from one position to another for controlling purposes, a spring-pressed slidably mounted member for causing said control lever to pass into a neutral position in its movement from one operative position to another, and means for limiting the movement of said stop member.

10. A lever control system comprising a lever movable from one position to another, a control plate having a plurality of passageways in which said lever is movable, said control plate having an offset pocket portion independent of said passageways, and a laterally yieldably mounted member in said pocket portion adapted to interrupt a direct movement of said control lever from one operative position to another.

11. A lever control system comprising a lever movable from one position to another, a control plate having a plurality of passageways in which said lever is movable, said control plate having an offset pocket portion independent of said passageways, a stop member yieldably mounted in said pocket portion for a lateral movement therein and adapted to interrupt a direct movement of said control lever from one operative position to another, and a spring in said pocket portion pressing against said stop member to normally hold it in the path of movement of said lever.

12. A lever control system comprising a lever movable from one position to another, a control plate having a plurality of passageways in which said lever is movable, said control plate having an offset pocket portion independent of said passageways, a laterally movable stop member yieldably mounted in said pocket portion and adapted to interrupt a direct movement of said control lever from one operative position to another, and means for limiting a lateral movement of said stop member.

13. A lever control system comprising a lever movable from one position to another, a control plate having a plurality of passageways in which said lever is movable, said control plate having an offset pocket portion independent of said passageways, a laterally movable stop member yieldably mounted in said pocket portion and adapted to interrupt a direct movement of said control lever from one operative position to another, a spring in said pocket portion pressing against said stop member to normally hold it in the path of movement of said lever, and means for limiting a lateral movement of said stop member.

14. A lever control system comprising a lever movable from one position to another for controlling purposes, a control plate having a plurality of passageways in which said lever is movable, said plate having an offset pocket portion independent of said passageways, a cam stop member mounted in said pocket portion, and having a portion for guiding the lever into a given position, a spring in said pocket portion engaging said stop member to normally hold it in the path of movement of said lever, and a pin for limiting the movement of said stop member toward the path of movement of said lever.

15. A lever control system comprising a lever movable from one position to another for control purposes, means associated with the reverse positions normally in the path of movement of said lever for causing said lever to pass to a neutral position before said lever can pass into said reverse position, and means associated with the first speed forward position normally in the path of movement of said lever for causing said lever to pass into a neutral position before said lever can pass into said first speed forward position.

16. A lever control system comprising a lever movable from reverse position to first speed forward position, a control plate in which said lever is movable, said plate having a plurality of offset pocket portions, a stop member yieldably mounted in one of said pocket portions normally in the path of movement of said lever and adapted to guide said lever into a neutral position before said lever can pass into said first speed forward position, and a second stop member yieldably mounted in the other of said offset pocket portions normally in the path of movement of said lever and adapted to guide said lever into a neutral position before said lever can pass into said reverse position.

17. A lever control system comprising a lever movable from one position to another, a control plate having a plurality of passageways in which said lever is movable, said control plate having a plurality of offset pocket portions independent of said passageways, a stop member yieldably mounted in each of said pocket portions for lateral movement therein and adapted to interrupt a direct movement of said control lever from one operative position to another, springs in said pocket portions pressing against said stop members to normally hold

them in the path of movement of said lever, and means for limiting a lateral movement of said stop members.

18. A lever control system comprising a lever movable between first and reverse speed positions for control purposes, means associated with said positions normally in the path of movement of said lever for causing said lever to pass into a neutral position before said lever can pass from either of said mentioned positions to the other.

In testimony whereof we affix our signatures, in the presence of two witnesses.

CHARLES W. ROBINSON.
ERNEST BASEMAN.

Witnesses:
JOHN H. DAVIDSON,
J. G. HUGHES.