April 8, 1958 A. W. MALL ET AL 2,829,537

THROTTLE LOCK MECHANISM

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Fig. 1.

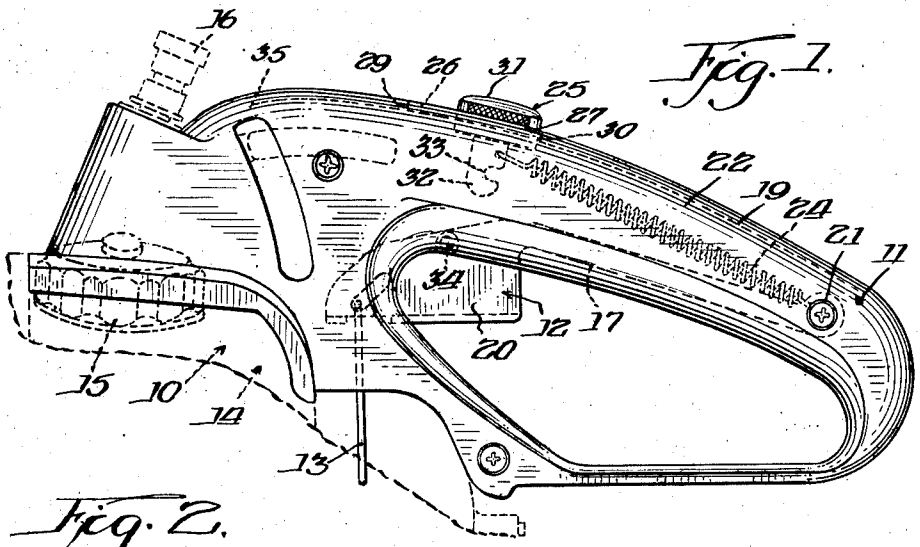


Fig. 2.

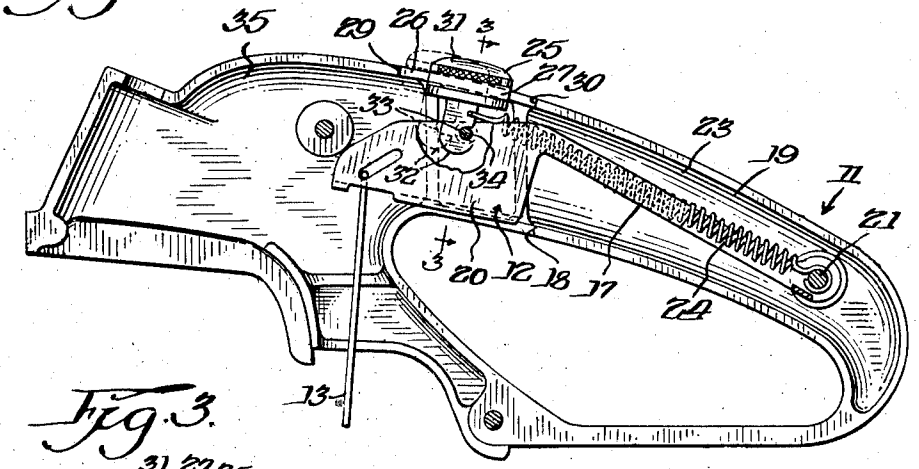


Fig. 3.

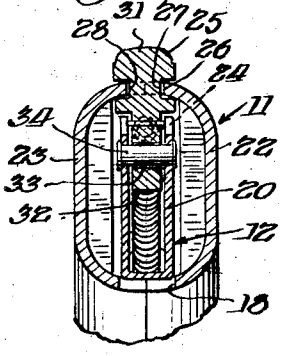
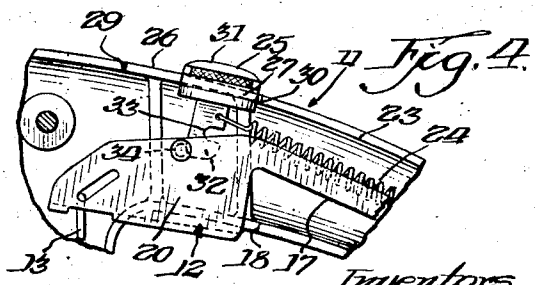


Fig. 4.



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THROTTLE LOCK MECHANISM

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Application January 31, 1955, Serial No. 485,242

7 Claims. (Cl. 74—532)

This invention relates to an improved handle structure for an internal combustion engine and more particularly is directed to a throttle lock installed in the handle of a portable gasoline engine.

Described in copending application, Serial No. 485,243, Arthur W. Mall, Charles A. Mattson and Walter Ziegler, is an engine so provided that the transmission of a pump, generator, or chain saw attachment, for illustration, clamped on the engine housing is automatically connected to be driven by the engine. This engine has a manually operated throttle, a lock which may be set to hold the throttle wide open, and a governor to automatically control engine speed.

It is a principal object of the present invention to provide a throttle lock which may be used on an internal combustion engine of the type described in said copending application. Locking the throttle on this engine enables the governor to automatically control engine speed, the manually operated throttle trigger being rendered temporarily inoperative.

A further object is to provide a throttle lock mechanism which is easily manipulated and so arranged that only by following a prescribed sequence of operations may the mechanism be set. Thus the invention is characterized by a safety feature in such a mechanism, namely that the lock cannot be set when the engine is running at high speed but first the throttle must be closed and the engine idling.

It is another object to provide a mechanism simple and economical to manufacture having few parts and easily installed on an engine.

Other and additional objects will become apparent from a reading of the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a view in side elevation of the handle of an internal combustion engine, equipped with the throttle lock mechanism;

Fig. 2 is a view in side elevation of the right hand half of the handle shown in Fig. 1 (with the left hand half removed), and the parts comprising the throttle lock mechanism shown in place;

Fig. 3 is a view in section taken on lines 3—3 of Fig. 2 through the lock button;

Fig. 4 is a view in side elevation similar to the view of the right hand half of the handle shown in Fig. 2, but with the trigger shown raised in the handle.

Referring to Fig. 1, a portable gasoline engine **10** has a pistol grip handle **11** having a trigger **12** which through a linkage **13** adjusts the throttle valve in the carburetor of the engine. Engine **10** may have a shroud **14** (Fig. 1) provided with a gas tank cap **15** which permits access to the gas tank lying under the shroud. Shown for illustrative purposes only, the engine may be provided with a ground switch **16** for convenience fastened on the top and in the front of the handle **11**.

It will be understood that by squeezing the trigger **12** the link **13** is raised to adjust the throttle valve in the carburetor. In the position shown in Fig. 1 the trigger is

depicted in its idle position with the under side **17** of the trailing portion resting against the edge of the opening **18** in the forward part of the grip portion **19** of the handle through which the enlarged front part **20** of the trigger extends into the open area of the handle. Throttle trigger **12** comprises a piece of sheet metal or the like stamped into a U or channel form (Fig. 3) and is pivoted on a pin **21** which in the structure shown is a screw to hold together the left-hand **22** and right-hand **23** parts of the handle **11**.

Hooked around this same pin **21** is a tension spring **24** which extends forward within the grip portion of the handle and is secured to a throttle lock button **25** which slides in the top of the handle. A portion of each of the two halves of the handle is cut away to provide a substantially rectangular slot **26** having edges gripping the button **25**. The sides of the button are formed with grooves **27** and **28** (Fig. 3) engaged by the edges of the slot in the handle and thus the button may slide back and forth within the slot between the forward **29** and back **30** edge which function as stops limiting the movement thereof.

Button **25** may be a casting or the like of metal or plastic material and includes a rounded head **31** which projects above the top of the grip portion of the handle and also has a knurled portion to aid in manipulating the button. A depending portion **32** extends a substantial distance into the cavity of the handle and is provided at its lower end with a hook formed by the recess or notch **33** which is adapted to engage the throttle trigger **12** and hold the trigger in a raised position corresponding to wide open throttle. As shown in Figs. 2 and 3 the channel shaped trigger **12** has a cross pin **34** fastened as by swaging the ends to the sides of the trigger. In the raised position of the trigger shown in Fig. 2 the cross pin is engageable by the hook portion **33** of the lock button so as to secure and retain the trigger in the raised position.

In Fig. 2 the assembly is shown with the left hand half of the handle removed and with the parts shown as they appear when the throttle trigger is locked by the button in its raised position. It may be observed that this right hand half **23** of the handle may be formed of metal or plastic material by die casting or by the use of similar methods of forming parts, and comprises the grip portion **19** and the forward portion **35** which provides a cavity to receive the mechanism (not shown) of the grounding switch **16**.

As shown in Fig. 1 the button **25** is held against the back edge of the slot by virtue of the spring **24**. When in this position the button will not touch or interfere with the cross pin of trigger **12** as the pin is raised to a position in front of the depending portion of the button for, as may be observed from Fig. 4, the cross pin will pass entirely by this portion of the button and will not contact or engage the button unless the button is pushed forward when the trigger is in the raised position. Thus during normal operation of the engine, as depicted in Fig. 4, which shows the button **25** pushed away from the back of the slot, the depending portion will engage or abut against the cross pin **34** to prevent further movement if attempt is made to urge the button forward when the trigger is in the raised position corresponding to wide open throttle.

In operating an engine with this handle assembly and throttle lock mechanism, the trigger may be manually actuated to regulate the engine speed and will not be interfered with when the button is in the inoperative position.

Further, to engage the trigger it is necessary the operator follow a prescribed sequence of operations since it is first necessary to lower the trigger sufficiently to allow

the button to be pushed forward toward the front edge of the slot in the top of the grip portion of the handle. After the button has been pushed to the forward position (shown in dotted lines in Fig. 2) the throttle trigger may be squeezed to elevate the cross pin to a position where it may be engaged by the hook under the button, as the button slides back in the slot. The button is located on the outside of the handle so that when the handle is gripped in a conventional manner, it may be manipulated with the thumb and easily urged back and forth in the slot.

By forming the trigger **12** channel in section (Fig. 3) the depending portion **32** of the button is confined between the sides of the trigger providing a structure where the button is restrained laterally both in the area of the slot and at the lower portion. This feature, along with the provision of grooves in the sides of the button which allows the button to slide in the slot prevents jamming resulting from canting of the button in either the forward or lateral direction.

A handle assembly equipped with a trigger and mechanism for locking the trigger in a position corresponding to wide open throttle may be used on an engine adapted to operate different machine attachments and provided with a governor to control engine speed. When this engine is installed on a generator which might be used for providing emergency electrical power, the governor is first set to regulate the engine speed in accordance with the rated speed of the generator. The throttle trigger is then rendered inoperative through the use of the throttle lock mechanism disclosed herein, and the governor control substituted to automatically regulate engine speed.

If this engine is installed on a power saw transmission, the governor is set to establish a limit on the no-load speed of the engine, to prevent the engine being operated at excessive speeds. The throttle lock mechanism, however, is not employed for safety reasons and the throttle is operated manually. When cutting with a power saw it is deemed unsafe to secure the trigger to hold the engine speed constant since the cutting chain may encounter obstructions in the wood or the tree may bind on the cutting bar or on the chain. In that event it is necessary to remove the cutting bar of the saw from the kerf which requires that the engine turn at idle speed so that the automatic clutch in the transmission may uncouple the engine from the chain sprocket shaft and allow the chain to stop. In felling timber, because power saws represent a substantial investment, after the tree begins to fall the feller usually pulls the saw from the kerf and carries it to a position of safety with him, rather than leave the saw in the kerf where it may be damaged by the falling tree. When pulling the cutting bar of the saw from the kerf it is necessary that the chain be stopped on the bar and a lock which secures the trigger in wide open throttle position and prevents manipulation of the trigger to slow down the engine presents a possible risk of harm if it is employed by the operator. Also in felling timber with a power saw, under the modern practice techniques have been developed to permit felling of trees having a diameter approximately double the length of the cutting bar on the saw. The operator makes cuts on each side of the tree to the depth permitted by the length of the bar and this operation requires a great deal of experience and care. It is considered extremely unsafe to make such cuts except with a saw with a trigger which is manually operated so as to provide the operator with close control over the cutting operation. Locking the trigger of a saw employed in this type of cutting would be considered a very unsafe practice.

The present invention, in this preferred embodiment, provides a mechanism which, although provided in the handle of an engine which may be part of a power saw, requires the operator to follow a prescribed sequence of operations in order to set the mechanism. It requires a deliberate act of the operator to set the mechanism and thus a safety feature is incorporated. With such a mechanism in the handle and available to be used it is deemed essential that the device be so constructed that it cannot be accidentally placed in operation to lock the trigger. Upon reference to Fig. 4 it will be observed that after the trigger is squeezed it is impossible to push the button forward in the slot and thus it is impossible to position the hook in front of the cross pin unless the trigger is first released. With the trigger lowered the depending portion carried by the button inside the handle is arranged to clear the cross pin. Thus in operation of a power saw equipped with this throttle lock mechanism the operator cannot accidentally lock the trigger and thus involve himself in difficulties such as have been enumerated above, whereas, if the engine is provided with a machine attachment such as a generator or pump, the operator may easily set the mechanism to lock the throttle thus enabling him to leave the machine and its engine unattended for extended periods of time.

Other objects and features of the invention will be apparent to a person skilled in the art and the scope and limits of the invention shall be as defined in the appended claims.

We claim:

1. In an improved handle structure for an internal combustion engine, a hollow handle, a throttle trigger pivotally mounted in the handle and adapted to be raised and lowered, a pin fixed in the trigger, a slot above the trigger in the top of the handle extending longitudinally of said handle, a throttle lock button held in the slot and movable forward and back between the extremities of said slot, a latch carried below the lock button inside the handle, the latch being arranged to clear said pin with the trigger lowered and to engage said pin with the trigger raised, and a spring mounted within said handle for biasing said button toward the back of said slot.

2. In an improved handle structure for an internal combustion engine, a hollow handle, a throttle trigger pivotally mounted in the handle and adapted to be raised and lowered, a pin fixed in the trigger, a slot above the trigger in the top of the handle extending longitudinally of said handle, a throttle lock button held in the slot and movable forward and back between the extremities of said slot, a latch carried below the lock button inside the handle, the latch being arranged to clear said pin with the trigger lowered and to engage said pin when with the trigger raised the button is allowed to move from the forward extremity toward the back of the slot, and a spring mounted within said handle for biasing said button toward the back of the slot.

3. In an improved handle structure for an internal combustion engine, a hollow handle, a throttle trigger pivotally mounted in the handle and adapted to be raised and lowered, a pin fixed in the trigger, a slot above the trigger in the top of the handle extending longitudinally of said handle, a throttle lock button held in the slot and movable forward and back between the extremities of said slot, a latch carried below the lock button inside the handle, including a depending portion formed with a notch, the latch being arranged to clear said pin with the trigger lowered and to engage said pin in the notch when with the trigger raised the button is allowed to move from the forward extremity toward the back of the slot, and a spring means for biasing said button toward the back of the slot.

4. In an improved handle structure for an internal combustion engine, a hollow handle, a throttle trigger pivotally mounted in the handle projecting through the wall of said handle, and adapted to be moved into and out of the handle, a slot in the handle, a throttle lock button held in the slot and movable forward and back between the extremities of said slot, a latch carried by the lock button inside the handle, the latch being arranged to clear said pin with the trigger held out of the

handle and to engage said pin when with the trigger held in the handle the button is allowed to move from the forward extremity toward the back of the slot, and means biasing the button toward the back of the slot.

5. In an improved handle structure for an internal combustion engine, a hollow handle, a throttle trigger pivotally mounted in the handle aligned with the long axis of the handle and adapted to be raised and lowered, said trigger having channel sides carried vertically in the handle, a pin fixed between the sides of said trigger, a slot located above the pin in the top of the handle extending longitudinally of said handle, a throttle lock button held in the slot and movable forward and back between the extremities of said slot, a latch carried below the button inside the handle and having a depending portion held between the sides of said trigger below the pin with the trigger raised, a notch formed in the back of the depending portion, the latch being arranged to clear said pin with the trigger lowered and to engage said pin in the notch when with the trigger raised the button is allowed to move from the forward extremity toward the back of the slot, and a spring means within said handle for biasing said button toward the back of the slot.

6. In an improved handle structure for an internal combustion engine, a handle having a hollow portion, a throttle trigger pivotally carried by said handle for pivotal movement between a raised and a lowered position, a slot in said handle, a throttle lock button held in said slot and movable between first and second positions adjacent

opposite ends of said slot, and a latch carried by said lock button inside the hollow portion of said handle and engageable with said trigger to hold the same in raised position only when said button is moved along said slot from said first position into said second position while said trigger is held in raised position.

7. In an improved handle structure for an internal combustion engine, a handle having a hollow portion and being provided with a slot in the handle wall adjacent said hollow portion, a throttle trigger pivotally carried by said handle for pivotal movement between a raised and a lowered position, a throttle lock button held in said slot and slidable along the length of the slot between first and second positions adjacent opposite ends thereof, a latch carried by said lock button inside the hollow portion of said handle and engageable with said trigger to hold the same in raised position only when said button is moved along said slot from said first position into said second position while said trigger is held in raised position, and spring means mounted within said handle for urgng said throttle lock button along said slot from said first position into said second position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,620,230	Renholdt	Mar. 8, 1927
2,472,442	Schueler	June 7, 1949

FOREIGN PATENTS

1,021,664	France	Dec. 3, 1952