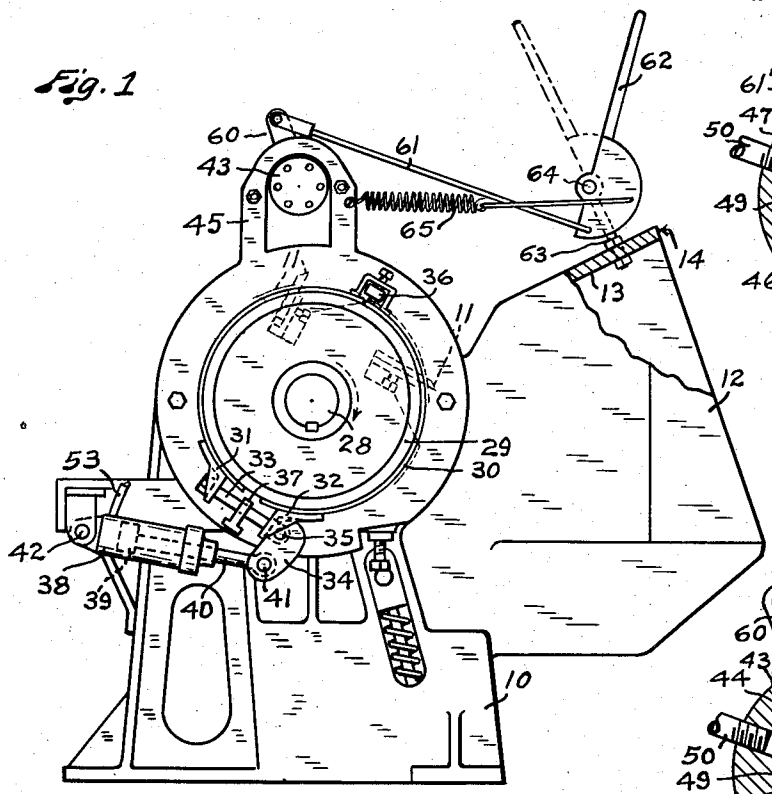
April 7, 1959 L. J. HALL 2,880,942

SAFETY DEVICE FOR BRUSH HOG

Filed May 19, 1954 2 Sheets-Sheet 1

Fig. 1



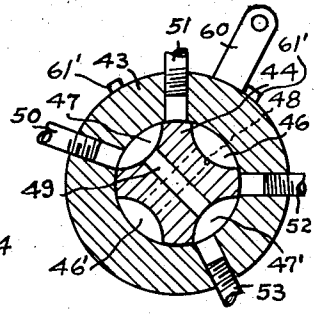


Fig. 4

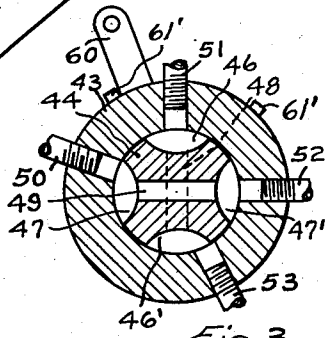


Fig. 3

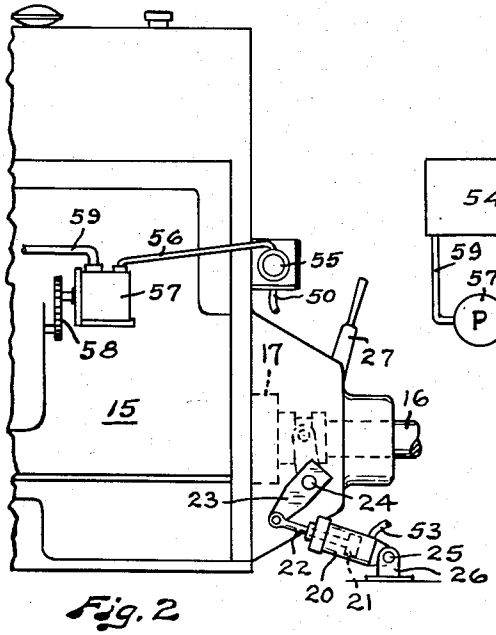


Fig. 2

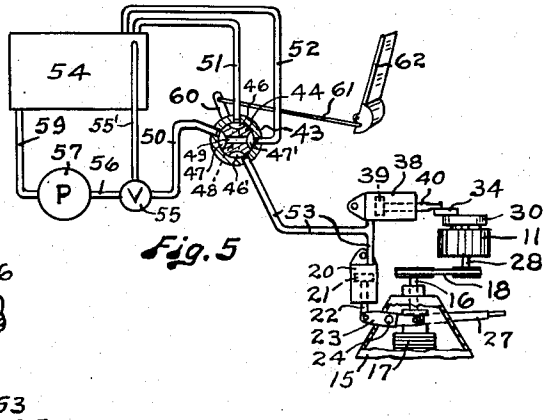


Fig. 5

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SAFETY DEVICE FOR BRUSH HOG

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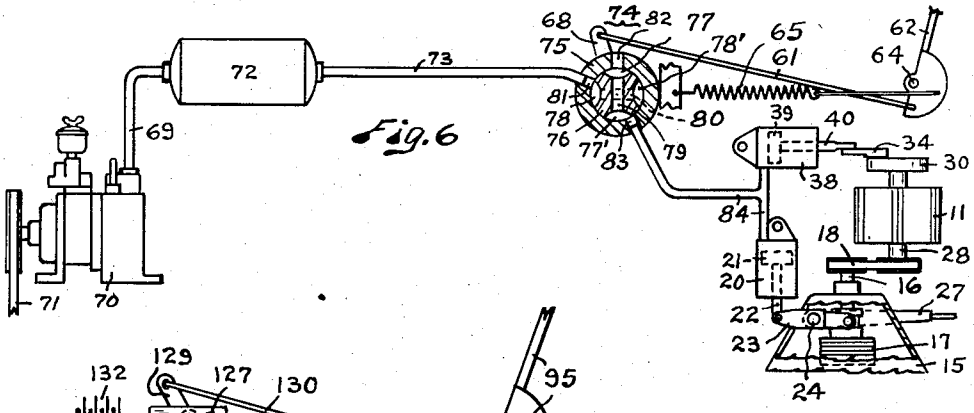


Fig. 6

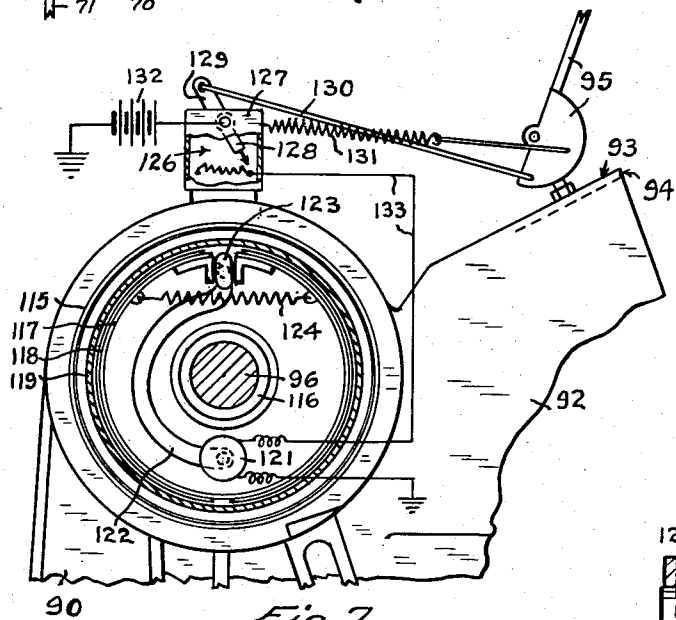


Fig. 7

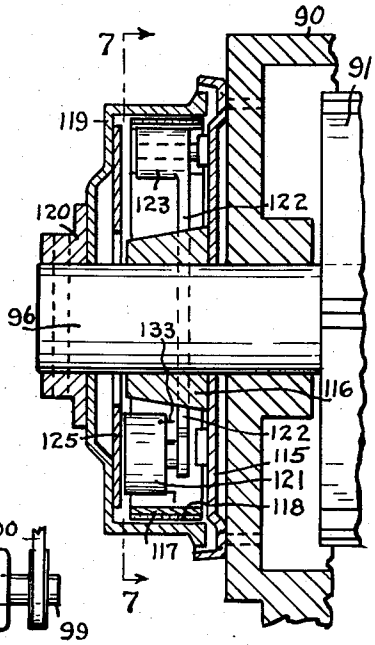


Fig. 8

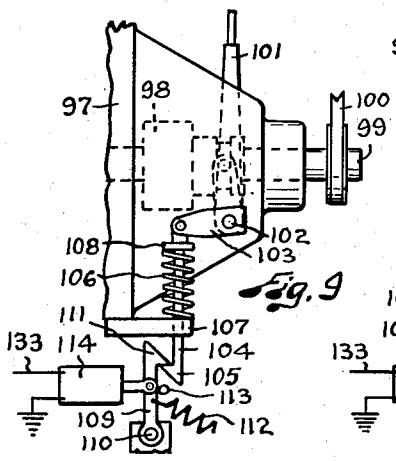


Fig. 9

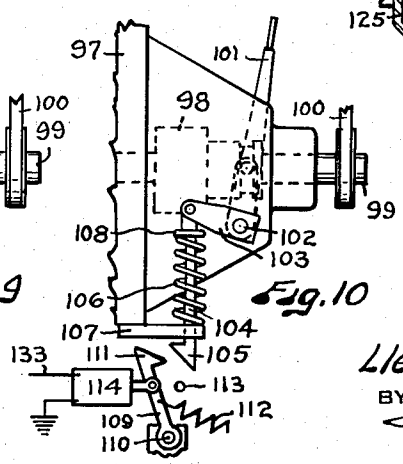


Fig. 10

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SAFETY DEVICE FOR BRUSH HOG

Llewellyn J. Hall, Sedro-Woolley, Wash.

Application May 19, 1954, Serial No. 430,858

3 Claims. (Cl. 241—222)

This invention relates to brush hogs and particularly to safety devices for brush hogs having rotatively driven cutter or chipper heads.

An object of this invention is to provide simple and efficient and easily operable means for very quickly and easily stopping the operation of the brush cutting element or head of a brush hog.

Brush hogs having rotatively driven heads for comminuting the brush are usually manually fed through approximately horizontal feed chutes of relatively large size. These machines are designed to hog up brush including small trees and limbs up to seven or eight inches in diameter. When this material is pushed into the feed chute and engaged by the rotating head it is drawn with a strong pull into the machine and if a person feeding the machine should become caught or entangled in the brush they could be pulled into contact with the rotating head. Also it sometimes happens that wires, stones, pieces of metal and the like will inadvertently be fed in along with the brush and will damage the machine.

An object of this invention is to provide safety means which is always accessible to the person feeding the machine and by which the cutter head can and ordinarily will be instantly stopped by the operator in case of emergency.

Another object is to provide control means which is instantly available to the operator but which is positioned so that it is not liable to be contacted and operated by the material being fed into the machine, said control means being on top of the feed chute and being protected from contact by incoming brush by an overhanging edge of the feed chute.

Another object of the invention is to provide safety devices in combination with a brush hog having a cutter head which is connected through a clutch with driving means, said safety devices comprising a brake connected with the cutter head and positioned between the clutch and the cutter head, together with a clutch releasing means and a brake applying means and manually operable control devices on the feed chute of the machine capable of instantly activating the clutch releasing means and the brake applying means to simultaneously release the clutch and apply the brake.

Other objects of the invention will be apparent from the following description taken in connection with the accompanying drawings.

Figure 1 is a view in side elevation, with parts in section, showing a brush hog having safety means constructed in accordance with this invention.

Fig. 2 is a fragmentary side elevation of a motor by which this brush hog is driven and showing by dotted lines a clutch and clutch releasing means connected therewith.

Fig. 3 is a sectional view of a hydraulic control valve used in connection with the safety means illustrated in Figs. 1 and 2, the valve being in an inoperative position.

Fig. 4 is a view similar to Fig. 3 showing the valve in a position for admitting fluid under pressure to the brake and clutch actuating means.

Fig. 5 is a diagrammatic view illustrating the operation of the safety devices shown in Figs. 1 to 4 inclusive.

Fig. 6 is a diagrammatic view illustrating safety devices similar to those shown in Figs. 1 to 5 but modified for actuation by compressed air.

Fig. 7 is a fragmentary view partly in elevation and partly in section taken on broken line 7—7 of Fig. 8 and illustrating an electric brake and control means therefor applied to a brush hog.

Fig. 8 is a fragmentary sectional view of the electric brake devices shown in Fig. 7.

Fig. 9 is a fragmentary side elevation of electrically actuated clutch releasing means.

Fig. 10 is a view similar to Fig. 9 showing the clutch releasing means in a different position, as it would appear when the clutch is released.

Like reference numerals designate like parts throughout the several views.

Referring to Figs. 1 to 5, inclusive, 10 indicates the frame and housing of a brush hog, 11 indicates a rotatively driven cutter head in said frame and housing and 12 a substantially horizontal feed chute extending outwardly from the cutter head and through which brush is fed into the machine. The feed chute 12 has an upper wall 13 which, outwardly considered, is inclined upwardly. Said upper wall 13 terminates in a forward edge 14 which serves as a brush guard for safety control devices, as hereinafter explained.

The cutter head 11 is driven from a motor 15, shown in Fig. 2 and shown diagrammatically in Fig. 5, through power transmitting means which includes a clutch 17, an intermediate shaft 16 and a driving connection, such as V-belt means 18 between the intermediate shaft 16 and a shaft 28 on which the cutter head 11 is mounted. A manually operated lever 27, Figs. 2 and 5, is normally used to engage and disengage the clutch 17. Emergency clutch disengaging means constructed in accordance with this invention is also connected with the clutch 17 and is operative to disengage said clutch and hold the same disengaged. This emergency clutch disengaging means comprises a fluid pressure cylinder 20 having therein a piston 21 which is connected by a piston rod 22 and lever 23 with a clutch operating shaft 24. The cylinder 20 is mounted by a pivot 25 on a fixed support 26 and has a fluid pressure conduit 53 connected therewith, as hereinafter explained.

This safety control means also embodies brake mechanism on the shaft 28 of the driven cutter head 11. Said brake mechanism comprises a brake drum 29 rigidly attached to the shaft 28, a brake band 30 extending around said drum, brackets 31 and 32 rigid with the respective end portions of said brake band, a tension rod 33 guided and supported in said brackets, a cam 34 connected by a pivot 35 with the tension rod 33 and means for imparting movement to the cam 34 to tension the band 30 on the drum 29. Anchor means 36 connects the brake band 30 with the housing 10 of the machine to resist torque and prevent rotary movement of the brake band. Also a guide and support member 37, rigid with the frame 10, is provided for the tension rod 33.

The cam moving means shown in Figs. 1 and 5 comprises a fluid pressure cylinder 38 having therein a piston 39 which is connected by a piston rod 40 and pivot 41 with the cam 34. A pivot 42 connects the outer end of the cylinder 38 with the frame 10.

A fluid pressure control valve comprising a cylindrical valve housing 43 having a rotatable valve member 44 therein is mounted by a suitable bracket 45 on the top of the housing 10. The valve member 44 has four equi-

distantly spaced peripheral cavities 46, 46', 47 and 47'. The opposite cavities 46, 46' are connected with each other by a passageway 48 and the other opposite cavities 47, 47' are connected with each other by another passageway 49 which is offset longitudinally of the valve member 44 relative to the passageway 48. Four conduits 50, 51, 52 and 53 are connected with the valve housing 43 at angular intervals, as shown in Figs. 3 and 4.

The conduit 53 is branched, as required, and is connected with both the clutch disengaging cylinder 20 and the brake applying cylinder 38. The conduits 52 and 51 are both connected with a fluid pressure reservoir or tank 54. The conduit 50, see Fig. 2, is connected with a pressure control valve 55 and said valve 55 is connected by a conduit 56 with a hydraulic pump 57 which is driven from the motor 15 by suitable driving means 58, see Fig. 2. A conduit 59 connects the tank 54 with the pump 57.

The valve member 44 has a lever 60 attached to one end thereof. A push and pull type link 61 connects the lever 60 with a manually operable control or trip arm or plate 62. Preferably this control member 62 is a plate of substantial width which extends across a major portion of the feed chute 12. With a wide control member 62, if an operator should fall or be drawn toward the feed chute he will be substantially certain to contact and operate said control member and stop the machine. The control member 62 is pivotally mounted on the top wall of the feed chute 13 a short distance inward from the forward edge 14 thereof so it will be protected by the edge 14 from contact by incoming brush but will always be instantly accessible to the person feeding the machine. A bracket 63, secured to the top wall 13 of the feed chute carries pivot means on which the control arm 62 is mounted, this being pivot means 64. A tension spring 65 is connected between the control member 62 and a fixed frame part, such as the valve supporting bracket 45. This spring 65 is connected in such a manner as to cause the line along which it exerts a tension to cross from one side to the other of the center of pivot 64 when the control member is moved between the full line and the dotted line positions shown in Fig. 1. Thus the spring will yieldingly hold the control member 62 in either of these positions. Stops 61' may be provided on the valve housing 43 in the path of the lever 60 to limit the movement of both the valve member 44 and the control member 62.

When the control member 62 is in the position shown by full lines in Fig. 1 the valve 44 will be in the position shown in Fig. 3 and fluid can by-pass continuously from the reservoir 54, through conduit 59, pump 57, conduit 56, valve 55, conduit 50, cavity 47, passageway 49, cavity 47' and conduit 52 back to the reservoir 54. At the same time a relief passageway from both of the cylinders 20 and 38 back to the reservoir 54 is open by way of the conduit 53, cavity 46' passageway 48, cavity 46 and conduit 51. Thus in this position of the valve member 44 the brake is released and the emergency clutch control means is neutralized and does not affect the operation of the clutch by the lever 27.

If the control arm 62 is pivotally moved to a position as shown by dotted lines in Fig. 1 the valve member 44 will be set in the position shown in Fig. 4. In this position said valve member will block off and close the passageways to the conduits 52 and 51 and will open a passageway from the pump 57, through conduit 56, valve 55, conduit 50, cavity 47, passageway 49, cavity 47' and conduit 53 to both of the cylinders 20 and 38. This simultaneously disengages the clutch 17 and applies the brake and instantly stops the machine. As long as the control member 62 remains in the dotted line position fluid pressure will be maintained in both of the cylinders 20 and 38 and it will be impossible to re-engage the clutch 17 by means of the manually operated lever 27. Obviously pressure regulated by-pass control means will be provided by the valve 55 so that excess fluid under pressure can return by way of a conduit 55' to the reservoir 54.

The apparatus diagrammatically shown in Fig. 6 illustrates means operated by compressed air for quickly stopping a machine of the type shown in Figs. 1 to 5. In the structure shown in Fig. 6 the cylinders 20 and 38 and the clutch and brake means and the cutter head and the parts connecting the cylinders 20 and 38 with the clutch and brake means respectively are all identical with those shown in Figs. 1 to 5 and insofar as they are shown they are correspondingly numbered. The pump 57 shown in Figs. 2 and 5 is replaced in Fig. 6 by an air compressor 70 of automatic loading and unloading type and this compressor 70 is driven, preferably by V-belt means 71 in a manner similar to the pump 57. The compressor 70 delivers compressed air through a conduit 69 to a reservoir 72. The reservoir 72 is connected by a conduit 73 with a valve 74 which is a modification of the previously described valve 43, 44 in that it is adapted to control a supply of compressed air. The valve 74 comprises a housing 75 having therein a rotatively movable valve member 76. The valve member 76 is provided with an operating lever 68 and has peripheral cavities 77, 77', 78 and 78'. A passageway 79 connects the two cavities 77 and 77' and a similar passageway 80 connects the other two cavities 78 and 78'. The valve housing 75 has three angularly spaced ports 81, 82 and 83. The air pressure supply conduit 73 is connected with the port 81. A branched conduit 84 connects the port 83 with both of the cylinders 20 and 38. The port 82 is an exhaust port and can either be left open, as shown, or can have an exhaust pipe connected therewith. The valve 74 is mounted in a bracket like bracket 45 of Fig. 1 and the control means 62, 61, 65 which is connected with valve lever 68 is the same as shown in Figs. 1 to 5.

When the valve member 76 is in the position shown in Fig. 6 the cylinders 20 and 38 will both be open to exhaust by way of conduit 84 and valve passageways 77', 79, 77 and 82 and the valve will be closed as respects the passage of compressed air therethrough. Movement of the control member 62 to the dotted line position will move the valve member 76 clockwise far enough to block the exhaust port 82 and connect the air pressure supply conduit 73, by way of passageways 78, 80, 78' and 83 and conduit 84 to the two cylinders 20 and 38. This will instantly stop the machine by releasing the clutch and applying the brake.

The apparatus illustrated in Figs. 7 to 10 inclusive discloses electrically operated safety means for quickly and easily stopping rotation of a driven hogging member. The brush hog frame 90, cutter head 91, feed chute 92 with top wall 93 having forward edge 94, trip member or plate 95 and cutter head shaft 96 are similar to the corresponding parts described in connection with Figs. 1 to 5 inclusive. Also similar cutter head driving means is provided in the form of a motor 97 connected through a clutch 98 and shaft 99 and V-belt 100 with the cutter head shaft 96. The clutch 98 is normally controlled by a manually operated lever 101 which is connected with a clutch control shaft 102. An emergency lever 103 is also connected with the shaft 102. The outer end of the emergency lever 103 is pivotally connected with a link 104 which is provided with a hook 105. A compression spring 106 on the link 104 is supported by a fixed bracket 107 which is rigid with the motor housing. The spring 106 exerts, against a collar 108 on link 104, a pressure which tends to disengage the clutch 98 when the link 104 is disengaged from link holding means, as shown in Fig. 10. The link holding means comprises a latch member 109 supported from a fixed pivot 110 and having

a hook **111** adapted to engage with the hook **105**. A spring **112** yieldingly holds the latch member **109** in engagement with the hook **105** and a stop **113** limits movement in one direction of said latch member. A solenoid **114** is connected with the latch member **109** for releasing the same. When the solenoid **114** is energized it instantly releases the latch member and permits the spring **106** to disengage the clutch **98**. Since the spring **106** holds the clutch **98** in engaged position it will be apparent that said clutch **98** can not be latched in an engaged position by the use of the clutch lever **101** as long as the solenoid **114** remains energized. This prevents re-engaging the clutch **98** until after the control member **95** has been reset in a neutral position after emergency operation.

If it is desired to disengage the clutch by the use of the lever **101** while the hooks **105** and **111** are latched the said hooks may be manually disengaged to permit this operation. When the solenoid **114** is de-energized and the hooks **105** and **111** are disengaged hook **111** will obviously snap into engagement with hook **105** if the link **104** is moved downwardly by movement of lever **101**.

The brake mechanism shown in Figs. 7 and 8 comprises a plate **115** fixed to the brush hog frame **90** and having a hub **116** within which the shaft **96** rotates. Brake band means **117** of internal type having brake lining **118** thereon is supported from the plate **115** and adapted to be expanded by a cam **123** to apply the lining **118** to a rotating brake drum **119**. The drum **119** is secured by a hub **120** to the cutter head shaft **96**. An electromagnet **121** is carried by a curved link **122** which is connected with the cam **123** so that when said link **122** is moved it will operate the cam **123** and apply the linings **118** to the drum **119**. A spring **124** urges this brake means into released position. When the electromagnet **121** is energized it is attracted to a rotating armature disc **125** which is carried by the drum **119** and the force applied by this rotating disc to the electromagnet **121** angularly moves the curved link **122** and applies the brake.

The supply of current to the electromagnet **121** is controlled by a rheostat type of switch **126**, Fig. 7. This switch is mounted in a housing **127** on the frame **90** and comprises a pivotally movable switch arm **128** connected with a lever **129**. The lever **129** is connected by a link **130** with the control member **95**. A spring **131**, similar to the previously described spring **65**, is provided to hold the control member **95** in either a neutral or an operative position.

The switch **126** controls the supply of electric current from a battery **132**, which usually will be the battery of the motor **97**, through a conductor **133**, shown in each of Figs. 7, 8, 9 and 10, to simultaneously energize the

ings clearly illustrate preferred embodiments of this invention but it will be understood that this disclosure is merely illustrative and that changes may be made within the scope of the following claims.

I claim:

1. In a brush hog a housing having a substantially horizontal feed chute, a cutter head in said housing; driving means connected with said cutter head; brake means operatively connected with said cutter head; brake applying devices connected with said brake means; a manually operable brake control member controlling said brake applying devices and pivotally mounted on the top of said feed chute a short distance inwardly from the outer end of the feed chute with said control member readily manually accessible from the intake end of the feed chute and shielded by the feed chute from contact with brush entering said feed chute; and a spring connected with said pivotally mounted brake control member yieldingly holding the same either in a brake released position or in a brake applied position.

2. In a brush hog, a housing having a substantially horizontal feed chute of generally rectangular cross sectional shape provided with a top wall under which brush entering said chute must pass; a cutter head in said housing; driving means connected with said cutter head; a clutch interposed in said driving means; clutch disengaging means connected with said clutch; brake means operatively connected with said cutter head; brake applying devices connected with said brake means; and a relatively wide upstanding emergency control member pivotally mounted on the exterior of the top wall of said feed chute a short distance inwardly from the outer end thereof and connected with both said clutch disengaging means and said brake applying means, said control member being manually accessible for a substantial distance crosswise of the feed chute and said control member being shielded by the forward edge of the chute from contact by incoming brush.

3. In a brush hog, a housing having a substantially horizontal feed chute of generally rectangular cross sectional shape provided with a top wall which is inclined downwardly from its outer toward its inner end and under which brush entering said chute must pass; a cutter head in said housing; driving means connected with said cutter head; a clutch interposed in the cutter head driving means; hydraulic fluid pressure supply means; a brake connected with said cutter head; hydraulic clutch releasing means connected with said clutch; hydraulic brake applying means connected with said brake; a valve controlling the supply of liquid under pressure from said fluid pressure supply means to said clutch releasing means and said brake applying means; and a valve controlling member pivotally mounted on the exterior of the inclined top wall of said feed chute a short distance inwardly from the outer end