Sept. 25, 1956 B. G. HARDY ET AL 2,763,967

ABRASIVE CUT-OFF MACHINE

Filed Dec. 15, 1954

4 Sheets-Sheet 1

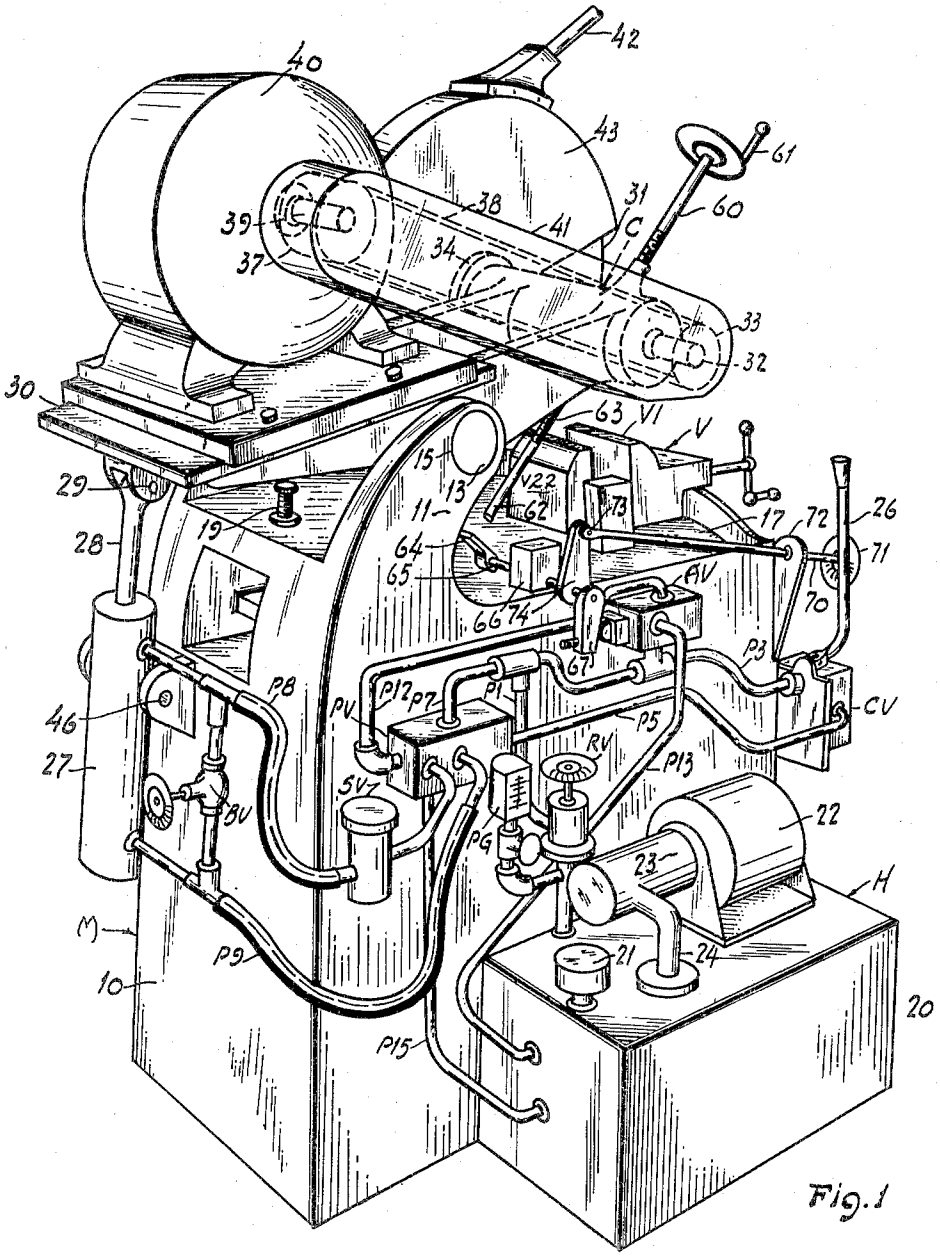


Fig. 1

INVENTORS
Benjamin G. Hardy
BY Charles M. Hammer
Harry Langsam
attorney

Sept. 25, 1956 B. G. HARDY ET AL 2,763,967

ABRASIVE CUT-OFF MACHINE

Filed Dec. 15, 1954

4 Sheets-Sheet 2

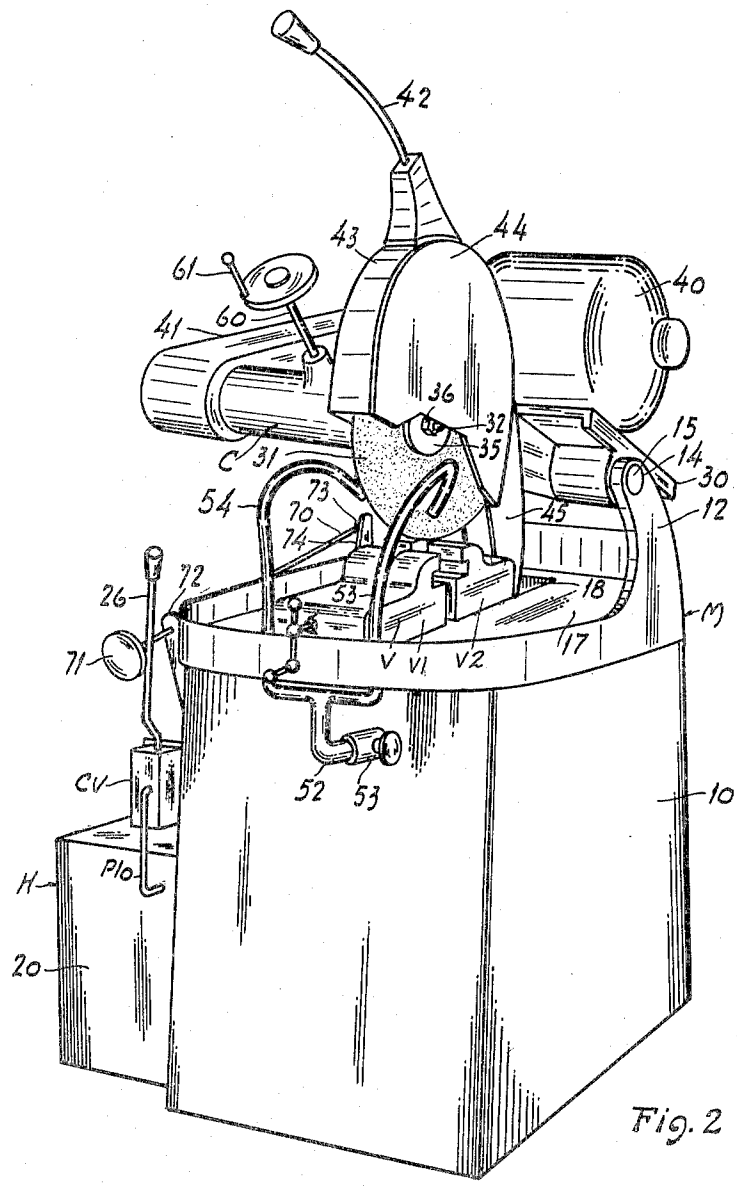


Fig. 2

INVENTORS
Benjamin G. Hardy
Charles M. Hammer

BY Harry Langsam

ATTORNEY

Sept. 25, 1956 B. G. HARDY ET AL 2,763,967

ABRASIVE CUT-OFF MACHINE

Filed Dec. 15, 1954

4 Sheets-Sheet 3

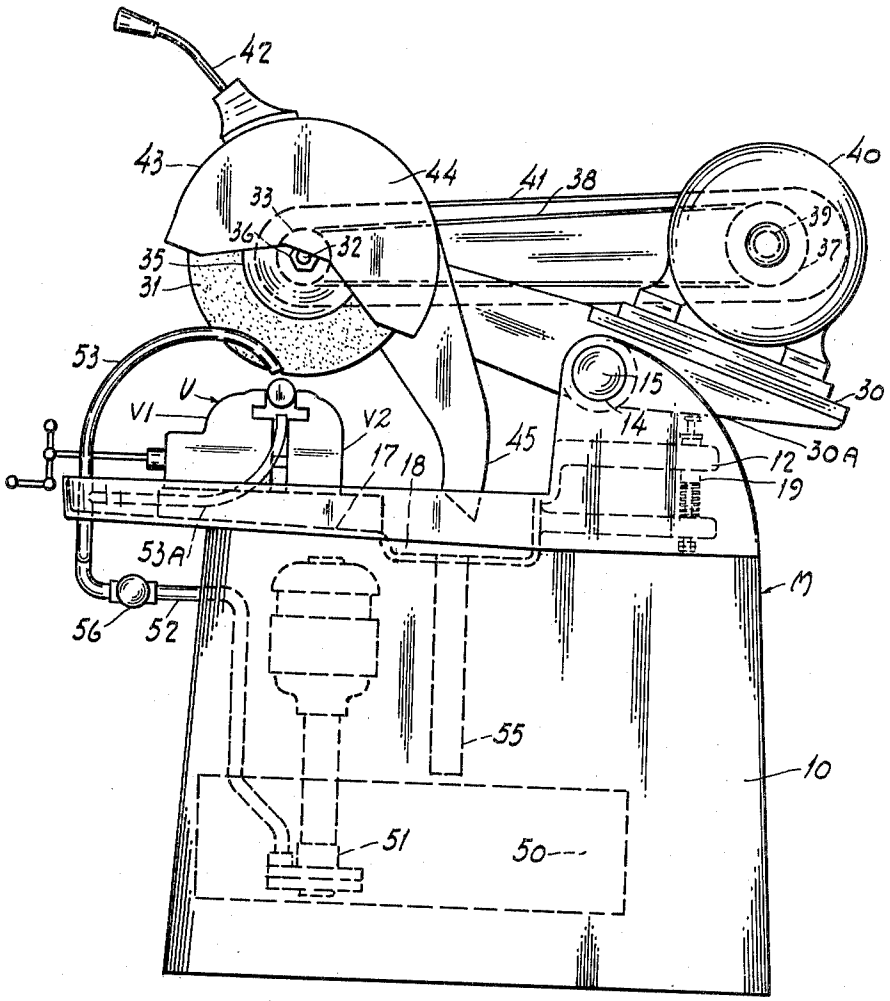


Fig. 3

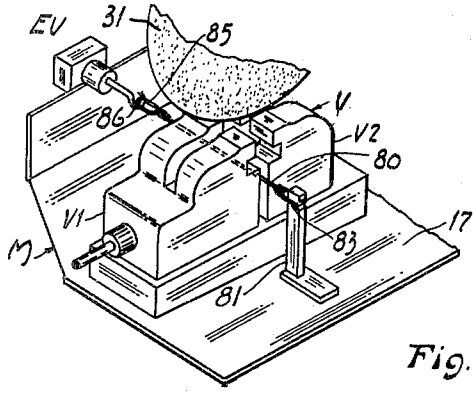


Fig. 4

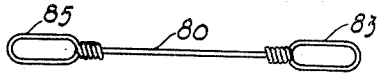


Fig. 5

INVENTORS

Benjamin G. Hardy

Charles M. Hammer

BY Harry Langsam

ATTORNEY

Sept. 25, 1956 B. G. HARDY ET AL 2,763,967

ABRASIVE CUT-OFF MACHINE

Filed Dec. 15, 1954

4 Sheets-Sheet 4

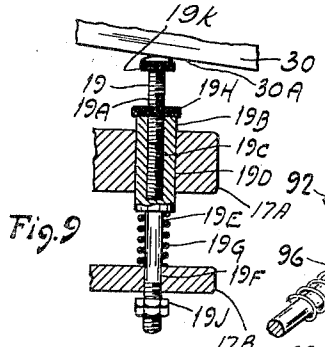


Fig. 9

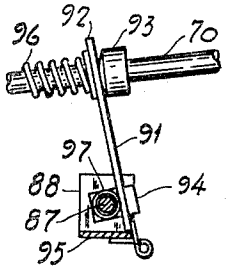


Fig. 7

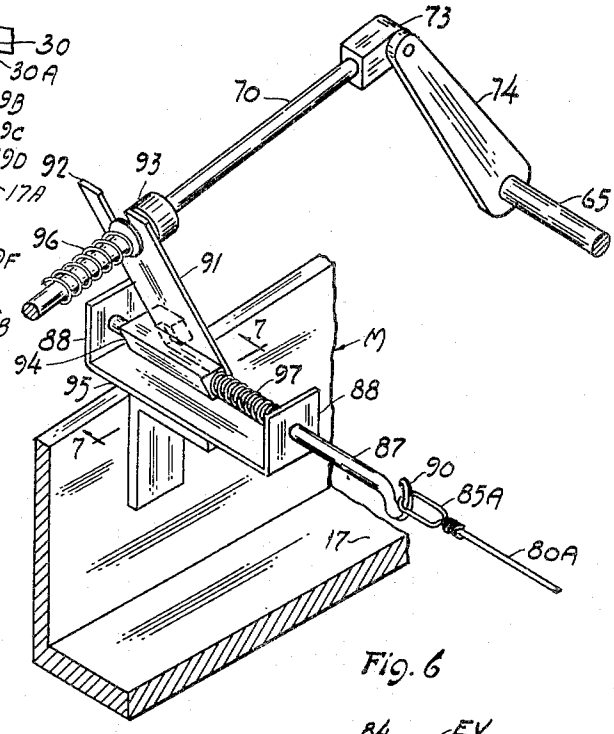


Fig. 6

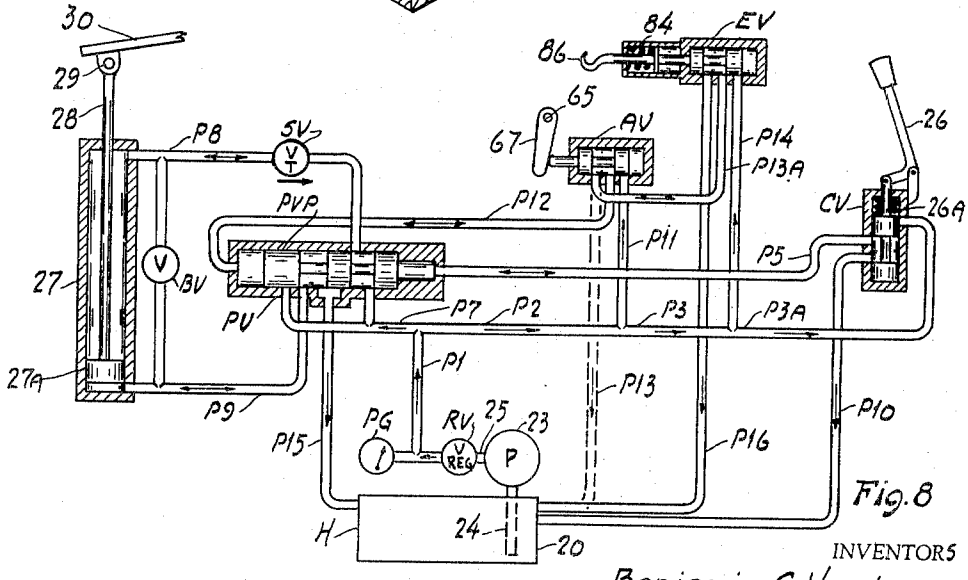


Fig. 8

INVENTORS

Benjamin G. Hardy

Charles M. Hammer

BY Harry Langsam

ATTORNEY

United States Patent Office 2,763,967 Patented Sept. 25, 1956

2,763,967

ABRASIVE CUT-OFF MACHINE

Benjamin G. Hardy, Strafford, and Charles M. Hammer, Gulph Mills, Pa., assignors to A. P. de Sanno & Son, Inc., Phoenixville, Pa., a corporation of Pennsylvania

Application December 15, 1954, Serial No. 475,364

5 Claims. (Cl. 51—98)

Our invention relates to an abrasive cut-off machine, and more particularly to a semi-automatic abrasive cut-off machine.

In order to relieve the operator of the manual effort in the operation of an abrasive cut-off machine, and to have more accurate control of the cutting head, we have devised an abrasive cut-off machine having a well balanced cut-off head, and hydraulic controls to minimize the effort expended by the operator in the operation of the machine.

It is an object of our invention to devise an abrasive cut-off machine that is a complete unit, compact and semi-automatic in its operation.

Another object of our invention is to devise a cut-off machine that is easy to operate and requires little effort on the part of the operator.

Another object of our invention is to devise a cut-off machine wherein the automatic features of the machine can be rendered inoperative and the machine can be manipulated manually.

Another object of our invention is to devise a cut-off machine wherein the cutting head is well balanced and the movement of the cutting head requires very little effort on the part of the operator when the machine is being operated manually.

Another object of our invention is to devise a cut-off machine that is safe and affords adequate protection to the operator.

Another object of our invention is to devise a cut-off machine that is provided with safety devices to prevent injury to the machine and to the securing device utilized to hold the stock in position on the machine.

Another object of our invention is to devise a cut-off machine that is well balanced and wherein vibration is substantially eliminated.

Another object of our invention is to provide an abrasive cut-off machine wherein the rate of approach of the abrasive cutting blade to the stock is controlled.

Another object of our invention is to provide an abrasive cut-off machine wherein the rate of feed of the abrasive cutting blade through the stock is controlled.

Another object of our invention is to provide an abrasive cut-off machine wherein the pressure exerted on the cutting head is controlled.

Another object of our invention is to provide an abrasive cut-off machine wherein an emergency stop rod and a depth adjusting means are interconnected.

Another object of our invention is to provide an abrasive cut-off machine wherein the swing of the abrasive cutting head may be adjusted upon a resilient bumper.

Another object of our invention is to provide for the proper cooling and lubricating of each side of the blade and the stock from two coolant jets above the stock, and at the same time flush the stock from the bottom by means of a third coolant jet thereby thoroughly lubricating the blade and cooling the stock to prevent the stock from overheating while being cut.

Other objects of our invention are to provide an improved device of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, our invention consists in the details of construction and combination of parts, as will be more fully understood from the following description when read in conjunction with the accompanying drawings, in which:

Fig. 1 is a perspective view of our improved abrasive cut-off machine showing the rear and left-hand side.

Fig. 2 is a perspective view of our machine showing the front and right-hand side.

Fig. 3 is a side elevational view of our machine showing the right hand side and details of the coolant system.

Fig. 4 is a perspective view of the stock-holding vise as used with our machine, showing the automatic emergency safety device which is cut by the blade, immediately returns the cutting blade automatically to its uppermost position, preventing the wheel from cutting into the bottom of the stock-holding vise.

Fig. 5 is a plan view of an expendable link used with the automatic emergency trip device.

Fig. 6 is an isometric view of an alternate automatic emergency trip device.

Fig. 7 is a sectional elevational view of the alternate automatic emergency trip device taken along line 7—7 of Fig. 6.

Fig. 8 is a diagram of the valves and piping for the automatic controls used with our improved abrasive cut-off machine.

Fig. 9 is a sectional elevational view of a stop positioned and arranged to adjustably limit the upward travel of the cutting head of the abrasive cut-off machine.

Referring in greater detail to the drawings, wherein similar reference characters refer to similar parts, we disclose an abrasive cut-off machine, generally designated M, having a cubical base **10**, wherein there is a cutting head, generally designated as C, a dual jaw vise, generally designated as V, a hydraulic power unit, generally designated as H, and extending upwardly from the sides of the base are bearing supports **11**, **12**, and supported bearings **13**, **14**, which engage the ends of a horizontal shaft **15** positioned between the bearings **13**, **14**. Mounted upon and secured to the shaft **15**, is a cutting head platform **30**. Secured to the operating end of the cutting head platform **30** is a cutting head, generally designated C, having an abrasive cutting blade **31**. Bearings in the cutting head C, position the cutting blade shaft **32**. A bed **17** on the base **10** supports a sump **18** arranged so that cuttings and dust from the cutting blade **31** are directed into the sump **18**.

A threaded spring mounted bumper **19** is located to be engaged by the underside of the cutting head platform **30**, near the back thereof, to provide a cushioned limit of travel for the cutting head platform. The spring mounted bumper **19** is adjustable so that a predetermined length of stroke of the cutting head can be established by adjusting the elevation of the bumper **19**.

The bumper **19** (see Fig. 9) is comprised of a threaded shaft **19A** vertically adjustably supported by the stop cylinder **19B**, the stop cylinder having a threaded lateral central hole **19C** arranged to receive the threaded shaft **19A**. The stop cylinder **19B** is vertically movably positioned in a hole **19D** in the diaphragm **17A** which is a part of the machine base **17**. A shaft **19E** extending downward from the bottom of the stop cylinder **19B** is arranged to pass through a hole **19F** in a second diaphragm **17B**. Surrounding the shaft **19E** is a helical compression spring **19G**, the spring **19G** providing a resilient support for the stop cylinder **19B**. A knurled head **19K** is provided on the top of the threaded shaft **19A** and a knurled jam nut **19H** is provided so that the

shaft 19A can be vertically adjusted in the stop cylinder 19B and then secured by the jam nut 19H. Stop nuts 19J are provided on the bottom of the shaft 19E to limit vertical movement of the stop cylinder.

With the bumper 19 as above described, it can be readily observed that adjustment of the travel of the cutting head C can be made to suit the size of the stock being cut and the diameter of the cut-off wheel 31. The operator, in making the adjustment, rotates the threaded shaft 19A to raise or lower the knurled head. After the adjustment has been made, the operator tightens the knurled jam nut 19H to retain the shaft 19A in vertical space relationship to the stop cylinder 19B. The upward travel of the cutting head C is adjustably limited by the bumper 19 when the underside 30A of the cutter head platform 30 impinges on the top of the shaft 19A.

Automatic hydraulic operation of the abrasive cut-off machine M is as follows: Adjacent to the left hand side of the machine M is a hydraulic power unit, generally designated H (Fig. 1), comprised of a base 20 containing a fluid tank; a vent 21 is provided to maintain atmospheric pressure in the base 20. Mounted upon the top of the base 20 is a hydraulic pump 23 driven by a motor 22. The hydraulic pump suction pipe 24 extends down into the tank within the base 20 (Fig. 8), and a discharge line 25 delivers fluid under pressure to a pressure regulating valve RV and pressure gauge PG. From the pressure regulating valve RV the fluid under pressure enters the pipe P1 and is conducted to the two position, four-way control valve CV by way of the pipes P2, P3, and P3A when used. The control valve CV is arranged to deliver controlled fluid pressure to the piston type pilot valve PV by way of the pipe P5. The fluid pressure delivered to the pilot valve PV, and the pilot valve PV is under control of the operator by his manipulating of the handle 26 of the control valve CV. A drain line P10 is connected between the control valve CV and the fluid holding tank in the base 20 of the hydraulic unit H.

The fluid pressure actuated pilot valve PV is arranged to deliver fluid under controlled pressure to the upper and lower chamber of a hydraulic cylinder 27 and its piston 27A. The cylinder 27 (Fig. 1) is pivotally mounted at 46 to the back of the abrasive cut-off machine base 10. A piston rod 28 (Figs. 1 and 8), connected to the piston 27A of the hydraulic cylinder, extends through the upper end of the hydraulic cylinder 27 and is pivotally connected to the back of the cutter head platform 30 at 29. With this arrangement, it will be readily seen that movement of the cutter head is under accurate control of the operator. The fluid under pressure is delivered from the pilot valve PV to the upper chamber of the hydraulic cylinder 27 by way of the flexible pipe P8 and speed control valve SV, and from the pilot valve PV to the lower chamber of the hydraulic cylinder 27 by way of the flexible pipe P9. Fluid under pressure entering the upper chamber of the hydraulic cylinder 27 moves the piston 27A downwardly thereby raising the cutting head C and fluid under pressure entering the lower chamber of the hydraulic cylinder 27 raises the piston 27A thereby lowering the cutting head C of the machine M. The speed control valve SV connected into the pipe P8 does not limit the flow of fluid from the pilot valve PV to the upper chamber of the hydraulic cylinder. However, it does permit adjustable control of the fluid being discharged from the upper chamber of the hydraulic cylinder 27. This control of the fluid being discharged from the upper chamber of the hydraulic cylinder permits the operator to adjust the speed control valve SV to control the speed at which the cutter head C descends upon the stock being cut. A drain pipe P15 is provided between the pilot valve PV and the tank in the base 20 of the hydraulic unit H.

The cutting blade 31 is secured to one end of the cut-off wheel shaft 32 by flanges 34, 35, and a securing nut

36 (Fig. 2). A guard 43 encloses the cut-off wheel 31 and is provided with a removable side plate 44 to permit access to the cut-off wheel 31 for removal and replacement of the cut-off wheel 31. The cut-off wheel guard is elongated on the back 45 so that cuttings and dust are directed down into a sump 18 of a bed 17. On the opposite end of the cut-off wheel shaft 32 is a V-belt pulley 33 which is coupled to a second V-belt pulley 37 by a multiplicity of flexible V-belts 38 (Fig. 1). The second V-belt pulley 37 is fixedly mounted on a shaft 39 of the cutting head driving motor 40, the motor being movably mounted upon the cutter head platform 30. The motor 40 moves laterally on the cutter head platform 30 to provide for tension adjustment of the V-belts 38 and is positioned to the rear of the cutting head platform shaft 15. In this position, the motor 40 counter-balances the cutting head C and appurtenances mounted on the operating end of the cutting head platform 30.

The units hereinbefore designated are positioned so that the cutting head platform is balanced upon the shaft 15.

A guard 41 is positioned over the V-belt drive to protect the operator of the machine. When the machine is being operated manually, the near even balance of the cutting head platform, including the equipment mounted thereon, makes it possible for the operator to manipulate the cutting head and also gives the operator a better feel of the work as the cut-off blade 31 is moved to meet the stock being cut. A handle 42 is provided for manual operation of the cutting head and is adjustable so that it can be moved out of the way.

Positioned upon the bed 17 of the base 10 and directly under the cut-off blade 31, is a dual jaw vise, generally designated V (Fig. 1), having jaws V1, V2 for securing the stock.

A coolant reservoir 50 (Fig. 3), and a motor driven pump 51 are positioned within the base 10 of the cut-off machine. The coolant pump 51 delivers coolant under pressure to the stock and the cut-off blade 31, at the point at which the cut is being made, by way of the pipe 52 and nozzles 53, 54. Provision is made for the proper cooling and lubricating of each side of the blade and the stock from two coolant jets above the stock, and at the same time, the stock is flushed from the bottom by means of a third coolant jet 53A whereby when the cutting blade is lubricated thoroughly it prevents the stock from overheating while being cut. The coolant, after cooling the cut, falls to the bed 17, which is recessed, collects in a sump 18, and drains back into the coolant reservoir 50 by way of the drain pipe 55. Control of the quantity of coolant delivered to the cut is regulated by a valve 56.

An automatic control valve AV (Figs. 1 and 8) is arranged to limit the downward travel of the cutting head C so that after a cut in the stock has been completed, the head returns to the raised position in readiness for another operation. The automatic control valve AV is actuated by an adjustable depth stop rod 60 that is adjustably positioned through the cutting head C.

By manipulating a handle 61 affixed to the outer end of the stop rod 60, the stop rod 60 which is threaded at 63 on that portion of the rod that passes through the cutting head C, is adjusted either upwardly or downwardly with respect to the cutting head C. When the adjustable depth stop rod 60 is correctly positioned, the lower end 62 of the adjustable stop bar 60 impinges upon a lever arm 64, see Fig. 1, after the cut-off blade 31 has passed completely through the stock and before the cut-off wheel 31 contacts and damages the vise V which holds the stock in position under the cut-off blade. When the lower end 62 of the adjustable stop rod 60 contacts the lever arm 64, the lever arm rotates a shaft 65 to which it is fixedly attached.

The rotating of the shaft 65, which is rotatably mounted upon a bearing 66, rotates a second lever arm 67

(Fig. 1), that is fixedly attached to the outer end of the shaft 65. The movement of the second lever arm 67 actuates the automatic valve AV. When the automatic valve, which is a normally closed type, is opened by the movement of the lever arms 64, 67, fluid under pressure entering the automatic valve by way of the pressure pipe P11, is delivered to the back end of the pilot valve PV by way of the pipe P12. A drain pipe P13 is provided between the automatic valve AV and the tank in the base 20 of the hydraulic unit H. The fluid pressure delivered to the back of the pilot valve PV by way of the pipe P12 is ample to force the control piston PVP in the pilot valve PV, forwardly since valve CV is spring returned and the operator releases handle 26 when the cutting head begins its stroke. Pressure in line P5 has been drained back to tank 20 through control valve CV and pipe P10. This forwardly movement of the pilot valve piston PVP to the right permits fluid under pressure, conducted to the pilot valve PV by the pipe P7, to flow from the pilot valve PV through the flexible pipe P8 to the upper chamber of the hydraulic cylinder 27 forcing the piston 27A within the cylinder downwardly and in turn pulling downwardly the back end of the cutting head platform 30 by way of the connecting rod 28 and thereby raising the cutting head C and cut-off blade 31 from the stock. The cutting head remains in the raised position until the stock has been adjusted in the vise under the cut-off wheel for another cut.

An emergency push rod 70 (Fig. 1) is arranged to work in cooperation with the automatic control valve AV by way of the shaft 65. The forward end of the push rod 70 is fitted with a mushroom handle 71 and the push rod 70 is positioned by a guide 72, see Fig. 1. The back end 73 of the push rod is pivotally attached to the upper end of a push rod lever arm 74 that is fixedly attached to the shaft 65. The mushroom handle 71 of the emergency push rod 70 is within easy reach of the operator and should the necessity arise, he need only to push on the mushroom handle to rotate the shaft 65 and actuate the automatic valve AV which, in turn, actuates the pilot valve PV to raise the cutting head C as described above.

Should it be desirable to operate the abrasive cut-off machine M without the hydraulic controls, the pump 23 should be stopped and the operator should open the by-pass valve BV (Fig. 8) connected into and between the pipes P8 and P9 supplying fluid under pressure to the upper and lower chambers of the hydraulic cylinder 27. With the by-pass valve BV open, and motor 22 and its pump 23 stopped, the operator has free manual control of the cutting head C of the abrasive cut-off machine M. The operator uses the handle 42 to manually manipulate the cutting head C.

As an additional safeguard, and to prevent damage to the machine M and stock holding vise V, should the operator fail to correctly adjust the adjustable depth stop 60, we disclosed in Figs. 4, 5, and 8, an automatic emergency trip device that automatically causes the cutting head C of the machine to raise, should it travel downwardly beyond a predetermined point. This feature is not shown in Figs. 1 and 2. The emergency trip unit is comprised of a preformed expendable wire link 80, see Fig. 5, that is positioned between the front V1 and back V2 of the vise V, see Fig. 4. The right hand end 83 of the wire link 80 is secured and positioned by a securing bracket 81 which is fixedly attached to the bed 17 of the machine M. The left hand end 85 of the link 80 is attached to a hook 86 formed on the stem of an emergency valve EV. With the link in place, a compression spring 84 in the emergency valve EV is held in a compressed condition and the piston valve member within the emergency valve EV is held in the position illustrated in Fig. 8. With the emergency trip device on the machine M, the drain pipe P13 (shown dotted in Fig. 8) is omitted and a pipe P13A is connected from the discharge orifice of the automatic valve AV to the emergency valve EV, see Fig. 8 .

The automatic emergency trip device functions as follows: Should the cut-off wheel 31 travel downward beyond its normal lower limit due to the operator's failure to properly adjust the automatic adjustable depth stop 60, the cut-off wheel will sever the expendable link 80, permitting the compression spring 84 to move the piston valve member of the emergency valve EV to the right, see Fig. 8; this movement of the piston valve member permits fluid under pressure in the pipe P14 to pass through the emergency valve EV, through pipe P13A, through the automatic valve AV, and into pipe P12 to operate the pilot valve PV as described above for automatic operation of the machine. With the link 80 intact and in place on the machine, the automatic operation of the machine is as described above for normal automatic operation, the only difference being in that the drainage from the automatic valve AV passes through the emergency valve EV by way of the pipes P13A and P16.

An alternate emergency trip device is illustrated in Figs. 6 and 7. In this embodiment, an expendable link 80A (Fig. 6), is positioned between the back and front sections of the vise (not shown in Fig. 6). The right hand end 83A (not shown) of the link is secured by a bracket which is, in turn, fixedly mounted on the bed 17 of the machine M (bracket and mounting is similar to the bracket 83 shown in Fig. 4). The left hand end 85A of the link 80 is secured to a hook 90 formed on the inner end of a spring loaded rod 87. The spring loaded rod 87 is free to move laterally in a guide 88. A lever retainer 94 is fixedly attached to the rod 87 and is arranged to interfit with an emergency trip lever 91 which is pivotally attached to the base 95 of the guide 88 (Fig. 7). The emergency trip lever 91 is forked on its upper end 92 and arranged to extend around the emergency push rod 70. A knob 93 fixedly attached to the emergency push rod 70 is positioned to be adjacent to the back-side of the emergency trip lever 91 when the emergency trip lever is in the retained position (see Fig. 6). A helical compression spring 96 surrounds that portion of the emergency push rod 70 that is between the emergency trip lever and the emergency push rod guide 72.

The alternate emergency trip device functions in the following manner: Should the cut-off wheel 31 travel downwardly beyond its normal lower limit, due to the operator's failure to properly adjust the automatic adjustable depth stop 60, the cut-off wheel will sever the expendable link 80A permitting the compression spring 97 to move the lever retainer 94 to the left, releasing the emergency trip lever 91. With the emergency trip lever 91 released, the helical compression spring 96 surrounding the emergency push rod 70, pushes the emergency trip lever 91 backward against the knob 93 which is fixedly attached to the emergency push rod 70. The backward movement of the emergency push rod 70 functions to actuate the automatic valve AV, as described above, to raise the cutting head and prevent damage to the machine M and vise V.

When the alternate emergency trip device is installed on the machine, the emergency valve EV, shown in the control diagram, see Fig. 8, is not used and the drain pipe P13 from the automatic valve AV is connected directly to the tank in the base 20 of the hydraulic unit H.

Although our invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

We claim as our invention:

1. An abrasive cut-off machine comprising a base arranged to position and support a pivotally mounted balanced cutting head platform above the operating bed of

said abrasive cut-off machine, an adjustable spring loaded stop positioned to engage the rear underside of said balanced cutting head platform so that the stroke of a cutting head supported and positioned by said cutting head platform can be regulated and adjusted so that the cutting head will have a stroke that is correct for the cutting operation being performed.

2. An abrasive cut-off machine comprising a base arranged to position and support a pivotally mounted balanced cutting head platform above the operating bed of said abrasive cut-off machine, said balanced cutting head platform supporting and positioning a cutting head having a rotatably mounted cut-off wheel and a driving means for said wheel, hydraulic actuating means for the control and manipulation of said balanced cutting head platform and supported cutting head, comprising a hydraulic power unit supplying fluid under pressure to a manually controlled control valve hydraulically controlling said pilot valve, said pilot valve hydraulically controlling the quantity of fluid to the upper and lower chamber of a hydraulic cylinder to position a piston within said hydraulic cylinder, a piston rod connected to said piston and to the back end of said pivotally mounted balanced cutting head platform so that by manipulating the control valve the operator has complete control of the movements of cutting head, and an emergency trip device comprised of an emergency push rod having a handle within easy reach of the operator, said push rod actuating an automatic valve to introduce fluid under pressure into the pilot valve to introduce fluid into the upper chamber of the hydraulic cylinder to raise and prevent lowering of the cutting head regardless of the control position of the control valve thereby putting the machine under emergency control of the operator.

3. An abrasive cut-off machine comprising a base arranged to position and support a pivotally mounted balanced cutting head platform above the operating bed of said abrasive cut-off machine, said balanced cutting head platform supporting and positioning a cutting head having a rotatably mounted cut-off wheel and a driving means for said wheel, hydraulic actuating means for the control and manipulation of said balanced cutting head platform and supported cutting head, comprising a hydraulic power unit supplying fluid under pressure to a manually controlled control valve, a pilot valve and an automatic valve, said manually controlled control valve hydraulically controlling said pilot valve, said pilot valve hydraulically controlling the quantity of fluid to the upper and lower chamber of a hydraulic cylinder to position a piston within said hydraulic cylinder, a piston rod connected to said piston and to the back end of said pivotally mounted balanced cutting head platform so that by manipulating the control valve the operator has complete control of the movements of cutting head, said controls incorporating an automatic depth of cut control operating through the hydraulic control system, comprised of an adjustable depth stop movably attached to the cutting head, the end of said adjustable depth stop impinging on an automatic valve actuating lever arm when the cutting head is at a predetermined lower limit said automatic valve introducing fluid under pressure into the piping system to actuate the pilot valve to introduce fluid under pressure into the upper chamber of the hydraulic cylinder to raise the cutting head regardless of the position of the control valve, thereby preventing the cutting head moving downward beyond the point fixed by the adjustable depth stop.

4. An abrasive cut-off machine comprising a base arranged to position and support a pivotally mounted balanced cutting head platform above the operating bed of said abrasive cut-off machine, said balanced cutting head platform supporting and positioning a cutting head having a rotatably mounted cut-off wheel and a driving means for said wheel, hydraulic actuating means for the control and manipulation of said balanced cutting head platform and supported cutting head, comprising a hydraulic power unit supplying fluid under pressure to a manually controlled control valve, a pilot valve and an automatic valve, said manually controlled control valve hydraulically controlling said pilot valve, said pilot valve hydraulically controlling the quantity of fluid to the upper and lower chamber of a hydraulic cylinder to position a piston within said hydraulic cylinder, a piston rod connected to said piston and to the back end of said pivotally mounted balanced cutting head platform so that by manipulating the control valve the operator has complete control of the movements of cutting head, and an emergency trip device comprised of an emergency push rod having a handle within easy reach of the operator, said push rod actuating an automatic valve to introduce fluid under pressure into the pilot valve to introduce fluid into the upper chamber of the hydraulic cylinder to raise and prevent lowering of the cutting head regardless of the control position of the control valve thereby putting the machine under emergency control of the operator, and an emergency valve introduced into the hydraulic piping system to raise and prevent lowering of the cutting head should the cutting head travel downward to a point that would cause injury to the abrasive cut-off machine or to the vise positioned on the bed of the machine and used for positioning the work being cut, said emergency valve arranged to be held closed by an expendable link positioned directly under the cut-off wheel of the cutting head at a point just below the normal low limit of travel; severing of said expendable link by the cut-off wheel when in a position lower than the normal low limit permitting the emergency valve to open and permit fluid under pressure to enter the hydraulic piping system to actuate the pilot valve and introduce fluid under pressure into the upper cylinder of a hydraulic cylinder to raise and prevent lowering of the cutting head regardless of the control position of the control valve, thereby preventing damage to the said machine and vise by failure to set an adjustable depth stop.

5. An abrasive cut-off machine comprising a base arranged to position and support a pivotally mounted balanced cutting head platform above the operating bed of said abrasive cut-off machine, said balanced cutting head platform supporting and positioning a cutting head having a rotatably mounted cut-off wheel and a driving means for said wheel, hydraulic actuating means for the control and manipulation of said balanced cutting head platform and supported cutting head, comprising a hydraulic power unit supplying fluid under pressure to a manually controlled control valve, a pilot valve and an automatic valve, said manually controlled control valve hydraulically controlling said pilot valve, said pilot valve hydraulically controlling the quantity of fluid to the upper and lower chamber of a hydraulic cylinder to position a piston within said hydraulic cylinder, a piston rod connected to said piston and to the back end of said pivotally mounted balanced cutting head platform so that by manipulating the control valve the operator has complete control of the movements of cutting head, and an emergency trip device comprised of an emergency push rod having a handle within easy reach of the operator, said push rod actuating an automatic valve to introduce fluid under pressure into the pilot valve to introduce fluid into the upper chamber of the hydraulic cylinder to raise and prevent lowering of the cutting head regardless of the control position of the control valve thereby putting the machine under emergency control of the operator, and an emergency trip device comprised of a lever arm arranged to interfit with and operate an emergency stop, said lever arm arranged to be held in the non-operating position by an expendable link positioned directly under the cut-off wheel of the cutting head at a point just below the normal low limit of travel of the cut-off wheel, severing of said expendable link permitting a lever arm retaining member to move laterally and release said lever arm, said lever arm being spring loaded actuates said emergency stop to operate an automatic valve which functions

through a pilot valve and hydraulic cylinder to raise and prevent lowering of the cutting head regardless of the control position of the control valve thereby preventing damage to said machine and said vise by failure to set an adjustable depth stop.

References Cited in the file of this patent

UNITED STATES PATENTS

1,979,140	Casey	Oct. 30, 1934
2,171,024	Coates	Aug. 29, 1939
2,176,486	Bruestle	Oct. 17, 1939
2,180,743	Martin	Nov. 21, 1939
2,340,553	O'Bear et al.	Feb. 1, 1944
2,343,556	Jacobsen	Mar. 7, 1944
2,354,509	Dreher	July 25, 1944
2,467,161	Sheeley	Apr. 12, 1949
2,534,941	Bladenhofer	Dec. 19, 1950