

June 7, 1955

A. J. BROAD
APPARATUS FOR EXTINGUISHING GRASS
FIRES AND BURNING FIRE BREAKS

2,709,998

Filed Nov. 24, 1950

4 Sheets-Sheet 1

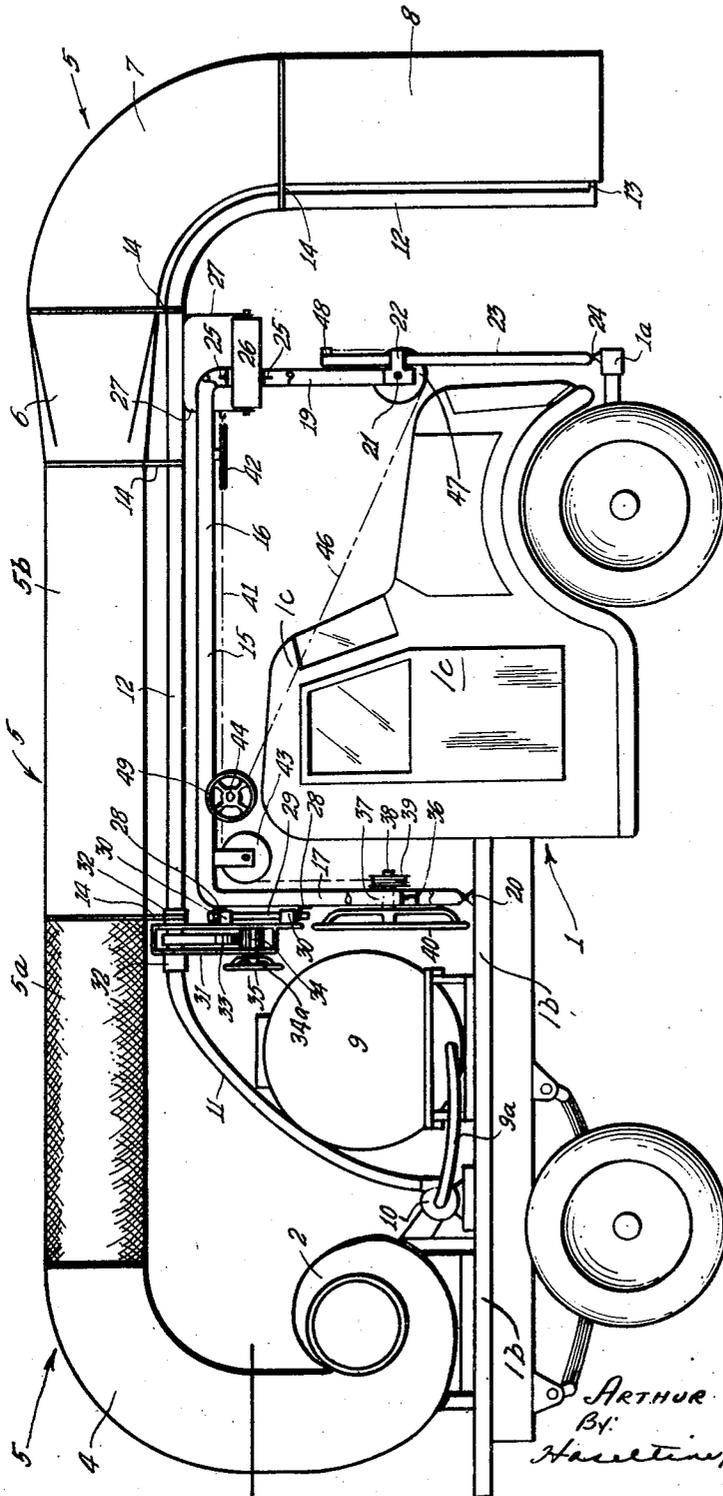


FIG. 1.

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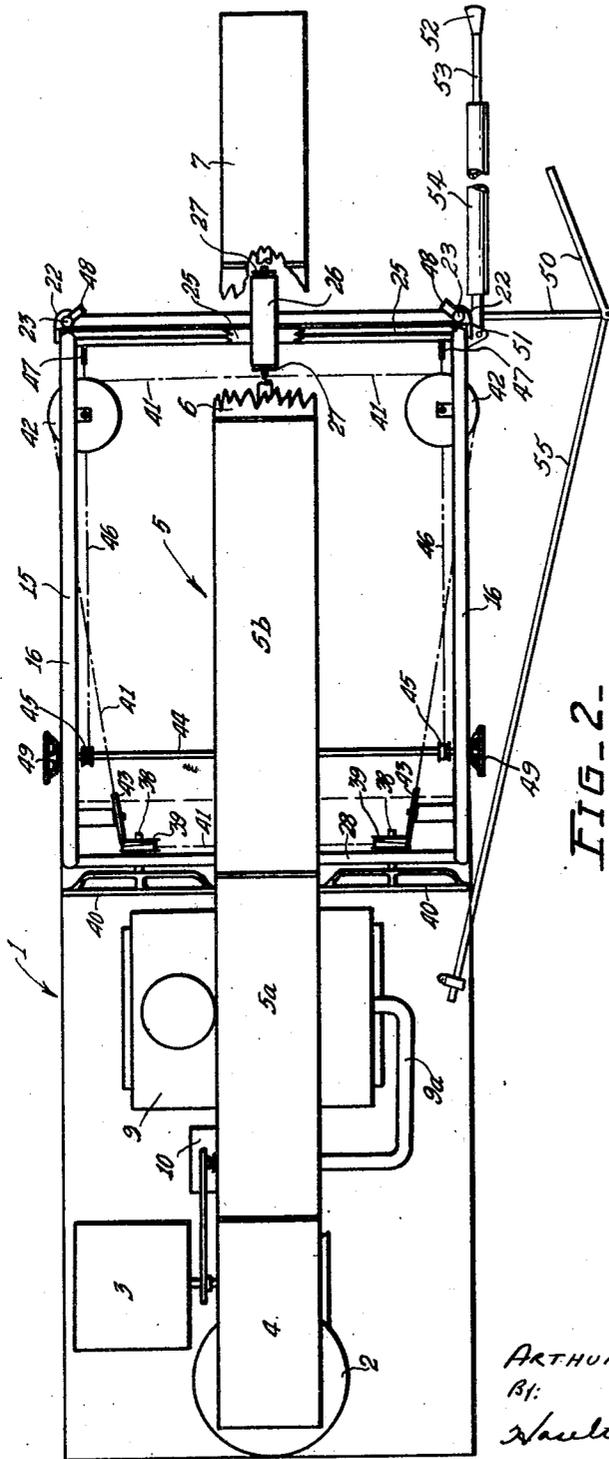


FIG. 2-

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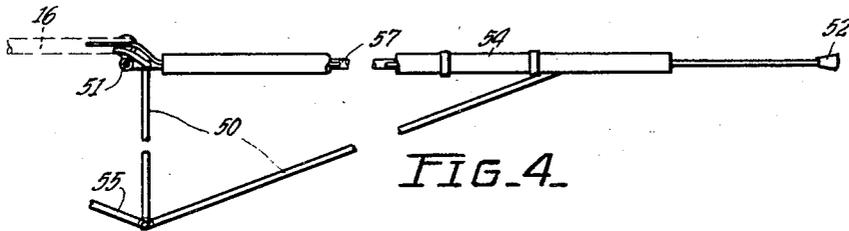
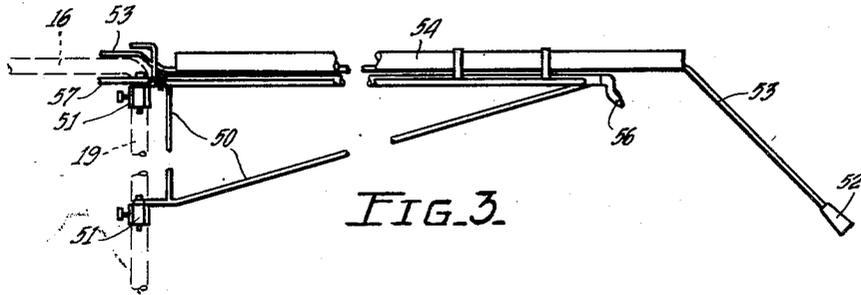
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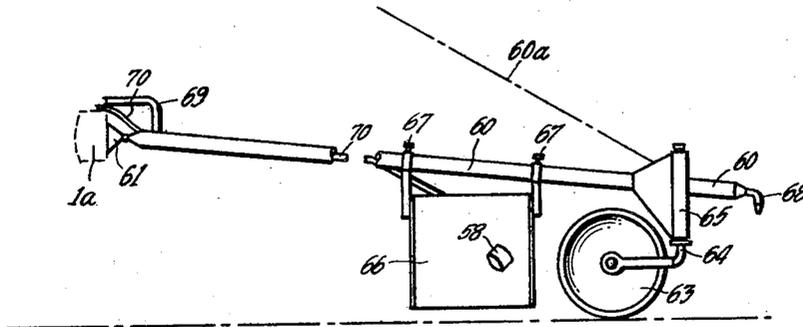


FIG. 5.

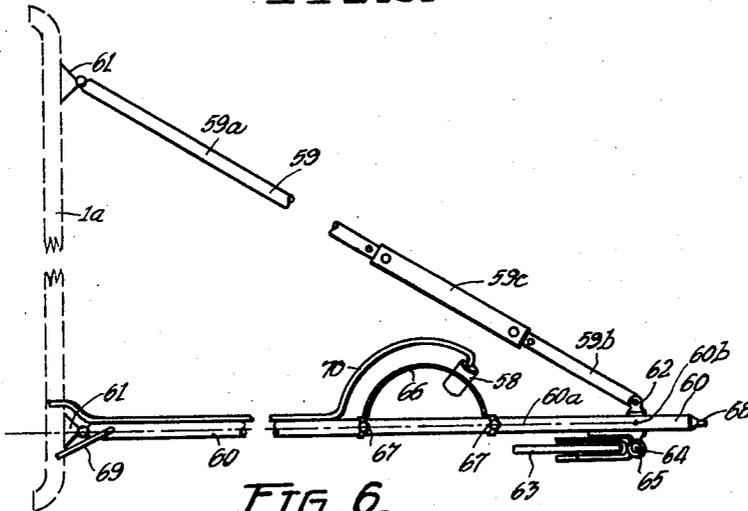


FIG. 6.

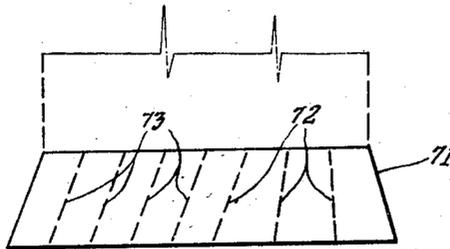


FIG. 7.

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2,709,998

APPARATUS FOR EXTINGUISHING GRASS FIRES AND BURNING FIRE BREAKS

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Application November 24, 1950, Serial No. 197,262

Claims priority, application Australia November 28, 1949

10 Claims. (Cl. 126—271.2)

This invention relates to apparatus to be transported by a motor vehicle and used for extinguishing fires in open grass country or for burning fire breaks or pre-burnt strips to check and prevent grass fires from spreading.

The present invention is directed to apparatus whereby a fire is extinguished by means of a strong current of air, and a fire break is burnt by igniting means moving sufficiently in advance of the extinguishing air current to enable a strip to the burnt before the burning grass is put out by the air current.

In the course of extended trials I have found that in order to be effective, certain conditions, hereinafter fully explained, relating to the flow and discharge of the extinguishing air current and the disposition of or enclosing of the igniting apparatus must be complied with, moreover, it has been found that for efficient air discharge, the air flow from the blower or fan should be as short and direct as possible.

I have also found that difficulty is encountered in mounting the air conduit at the side of motor vehicle in that complexity is involved in supporting the air conduit, and delay in changing the conduit from one side to the other, if one conduit only be provided. If two conduits, one at each side of the vehicle, are provided, the overall width becomes to great, and the vehicle cannot be driven through gateways of normal width.

If an air flow of large volume be employed a further difficulty is met with, in that the resistance to movement of the pivoted portion of the conduit is greatly increased, so much so that the delivery end of the conduit is extremely difficult to move and requires much exertion on the part of an operative to effect its adjustment.

Now the principal objective of this invention is the provision of fire extinguishing and break burning apparatus of simple construction which is mounted upon and associated with a power driven vehicle so as to be traversed at relatively high speed over grassed country to extinguish a fire already burning or to burn a fire break, as it travels.

An object of the invention is to locate the air conduit, in such a position that it will not obstruct the passage of the vehicle through gateways and other relatively narrow spaces, and to so support the air conduit that it may be angularly adjusted and moved to direct the air flow to either side of the vehicle without difficulty, as and when required.

In attaining the above stated principal objective and according to the invention, fire extinguishing and break burning apparatus in association with a power driven vehicle comprises a blower mounted on the vehicle, an engine drive-connected to the blower, an air conduit extending from the blower to the front of the vehicle at least one discharge nozzle connected with the conduit, and igniting devices arranged for firing grass as the vehicle travels.

The air conduit is partly flexible to permit of raising, lowering and turning movements to accommodate the discharge nozzles to the height of the burning grass to be extinguished, as it has been found that in order to effec-

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tively put out burning long grass, the air current must be directed thereon at an angle of from thirty to forty five degrees from a height of approximately two feet, while for extinguishing short grass a lower elevation is preferable.

In achieving the above recited object and according to the invention, the air conduit is extended forwardly from the blower over the roof of the cabin of the vehicle and is supported for raising and lowering movements, angular movements, and lateral movements from side to side.

More specifically, the air conduit is supported by a frame extending from the tray to the front bumper bar of the vehicle, and the air conduit is prolonged forwardly for a required distance from the front of the vehicle, the front end of the conduit terminating in a downwardly directed bend comprising the outlet from which the air flow is discharged.

The frame is pivotally supported upon the tray, and lifting mechanism is provided for angularly moving the frame about the pivotal support thereof so as to raise and lower the forward extension.

The air conduit is movably supported upon the forward end of the frame, so as to be moved from side to side of the latter to direct the air flow to either side of the vehicle, and the downward bend or outlet is angularly movable in a vertical plane so as to permit the angle of the air flow to be adjusted relatively to the surface of the ground.

A practical exemplary construction of apparatus in accordance with the invention for extinguishing grass fires and burning firebreaks is depicted in the accompanying drawings.

In these drawings:

Fig. 1 is a side elevation of the fire extinguishing section of the apparatus mounted upon a motor vehicle, the latter being shown in outline.

Fig. 2 is a plan of the fire extinguishing section illustrated in Fig. 1.

Figs. 3 and 4 are respectively a side elevation and a plan of a break burning attachment for connection with the fire extinguishing section of the apparatus illustrated by Figs. 1 and 2.

Figs. 5 and 6 are respectively a side elevation and a plan of a modified break burning attachment for connection with the fire extinguishing section.

Fig. 7 is a fragmentary detail of a part of the fire extinguishing section.

Referring to these drawings in more detail, the numeral 1 designates generally a motor truck having mounted upon the tray 1b thereof a centrifugal blower 2 of required capacity which is drive-connected with a suitable engine or power plant 3.

Upon the outlet of the blower 2 there is mounted a bend 4 which is directed forwardly as shown.

Connected to the outlet of the swivel bend 4 is an air tube or conduit indicated generally by 5 having a flexible section or portion 5a constructed of canvas or the like, which as illustrated in Figs. 1 and 2 is connected with a rigid section 5b of metal tubing extending forwardly over the cabin 1c of the truck.

At the forward end the air tube section 5b is connected through a tapering tubular member 6 with a downwardly extended bend 7 with which is connected a straight depending tubular portion 8 comprising the air discharge nozzle or outlet.

In the bends 4 and 7 there are fitted air splitters or vanes (not shown) which improve the efficiency of the air flow in passing around the bends.

Also mounted upon the tray of the truck is a container or tank 9 for water which by a pump 10 driven by the motor 3, is drawn from the tank 9 through an inlet

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pipe 9a and discharged through a flexible tube 11 to a metallic tube 12 connected at the front terminal end with a discharge nozzle 13. A manually operable valve (not shown) is provided in the tube 12 whereby the water supply may be cut off when not required.

The air tube 5 comprised of the bend 4, flexible section 5a, rigid section 5b, connecting piece 6, bend 7 and depending tubular portion 8 is supported partly upon the blower 2, but mainly upon the tube 12, with which the air tube is connected by supports 14.

The air tube 5 and the water tube 12 are carried by a frame 15, preferably constructed of bent metal tubing and comprising lateral sections 16 disposed on opposite sides of the truck in parallel alignment, rear upright portions or members 17 and front downwardly extended portions or members 19.

The frame 15 comprised of bent tubing as above described is supported at the rear end by hinged connections 20 secured to the truck tray 1b, and at the forward end is pivotally connected by pins 21 to sleeves 22 slidable upwardly and downwardly upon upright lateral members 23 of a transversely disposed frame hinged at 24 to and supported by the front bumper bar 1a of the truck.

Extending between and secured at the ends to the front members 19 of the tubular frame 15 are horizontally disposed rails 25 upon the lower of which is mounted a roller 26 which through brackets 27 supports the metal water supply tube 12 and therewith the forward sections of the air tube 5.

Positioned transversely between and secured to the rear upright members 17 of the tubular frame 15, are angle brackets 28, which midway between the members 17 carry a pivot pin 29 to which is hingedly connected by lugs 30 an open frame 31 supporting at the upper end bearings 32 wherein the water tube 12 is rotatably supported.

Secured to the rotatable water tube 12 is a sector gear 33 with which is meshed a pinion 34 carried by a shaft 34a rotatably mounted in the open frame 31 and having secured thereto a handwheel 35 whereby the pinion 34 may be rotated to angularly move the sector gear 33 and therewith the tube 12.

It will be apparent that by means of the handwheel 35, pinion 34, sector gear 33, and rotatable water tube 12, the air tube 5 may be rotatably adjusted from the normal position wherein the air discharge nozzle 8 is vertically disposed as shown in Fig. 1, into positions wherein the nozzle 8 is inclined to either side, so that the outflowing air current may be directed laterally to either side of the truck in a downwardly sloping direction as required.

Extending between and welded to the upright frame members 17, is a bracing member 36 which comprises a support for bearings 37 in which are rotatably mounted shafts 38 having secured thereto winding drums 39 and handwheels 40.

Fixed at opposite ends to one of the brackets 27 carrying the roller 26, is a cable 41 which passes around guide pulleys 42 and 43 supported by the lateral frame sections 16, to and around the winding drums 39.

It will be appreciated that by appropriate rotation of the handwheels 40, and drums 39, the air tube 5 and discharge nozzle 8 may be moved from side to side, the roller 26 traversing the rail 25, while the supporting water tube 12 through the medium of the open frame 31 and hinge lugs 30 swings about the pivot pin 29.

A shaft 44 extends transversely between the frame sections 16, and is rotatably supported in bearings secured to the latter. Upon the shaft 44 there are secured winding drums 45 to which are fixed one end of each of two cables 46 which pass around guide pulleys 47 rotatably mounted on extensions of the pivot pins 21 previously described, and are secured at the opposite ends to lugs 48 on the upper ends of the upright members 23.

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Secured to the shaft 44 are handwheels 49, and it will be evident that upon appropriate rotation of the latter and the winding drums 45, the portions or loops of the cables extending between the winding drums and the lugs 48 may be shortened or lengthened to respectively raise or lower the front members 19 of the frame 15, which as a whole together with the open frame 31, water tube 12, air tube 5 and the air discharge nozzle 8, is angularly moved about the hinge connections 20 by shortening or lengthening the loops of the cables 46.

It will be appreciated that the air tube 5 and the nozzle 8 may be raised and lowered, set at a required elevation, and traversed from side to side by manipulation of the hand wheels 44 and 40 respectively, and that the downwardly directed nozzle or outlet 8 may be readily set to discharge air vertically upon the ground or at any required angle, not generally exceeding 45 degrees, to the ground on either side of the vertical position by manipulation of the handwheel 35.

The several movements of the air tube described, are permitted by the flexible or canvas portions 5a of the air tube and the flexible water tube 11 as will be readily understood.

Alternatively, to the manually operated handwheels 35, 50 and 44, there may be employed hydraulic means under manually operable valvular control for performing the functions of the handwheels, thus cylinders fitted with rams actuated by a suitable hydraulic pump may be used if necessary or preferred.

In extinguishing a grass fire with the apparatus above described, the vehicle 1 is driven along the front of the fire and air and water spray are directed upon the burning grass from the discharge nozzles 8 and 13 under control of operatives who move the air tube or conduit 5 as required by adjustment of the handwheels or hydraulic mechanism above described whereby the several movements of the air tube are effected.

The fire extinguishing apparatus above described may also be used for burning fire breaks in calm or mild weather, and for this purpose an attachment carrying ignition means is provided in advance of the truck 1 for the purpose of igniting the grass which is burnt to make the fire break as the truck travels. Burning grass at the edges of the fire break is extinguished by the air and water spray discharged from the nozzles 8 and 13.

Referring now to Figs. 3 and 4, a frame 50 is pivotally supported upon hinges 51 secured to one of the upright frame members 19.

Upon the frame 50 there is mounted a flame thrower 52 which may be of well known commercial type and is supplied with fuel under pressure from a container (not shown) on the truck by way of a pipe 53 carried within a tubular support 54 fixed to the frame 50.

The frame 50 may be angularly moved upon the hinges 51 to direct the flame thrower as required by a rod 55 extended to and manually operable from the truck tray.

Also mounted on the frame 50 is a water spray 56 which by a pipe 57 is connected with the pump 10.

The flame thrower 52 is carried at a considerable distance in advance of the vehicle 1, and the burning material ignited thereby is extinguished by the air and water blast discharged by the nozzles 8 and 13 as said nozzles in advancing become level with the burning grass. Water from the spray 56 is used to wet the grass and thereby hold the fire in check or prevent it spreading until subjected to the air and water blast.

In a modified firebreak burning attachment shown in Figs. 5 and 6, for the fire extinguishing apparatus previously described, there is utilised a blow-lamp type of burner 58 for liquid fuel which is supported in advance of the truck 1.

This modified attachment comprises a pair of tubular arms 59 and 60 which are pivoted upon hinge connections 61 secured to the front bumper bar 1a of the truck and pivotally connected together by a hinge connection

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62 fixed to the forward or leading end of the arm 60.

The arms 59 and 60 project forwardly in advance of the bumper bar 1a and are supported at the leading ends by a castor wheel 63, the swivel shank 64 of which is rotatable in a bracket 65 secured to the arm 60.

The arm 59 comprises two sections 59a, 59b connected by a sleeve 59c, whereby the overall length of the arm may be increased or diminished to adjust the angular setting of the two arms in relation to the bumper bar 1a, and accordingly vary the transverse location of the blowlamp 58 at the front of the truck, as will be readily understood.

The blowlamp 58 is disposed within a semicylindrical shield 66 which is longitudinally adjustable on the arm 60 and together with the burner 58 may be secured in required positions thereon so as to be nearer to or further from the bumper bar 1a, by clamping screws 67.

A water spray 68 for extinguishing burning grass when required, is provided at the leading end of the arm 60 and is connected by a pipe 69 with the pump 10, while the burner 58 is connected by a pipe 70 with the fuel container on the truck tray.

In order to burn a firebreak, the flame thrower 52 or the blowlamp 58 is ignited and the flames therefrom are directed upon the grass which is burnt as the truck travels.

The flame thrower 52 and the blowlamp 58 may be used separately, but in order to provide a wider burn the former and the latter may be used in conjunction.

Both the frame 50 carrying the flame thrower 52 and the arms 59 and 60 carrying the blowlamp 58 may be folded up alongside the frame 15 when out of use. The hinge connections 61 of the arms 59 and 60 are of universal type to permit of horizontal angular movement in relation to the bumper bar 1a as previously described and angular movement in a vertical plane for folding against the frame 15.

In order that the arms 59 and 60 may be readily raised and lowered, a cable 60a operable from the truck 1 is connected to the arm 60 at 60b near the forward end thereof, see Figs. 5 and 6.

The burning grass at the edges of the firebreak is extinguished by the air blast and water spray issuing from the nozzles 8 and 13.

In order that the air nozzle 8 may discharge air at moderate velocity to spread the flames in burning a firebreak and a concentrated blast to extinguish a fire, there is provided an additional flared nozzle 71, see Fig. 7, which may be fitted on the nozzle 8, and is provided with air splitters 72 and 73, the former providing an air current at moderate velocity and the latter the concentrated air blast.

I claim:

1. An apparatus for extinguishing grass fires and burning firebreaks in open grass country, comprising an automotive vehicle, a power driven blower, a receptacle for water and a container for liquid fuel on the automotive vehicle, igniting means mounted upon and in advance of the vehicle and connected with the liquid fuel container to ignite herbage material as the vehicle travels, air discharging means mounted upon the vehicle and extending to a location rearwardly of the igniting means, said air discharging means being connected to the blower and operable to direct a strong current of air upon the burning herbage material to extinguish it, water spraying means mounted upon the vehicle at a location to the rear of the air discharging means, and means connecting said water spraying means to the water receptacle so that said water spraying means operates to quench smouldering residue of the herbage material.

2. An apparatus for extinguishing grass fires and burning firebreaks in open grass country, comprising an automotive vehicle, a power driven blower, a receptacle for water and a container for liquid fuel on the automotive vehicle, at least one liquid fuel burner mounted upon and in advance of the vehicle and connected with the

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liquid fuel container to ignite herbage material as the vehicle travels, a downwardly directed air discharge nozzle mounted upon the vehicle at a location rearwardly of the liquid fuel burner, said air discharge nozzle being

5 connected to the blower and operable to discharge a strong air current upon the burning herbage material to extinguish it, at least one water spraying jet mounted upon the vehicle at a location to the rear of the air discharge nozzle, and means connecting said jet to the water container so that said jet operates to quench smouldering residue of the herbage material.

3. An apparatus for extinguishing grass fires and burning firebreaks in open grass country, comprising an automotive vehicle, a power driven blower, a receptacle for water and a container for liquid fuel on the automotive vehicle, at least one liquid fuel burner mounted upon and in advance of the vehicle and connected with the liquid fuel container to ignite herbage material as the vehicle travels, a movable downwardly directed air discharge nozzle mounted on the vehicle at a location rearwardly of the liquid fuel burner, said air discharge nozzle being connected to said blower and operable to discharge a strong air current upon the burning herbage material to extinguish it, means for angularly moving the air discharge nozzle to vary the inclination of the air current with respect to the ground surface, means for displacing the air nozzle transversely to discharge the air current at either side of the vehicle, means for raising and lowering the air nozzle to conform with the height of the herbage to be burnt, at least one water spraying jet mounted on the vehicle at a location to the rear of the air discharging nozzle, means connecting said jet to the water receptacle so that the jet operates to quench smouldering residue of the herbage material.

4. An apparatus for extinguishing grass fires and burning fire breaks in open grass country, comprising an automotive vehicle, a power driven blower at the rear end of the automotive vehicle, a receptacle for water and a container for liquid fuel on the vehicle, igniting means mounted upon and in advance of the vehicle and connected with the liquid fuel container to ignite herbage material as the vehicle travels, a movable air discharge nozzle mounted upon the vehicle in a normal upright central position at a location rearwardly of the igniting means a flexible longitudinally disposed tubular conduit connecting said air discharge nozzle to said blower so that said nozzle is operable to direct a strong current of air upon the burning herbage material to extinguish it, means for angularly moving the air discharge nozzle to either side of the normal central position to vary the direction and inclination of the air current to the ground surface, means for moving the air nozzle bodily from the normal central position to discharge the air current at either side of the vehicle, means for raising and lowering the air discharge nozzle to conform with the height of the herbage material, and at least one water spraying jet mounted on the vehicle at a location to the rear of the air discharge nozzle, means connecting said jet to the water receptacle so that the jet operates to quench smouldering residue of the herbage material not extinguished by the strong air current.

5. An apparatus for extinguishing grass fires and burning fire breaks in open grass country, comprising an automotive vehicle, a power driven blower at the rear end of the automotive vehicle, a receptacle for water and a container for liquid fuel on the vehicle, igniting means mounted upon and in advance of the vehicle and connected with the liquid fuel container to ignite herbage material as the vehicle travels, a movable air discharge nozzle mounted upon the vehicle in a normal upright central position at a location rearwardly of the igniting means, a flexible longitudinally disposed tubular conduit connecting said nozzle to said blower so that the nozzle operates to direct a strong current of air upon the burning herbage material to extinguish it, a longitudinal frame

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pivotaly mounted on the vehicle and supporting the air discharge nozzle and angularly movable upwardly and downwardly to vertically adjust the air discharge nozzle to conform with the height of the herbage material, a longitudinally disposed rotatable member supported by the longitudinal frame and carrying the air discharge nozzle for angularly adjusting said nozzle between said normal upright position and sloping positions on either side of the upright position to vary the direction and inclination of the air current with respect to the ground surface, an upright pivotal support connecting the rotatable member to the rear of the longitudinal frame, a transverse rail at the front end of the longitudinal frame, a roller supporting the rotatable member and the air discharge nozzle upon the transverse rail, manually operable means for angularly moving the rotatable member about the upright pivotal support to displace the air nozzle transversely to deliver the air current at either side of the vehicle, and water spraying means positioned at the rear of and movable with the air discharge nozzle, means connecting said water spraying means to said water receptacle so that said spraying means operates to quench smouldering residue of the herbage material not extinguished by the strong air current.

6. An apparatus for extinguishing grass fires and burning firebreaks in open grass country, comprising a motor truck, a driver's cabin on the motor truck, a tray on the motor truck at the rear of the driver's cabin, a power driven blower mounted upon and at the rear end of the tray, a receptacle for water and a container for liquid fuel on the tray, igniting means mounted upon and in advance of the vehicle and connected with the liquid fuel container to ignite herbage material as the truck travels, a movable downwardly extended air discharge nozzle at the front of the truck normally disposed in a central position rearwardly of the igniting means, means connecting said blower to said nozzle so that the latter operates to direct a strong current of air upon the burning herbage material to extinguish it, said connecting means including an upturned outlet on the blower, a forwardly directed tubular bend secured to the upturned outlet, a flexible tubular air conduit extending longitudinally above the truck cabin and connecting the tubular bend with the downwardly extended air discharge nozzle, a longitudinal tubular frame pivotaly mounted at the rear end upon a transverse axis rearwardly of the truck cabin and supporting the air discharge nozzle, said longitudinal tubular frame being angularly movable to raise and lower said nozzle to conform with variations in height of the herbage material, said tubular frame including a pair of forwardly extended members positioned above and at opposite sides of the driver's cabin, a pair of upright members pivotaly supported at the lower ends upon the front end of the motor truck, downward extensions of said pair of forwardly extended members being slidably connected with and supported by the upright members, said downward extensions and upright members supporting the forward end of the longitudinal frame, a longitudinally disposed tubular member carrying the air discharge nozzle and supported upon the longitudinal frame for angular movement of the air discharge nozzle in either direction from the normal position to deliver the air current at variable inclinations to the ground surface, a transverse rail extending between and secured to the

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downwardly extended members, means defining an upright axis pivotaly supporting the rear end of the tubular member and the flexible conduit upon the rear of the tubular frame, a carriage supporting the tubular member and the air discharge nozzle upon the transverse rail and permitting angular bodily movement of the air discharge nozzle about the upright axis to deliver the air current at either side of the motor truck, at least one water spraying jet positioned at the rear of and movable with the air discharge nozzle, and means connecting said water receptacle to said jet so that the latter operates to quench smouldering residue of the herbage material not extinguished by the strong air current.

7. An apparatus as claimed in claim 6, further comprising means for angularly raising and lowering the tubular frame including a shaft disposed transversely to and rotatably supported by said frame, hand wheels secured to the shaft, winding drums on the shaft, sleeves carried by the frame and slidable on the upright members, guide pulleys rotatably supported on the sleeves, and cables passed about the guide pulleys and secured at the ends respectively to the winding drums and the upper ends of the upright members.

8. An apparatus as claimed in claim 6, further comprising means for angularly moving the tubular member and the forwardly extended air conduit and discharge nozzle about the upright axis, the last mentioned means including shafts rotatably supported on the rear end of the frame, winding drums and hand wheels secured to the shaft, guide pulleys rotatably supported by the longitudinal tubular frame, and a cable secured at the ends to the carriage and extending about the winding drums and the guide pulleys.

9. An apparatus as claimed in claim 6, wherein the longitudinally disposed tubular member is journaled in bearings in an open frame pivotaly connected to the rear end of the longitudinal tubular frame, and means for rotating the tubular member comprising a toothed sector secured to said member, a shaft rotatably mounted in the open frame, a hand wheel secured to the shaft, and a pinion on the shaft meshed with the toothed sector.

10. An apparatus as claimed in claim 6, wherein said means connecting the jet to the water receptacle includes the longitudinally disposed tubular member, flexible tubing connecting the rear end of said longitudinally disposed tubular member with a power driven water pump supplied from said water receptacle on the tray of the truck, said tubular member at its forward end being connected with the water spraying jet.

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