April 3, 1934. J. ARMSTRONG 1,953,331

FOREST FIRE FIGHTING APPARATUS

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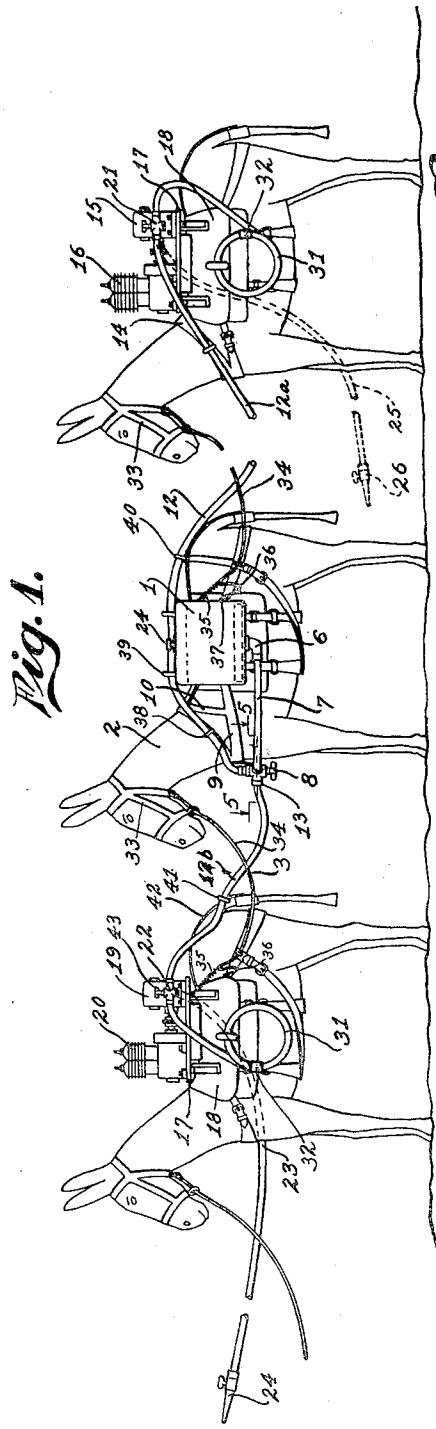

Fig. 1.

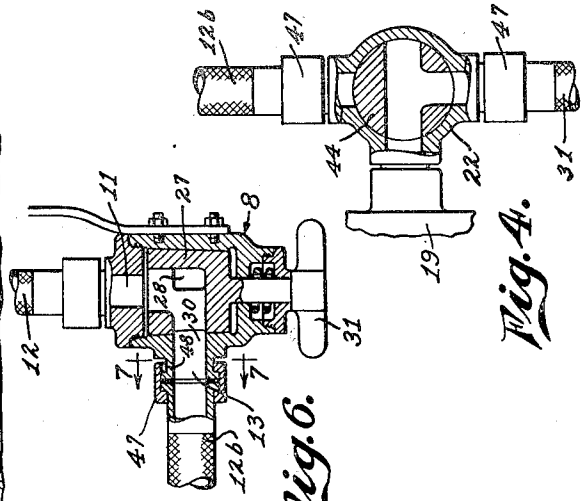

Fig. 4.

Fig. 6.

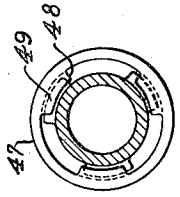

Fig. 7.

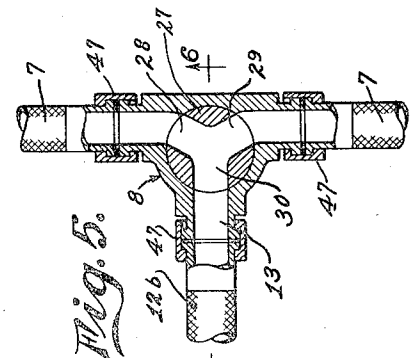

Fig. 5.

Inventor
James Armstrong

By Lyon & Lyon

Attorneys

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Fig. 8.

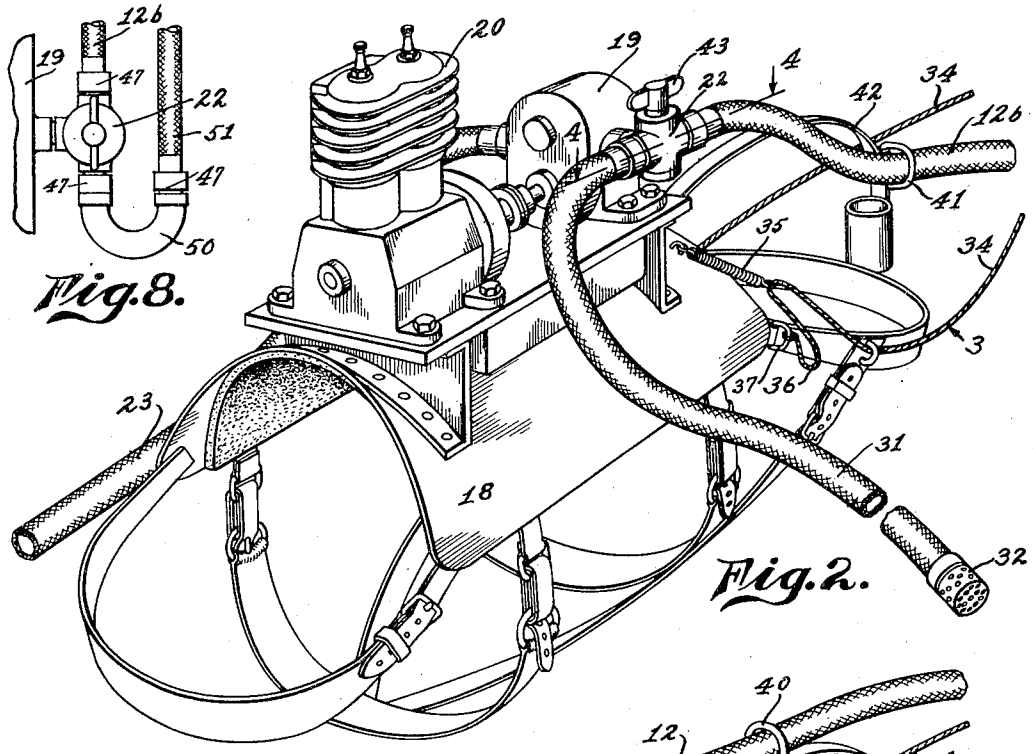

Fig. 2.

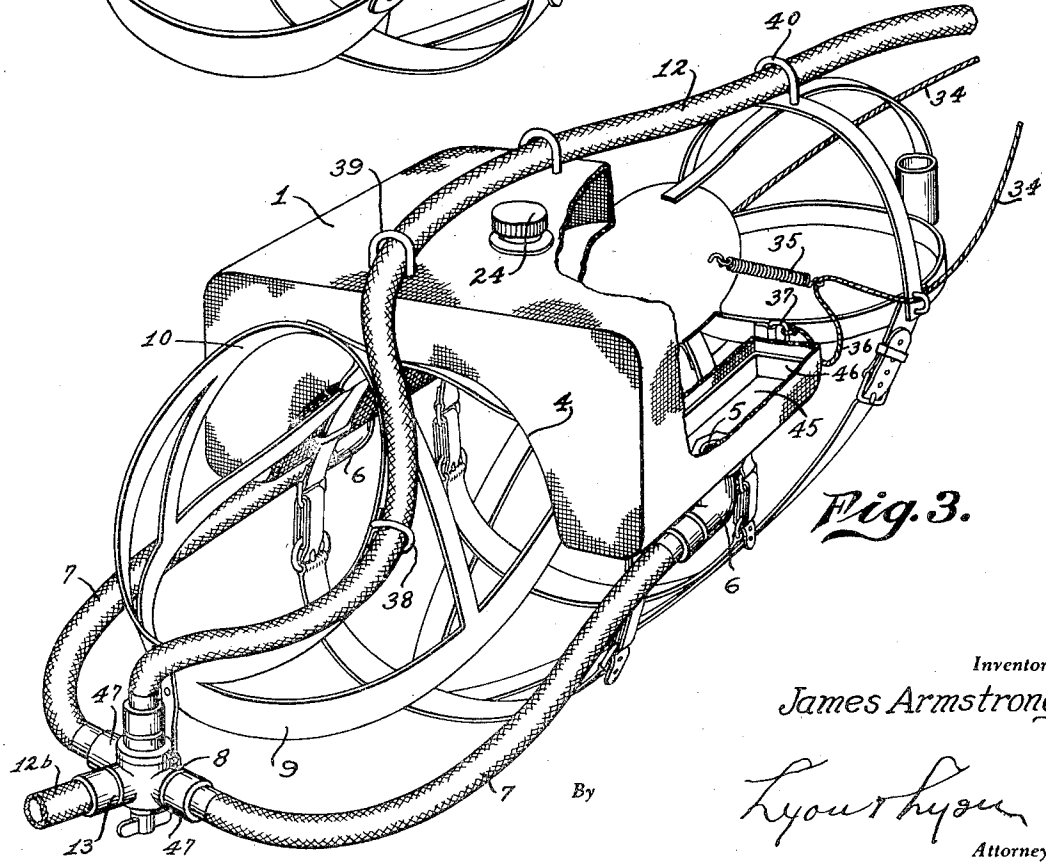

Fig. 3.

Inventor
James Armstrong

By Lyon & Lyon

Attorneys

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FOREST FIRE FIGHTING APPARATUS

James Armstrong, Los Angeles, Calif.

Application November 10, 1931, Serial No. 574,113

5 Claims. (Cl. 169—2)

This invention relates to fire fighting apparatus, and particularly to apparatus of this kind used in fighting forest fires.

The yearly losses from forest fires in the United States are enormous and at the present time there seems to be no effective method of fighting such fires. Resort is had to back firing, but this method itself results in destroying a considerable forest area.

One of the principal difficulties in fighting forest fires by ordinary methods, using water, is due to the difficult topography and to the fact that there are usually no roads available to bring fire fighting apparatus close to the fire.

A general object of this invention is to provide fire fighting apparatus which will enable a quantity of water to be readily brought to the fire and projected onto it.

In its preferred form, the invention involves the use of pack animals in a train for carrying the water or other means to be employed to extinguish the fire, and one of the objects of the invention is to provide means for enabling the water carried by all of the animals in the train to be available regardless of whether the pack train is located on a slope or on level ground.

According to the invention, a liquid employed for extinguishing the fires is carried in reservoirs on pack animals, and one of the objects of the invention is to provide simple means for supplying this water to projecting apparatus at either end of the pack train for throwing the water toward the fire.

Further objects of the invention will appear hereinafter.

The invention consists of novel parts and combinations of parts to be described hereinafter, all of which contribute to produce an efficient forest fire fighting apparatus.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawings—

Figure 1 is a side elevation indicating a pack train carrying my fire fighting apparatus;

Figure 2 is a perspective of a liquid projecting apparatus to be carried by one of the pack animals, and further illustrating details of the hitching means for connecting the animals into a train; this view also illustrates a hose connection for enabling the reservoirs of the pack animals to be filled; too, this view illustrates a harness associated with this apparatus;

Figure 3 is a perspective of one of the reservoirs, and illustrating the hose connections and harness; a portion of this view is broken away to further illustrate the construction;

Figure 4 is a horizontal section taken about on the line 4—4 of Figure 2, and further illustrating a valve employed in connection with the water projecting apparatus or pump;

Figure 5 is a horizontal section taken about on the line 5—5 of Figure 1, and further illustrating the details of the hose connections to the reservoir of the pack animals;

Figure 6 is a vertical section taken about on the line 6—6 of Figure 5, and further illustrating details of the valve for connecting up the hose to the pack animals;

Figure 7 is a vertical section taken on the line 7—7 of Figure 6, and illustrating a quick, detachable coupling which I prefer to use with this apparatus;

Figure 8 is a fragmentary view illustrating a connection which should be employed at the projecting apparatus or pump for enabling a second train of fire fighting apparatus to be connected up before the water of a similar apparatus has become exhausted, thereby providing a continuous supply to the pump.

Referring more particularly to the parts and particularly to Figure 1, the apparatus includes a plurality of reservoirs such as the reservoir 1, carried on a number of pack animals such as the animal 2, and the animals carrying these reservoirs would constitute most of the train of animals which would be connected together by hitching apparatus 3 to form a train. These animals are preferably mules or horses. Each reservoir 1 is mounted on a saddle or formed as a saddle as indicated in Figure 3. In this figure, the reservoir is formed on its under side with a deep recess 4 extending upwardly which enables the reservoir to be applied as a saddle to the animal's back. These reservoirs are formed of water-tight collapsible material such as rubberized duck or canvas. At the lowest points on each saddle, an outlet 5 is formed and at each outlet an elbow connection 6 is provided for the attachment of a section of hose 7 which extends forwardly at each side of the animal and so as to connect near the animal's breast to a four-way valve or cock 8 that is supported from a breast strap 9 of the harness 10. The four-way valve 8 is preferably constructed as indicated in Figure 6. It has an upper outlet 11 at which hose section 12 is connected which leads back over the reservoir 1 to the next following animal, at which point this hose 12 would be connected to an inlet 13 on the forward

side of the corresponding valve 8 of the next following animal in the train.

As illustrated in Figure 1, the last hose section corresponding to the hose section 12 is indicated by the numeral 12*a*, and this hose section is supported on the harness 14 of the last animal in the train, and is connected to liquid projecting apparatus, for example a water pump 15, which is directly connected to a motor such as a gas engine 16. This motor and pump are supported on a base plate 17 carried on a saddle 18 secured on the last animal of the train.

At the forward end of the train, similar water projecting apparatus is provided which may include a pump 19 driven by motor 20, and similar to the apparatus illustrated on the last animal of the train. The hose 12*a* connects to the suction side of the pump 15 through a suitable valve 21 which will be described more in detail hereinafter. From the forward side of the breast valve 8 of the second animal in the train, the hose 12*b* extends forwardly and attaches to the suction side of the pump 19 through a valve 22 which is similar to the valve 21. From the delivery side of the pump 19, a fire hose 23 extends forwardly being provided at its forward end with a fire nozzle 24 for projecting a stream of water toward the fire. Each saddle reservoir 1 is provided on its upper side with a filling opening with a removable cap 24 which can be removed to enable the reservoirs on the pack animals to be refilled.

From the delivery side of the pump 15, a fire hose indicated by the dotted lines 25 is detachably connected. This hose 25 may be provided with its own fire nozzle 26, or, if desired, it may consist of a hose extending forwardly to be connected with the rear end of the hose 23. This arrangement is adopted so as to enable either one of the pumps 15 or 19 to be used at will to flight the fire. In this connection, it should be explained that the grade of the ground on which the train is located is of considerable importance. If a single pump is employed at the forward end of a train and the pack animals near the rear end of the train are more than 34 feet below the level of the pump of course the water in the lowest reservoirs would not flow up to the pump. This places a limit on the amount of water that is available to a forwardly located pump, and for this reason I provide a pump on the last animal of the train and this pump will be used in a situation where the train is on an up grade with the fire located beyond the front animal in the train. With this arrangement, the water will readily run down from all the reservoirs to the rear pump enabling the water to be supplied to the fire through the hose connection 25 and the nozzle 26 or through a connection to the front hose 23.

Each four-way valve preferably includes a rotatable plug 27 (see Figures 5 and 6) which has two side ports 28 and 29 which connect respectively to the side hose 7 and the plug includes a forwardly disposed port 30 that connects to the inlet 13. By rotating the plug more or less by means of its handle 31, the ports 28 and 29 can be controlled so as to regulate the effective area of opening from each reservoir into the hose connections 12 or 12*b*.

In order to enable the reservoirs to be filled at a water supply, I provide a hose 31 (see Figure 1) which is connected to the suction side of corresponding pumps 15 and 19, and this hose 31 is provided with a suction inlet or screen 32 (see Figure 2) which can be immersed in water so as to enable the corresponding pump to raise water from the water supply and deliver it through the delivery hose of the pump. The fire nozzles 24 and 26 can be handled by the men in filling the tanks or reservoirs.

Each of the pack animals carries a halter 33 with two hitching straps or ropes 34 that extend forwardly, and these halter ropes can be attached, if desired, directly to the harness of the animal in advance, but I prefer to use a hitch that includes a spring 35 (see Figure 1), which, if pulled upon will tend to pull the animal forwardly although giving the animal a certain amount of "rope" through the medium of a slack loop 36 in the halter rope, the end of the rope being secured at 37 on the harness.

The hose 12 is passed up at one side of the animal through a guide 38 on the side of the animal's neck, secured to the harness, and from this point passes back through guide 39 on the upper side of the reservoir. From this point, the hose passes rearwardly and through a guide 40 on the harness over the animal's rump.

The hose 12*b* that passes up to the forward pump 19, may, if desired, be supported on a guide 41 carried on a tail strap 42 that passes down from the harness of the foremost animal of the train.

The valves 21 and 22 are each provided with a handle 43 for rotating the plug 44 of the valve (see Figure 4). This view shows the valve set for taking in water through the supply hose 31 to deliver water to the pump when filling the reservoir or saddle bags.

The caps 24 on the reservoirs should be airtight, and as the water is withdrawn from the tanks they collapse due to the exterior atmospheric pressure. In order to facilitate connecting the elbows 6 to the bottoms of the tanks or reservoirs, these reservoirs are preferably provided with metal bottoms 45 (see Figure 3), and, if desired, these bottoms may have edge flanges 46 inside of the fabric walls of the reservoir.

The couplings employed throughout the apparatus are quick, detachable couplings, preferably of the type illustrated in Figure 7. In this type of coupling, one of the coupling members, for example the outer coupling member 47 (see Figure 6), is provided with inwardly projecting lugs 48 that pass between corresponding lugs 49 on the inner coupling member. After the lugs pass each other, the outer coupling member 47 is rotated, thereby drawing the coupling up tight. This type of coupling is well known in this art.

In order to provide for using relay pack trains of animals carrying water reservoirs, I prefer to provide a detachable connection or goose neck 50 (see Figure 8) which can be attached to the suction side of the valves 21 or 22. A pack train can then be brought up and a hose 51 supplying water from its reservoirs may be attached to the goose neck 50, and the valve 22 can then be set in the position indicated in Figure 4 so as to close its other inlet, thereby enabling the hose 12*b* to be disconnected. In this way, the pack train being used can be released to enable it to be led down to the water supply to refill its tanks. The relief pack train may carry with it the pump which is not being used in the train to enable this pump to be used to refill the tanks or reservoirs on the pack animals.

In using the apparatus to fight a fire, the pump is employed which is at the lowest end of the train in case the animals are not on level ground. As the water flows from the reservoirs, they, of course, collapse, due to atmospheric pressure, and

this insures flow of the water to either of the pumps that is being used at the time.

It will be noted that by carrying the hose sections 12 over the backs of the pack animals, I keep the weight on the animals disposed nearly centrally and this is most advantageous where the animals must pass on rough trails or over ground where the footing is not good.

Of course, the quantity of water which can be carried by each pack animal is limited by the strength of the animal, but a mule could carry safely about two hundred fifty (250) pounds. This would give a capacity of over a ton of water for a pack train of ten (10) mules, which would not be an unusually long pack train.

The fact that the reservoirs are of collapsible material makes it unnecessary to use inlet valves for letting air into them after the water is drawn off. In other words, these reservoirs are closed and air-tight and when the water is being drawn off the air pressure on the exterior of the bags assists in expelling the water from them.

I do not limit myself to any particular type of projecting apparatus for throwing a stream of water toward the fire. For the purpose of illustration in this specification, I have described a pump to perform this function.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and I do not wish to be limited in the practice of my invention, nor in my claims, to the particular embodiment set forth.

What I claim is:

1. In forest fire fighting apparatus, the combination of a plurality of saddles for pack animals, hitching apparatus for hitching the animals into a train, water projecting apparatus carried on the saddle that is located at one end of the train, water projecting apparatus carried on the saddle that is located at the other end of the train, reservoirs for the water carried on the animals, hose having branch connections leading from the reservoirs for supplying water from the reservoirs to either of the water projecting apparatuses, and a hose with a fire nozzle and having a connection for connecting the hose to either of the water projecting apparatuses.

2. In forest fire fighting apparatus, the combination of a plurality of saddles for pack animals, hitching apparatus for hitching the animals into a train, water projecting apparatus carried on one of the saddles adjacent the forward end of the train, water projecting apparatus carried on one of the saddles adjacent the rear end of the train, water reservoirs carried on other of said saddles, and hose connections from the reservoir to supply water from the reservoirs to either of said projecting apparatuses, and fire hose connections with a fire nozzle, for throwing water from one of the water projecting apparatus while the other water projecting apparatus is employed for filling empty reservoirs.

3. In forest fire fighting apparatus, the combination of a plurality of saddles for pack animals, a pump carried on one of the saddles, a plurality of airtight closed, and collapsible, water reservoirs carried on others of said saddles, said reservoirs each having an outlet at each side with a hose connection to correspond to each outlet, and hose connections for connecting said first-named hose connections to the suction side of the pump, said collapsible water reservoirs operating to collapse under atmospheric pressure and cooperating to maintain flow of water from them to the pump.

4. In forest fire fighting apparatus, the combination of a plurality of saddles for pack animals, a pump carried on one of the saddles, a plurality of airtight collapsible water reservoirs carried on other of the said saddles, hose connections from the reservoirs to the suction side of the pump, and a fire hose with a fire nozzle leading from the water projecting apparatus, said collapsible water reservoirs operating to collapse under atmospheric pressure and cooperating to maintain flow of water from them to the pump.

5. In forest fire fighting apparatus, the combination of a plurality of saddles for pack animals, water projecting apparatus including a pump carried on one of the saddles, and water reservoirs in the form of closed airtight flexible saddle bags carried on other of said saddles, and connected to the suction side of the pump, means for hitching the animals together in a train, hose connections from the reservoirs to the water projecting apparatus, and a hose with a fire nozzle leading from the water projecting apparatus, the external atmospheric pressure on said bags operating to collapse them as the water is drawn off and force the water in them to the pump.

JAMES ARMSTRONG.