Oct. 17, 1939. C. J. SCUDDER 2,176,454

CONTROL VALVE

Filed March 5, 1938 2 Sheets-Sheet 1

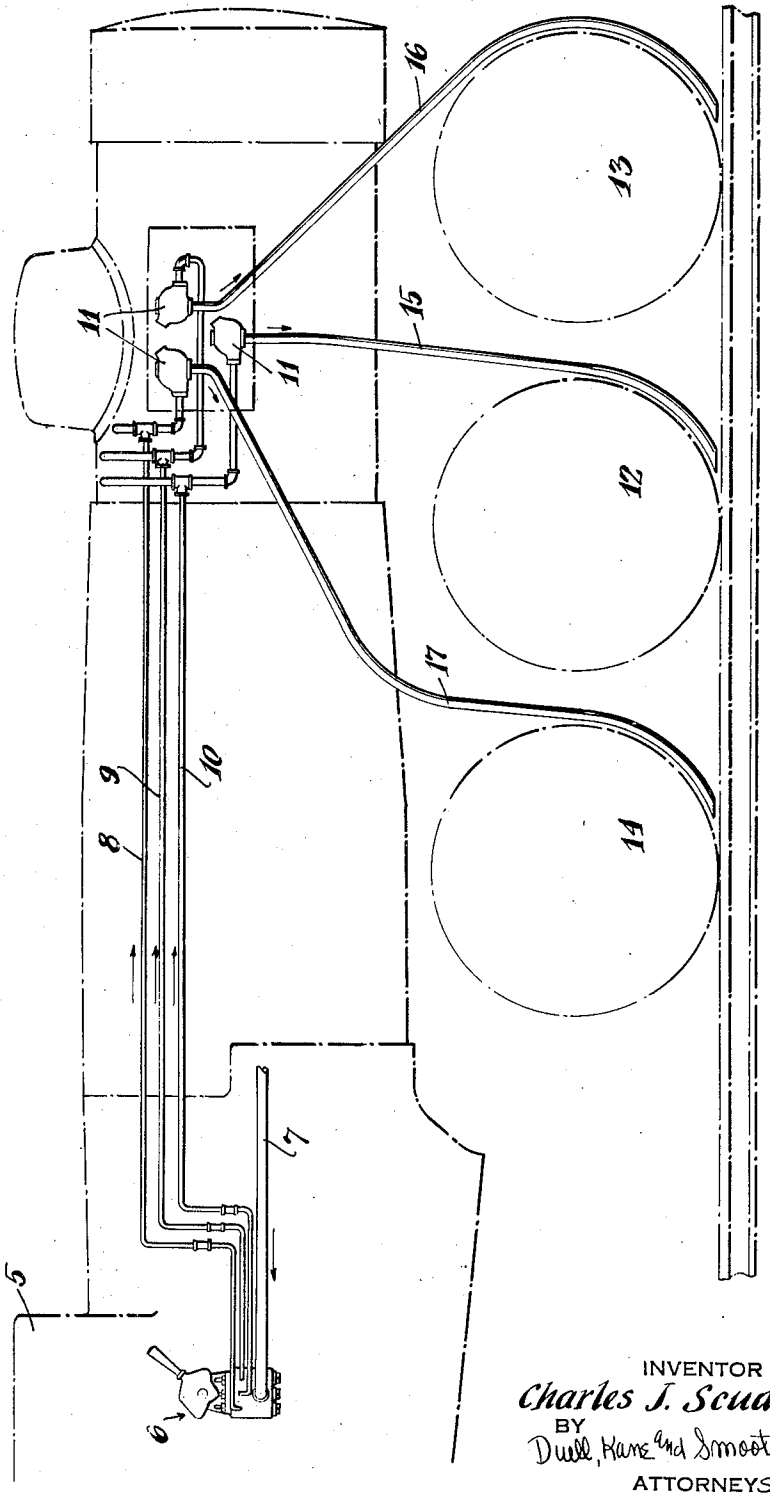


Fig. 1

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Fig. 2

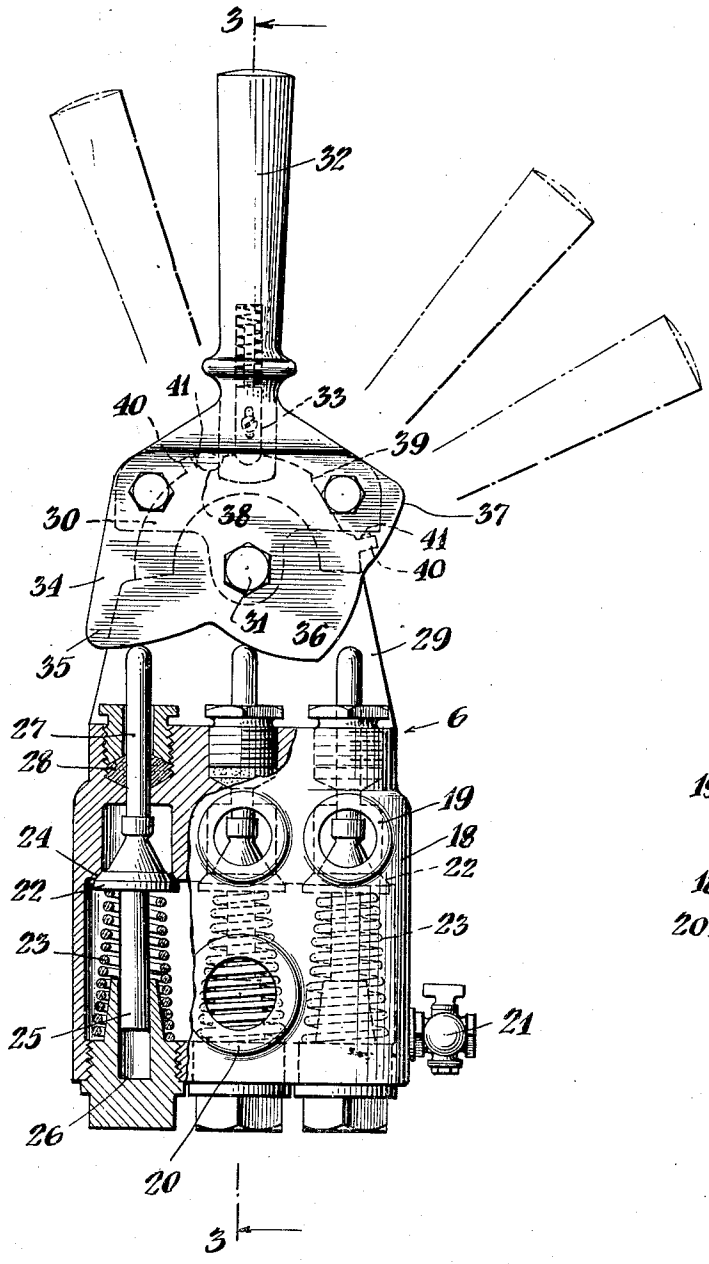
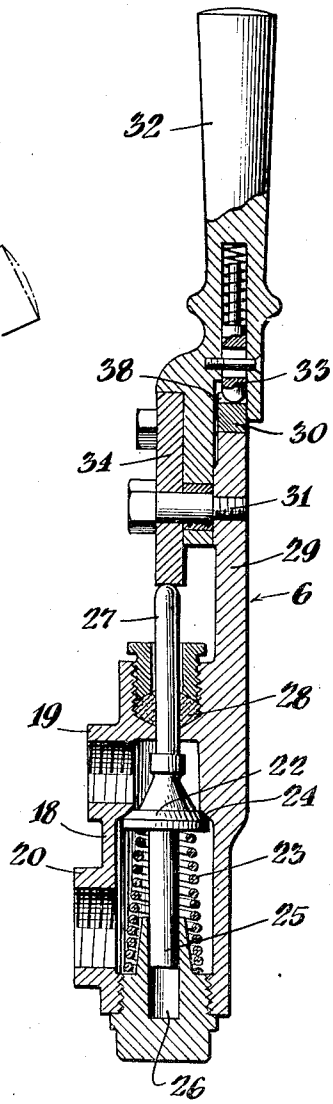


Fig. 3



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CONTROL VALVE

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2 Claims. (Cl. 291—16)

This invention relates to a structurally and functionally improved control valve and in its more specific aspects aims to provide an apparatus of this character particularly intended for use in controlling the sanding apparatus of a locomotive.

It is an object of the invention to furnish a unit of this type which may readily be operated by an engineman so that during unfavorable weather conditions sand or its equivalent may be properly distributed ahead of the main driving wheels to provide the desired protection.

A further object is that of furnishing a mechanism of this type which—when unusual conditions occur—may be operated to supply sand to any desired number of additional driving wheels so that the proper adhesion of the locomotive to the rails will be obtained.

A still further object is that of designing a control valve of the type aforementioned and which, to a maximum extent, will prevent continued and unnecessary application of sand in advance of the forward driving wheels tc eliminate slipping, and which, when the locomotive is travelling at high speed, tends to result in bent side rods, loose tires, loose wheel fits and other damage. In this manner the fallibility of human operation is guarded against insofar as this is practicable, it being noted, however, that—as afore brought out—the engineman will have within his control the distribution of as much sand or equivalent as may in his judgment be necessary.

An additional object is that of furnishing a unit of this type which will embody a relatively simple design, capable of being manufactured at nominal cost and which may be operated by an ordinarily skilled person over long periods of time with freedom from all difficulties.

With these and other objects in mind, reference is had to the attached sheets of drawings, illustrating one practical embodiment of the invention, and in which:

Fig. 1 is a fragmentary side elevation of a locomotive and shows the control valve and sanding apparatus in association therewith;

Fig. 2 is a particularly sectional side elevation showing the interior construction of the control, and

Fig. 3 is a transverse sectional view taken along the lines 3—3 and in the direction of the arrows of Fig. 2.

In these views and for the sake of simplicity, a locomotive has been illustrated with three pairs of driving wheels. Likewise, provision for sanding has been made to these three pairs of wheels. At this time it is to be understood that this illustration has been resorted to for the sake of simplicity and that the invention might, with facility, be adapted to locomotives having a different number of driving wheels and that a sanding provision might be made in juxtaposition to all of these wheels, or to as many as might be most desirable.

Thus referring primarily to Fig. 1, the numeral 5 indicates the engineer's cab within which the control unit—generally indicated at 6—is positioned. Extending to this unit is a pipe 7 connected to a source of compressed air (not shown) and extending from the unit or pipes 8, 9 and 10 which are coupled one to each of the sand traps 11. As afore brought out, the locomotive illustrated has pairs of main, front, and rear driving wheels respectively indicated at 12, 13 and 14, and sand pipes 15, 16, and 17, extending in operative relationship with respect to these wheels. These pipes connect to the traps indicated at 11, and it is obvious that when operative, sand will be distributed through the pipes 15, 16 and 17, so that the necessary adhesion and control may be provided for.

Now, referring to Figs. 2 and 3 in which the control 6 has been indicated in detail, it will be noted that the numeral 18 indicates a casing provided with a plurality of outlets 19 respectively coupled to pipes 8, 9 and 10. This casing is also furnished with an inlet opening 20 to be coupled to pipe 7 and may be furnished with a petcock 21 so that the casing may be drained of any condensate.

Disposed within the casing are valves corresponding in number to the number of traps employed. These valves may be of any desired construction, but preferably, as shown, are of the poppet type, and include bodies 22 which under the urging of springs 23 normally seat against casing portions 24. These valves are guided by being provided with lower stems 25 riding within guide sockets 26 and upper stems 27 which extend through packing assemblies 28 and beyond the main body of the casing. Accordingly, stems 27 not alone serve as guides, but by depressing any of them the corresponding valve 22 may be unseated.

A bracket or extension 29 may project beyond the casing 18 and present in its upper edge a quadrant portion 30. Pivotally mounted as at 31 and preferably in line with the stem of the central valve is a control handle 32 which may be recessed to accommodate a spring pressed

latch pin 33 riding in engagement with the quadrant 30. This handle mounts a cam 34 having projecting portions 35, 36 and 37 which operate respectively the left, central and right hand valves as viewed in Figs. 1 and 2. Having in mind that only three sand traps and valves are employed, only three of these operative portions have been included in the cam body, and with the same thought in mind the quadrant 30 is formed with only three notches. One of these indicated at 38 is occupied by the latch pin 33 when the latter is in neutral position. Another indicated at 39 is occupied by the pin when the control handle is in a partially forward position. The rod, as indicated at 40, receives the latch pin when handle 32 is moved to a reverse or left hand position as viewed in Fig. 2. It will also be observed that the quadrant may mount stop members 41 which will limit movements of the control handle to a proper zone.

In operation it will, of course, be assumed that a source of compressed air supply causes pressure to exist within pipe 7 and hence below the valve bodies 22, and that sand is provided. Now, with the handle 32 in the positions shown in Figs. 2 and 3, all three valves will be closed and no sand or its equivalent will be delivered to points adjacent the driving wheels. However, should an engineman, for the purpose of providing for proper adhesion and control of the locomotive, desire to supply sand to the main driving wheels, he may do so by simply shifting the control of handle 32 to the partially forward position indicated in the first dot-and-dash lines to the right of the center in Fig. 2. This will result in cam portion 36 depressing the upper stem of the central valve. Thereupon air will be free to flow from pipe 7 through pipe 10, thus causing sand to be delivered in advance of the main driving wheels of the locomotive. In such a position the latch pin 33 will occupy the notch 39 and consequently the engineman may devote his attention to other matters and the sanding operation will continue. However, should unusual conditions be encountered requiring additional sand to be delivered, for example, in advance of the front driving wheels, the engineman, by advancing the control handle 32 fully to the extreme position indicated in dot-and-dash lines in the right hand side of Fig. 2, will cause the central valve to be maintained in open position, and will additionally cause the operating portion 37 to contact the stem of the right valve as viewed in Fig. 2. Consequently, in addition to air flowing through pipe 10, air will be caused to flow through the trap connected to pipes 9 and 16. As a consequence sand will be delivered in advance of the front wheels.

However, it will be necessary for the engineman to maintain his hand on the control handle 32 in order to continue such a condition. This is because no notch is provided to receive the latch pin under these conditions and the spring associated with the right hand valve will constantly tend to throw the control handle to a position at which the pin again bears against the inner edge of notch 39, under which circumstances sand would be delivered only to the main drive wheels. It is apparent that the control of any desired number of valves, as afore brought out, might follow the same principle. In any event, however, it is apparent that by the construction proposed, sand is not applied to the front wheels until the main drive wheels are sanded. Consequently the likelihood of damage to the wheels, running gear, etc., is avoided.

It is of course obvious that with the control handle 32 moved to its rear or left hand position as viewed in Fig. 2, air is supplied to the rear pair of driving wheels, or if the locomotive is "backing-up" the sand so distributed will be applied in advance of the main driving wheels. Again, in this position, the inner edge of notch 40 will serve to maintain the control so that the engineman may devote his attention to other matters.

Thus, among others, the several objects of the invention as afore noted are achieved. Obviously, numerous changes in construction and rearrangement of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A control valve to be employed in connection with a locomotive for distributing sand in advance of the driving wheels of the same, said valve including a quadrant, a handle pivotally secured to said quadrant, a body portion forming a part of said handle and to move adjacent the edge of said quadrant, a spring-pressed element forming a part of said body and urged toward said edge, said edge presenting notches to receive said element and retain said body and handle in predetermined positions, cam portions forming a part of said body, a pair of valves and a third valve, stems forming a part of said valves and contractible with said cam portions, said cam portions being formed to contact the second stem of said pair and the third successively, springs associated with said valves whereby said stems in cooperation with said cam portions will normally tend to move said body to a position such that all of said valves are closed, said element in cooperation with said notches maintaining said handle in a position where either of said pair of valves may remain open, said handle being manually shiftable and maintainable in a position such that said cam portions will first open the second of said pair of valves and then the third and retain the second of said pair of valves and the third valve in open positions, all of said valves being connectible to sanding apparatus, said pair of valves being adapted to control the flow of abrasive to the main and rear driving wheels of the locomotive, and said third valve being adapted to control such flow to the front driving wheels of the locomotive.

2. A control valve to be employed in connection with a locomotive for distributing sand in advance of the driving wheels of the same, said valve including a quadrant, a handle pivotally secured to said quadrant, a body portion forming a part of said handle and to move adjacent the edge of said quadrant, a spring-pressed element forming a part of said body and urged toward said edge, said edge presenting notches to receive said element and retain said body and handle in predetermined positions, cam portions forming a part of said body, a pair of valves and a third valve, stems forming a part of said valves and contactible with said cam portions, said cam portions being formed to contact the second stem of said pair and third successively, springs associated with said valves whereby said stems in cooperation with said cam portions will normally tend to move said body to a position such that all of said valves are closed, said element in cooperation with said

notches maintaining said handle in a position where either of said pair of valves may remain open, said handle being manually shiftable and maintainable in a position such that said cam portions will first open the second of said pair of valves and then the third and retain the second of said pair of valves and the third valve in open positions, all of said valves being connectible to sanding apparatus, said pair of valves being adapted to control the flow of abrasive to the main and rear driving wheels of the locomotive, and said third valve being adapted to control such flow to the front driving wheels of the locomotive, a casing enclosing said pair and third valve and formed with outlets individual to said valves, and an inlet common to all of said valves.

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