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LOG CONVEYING

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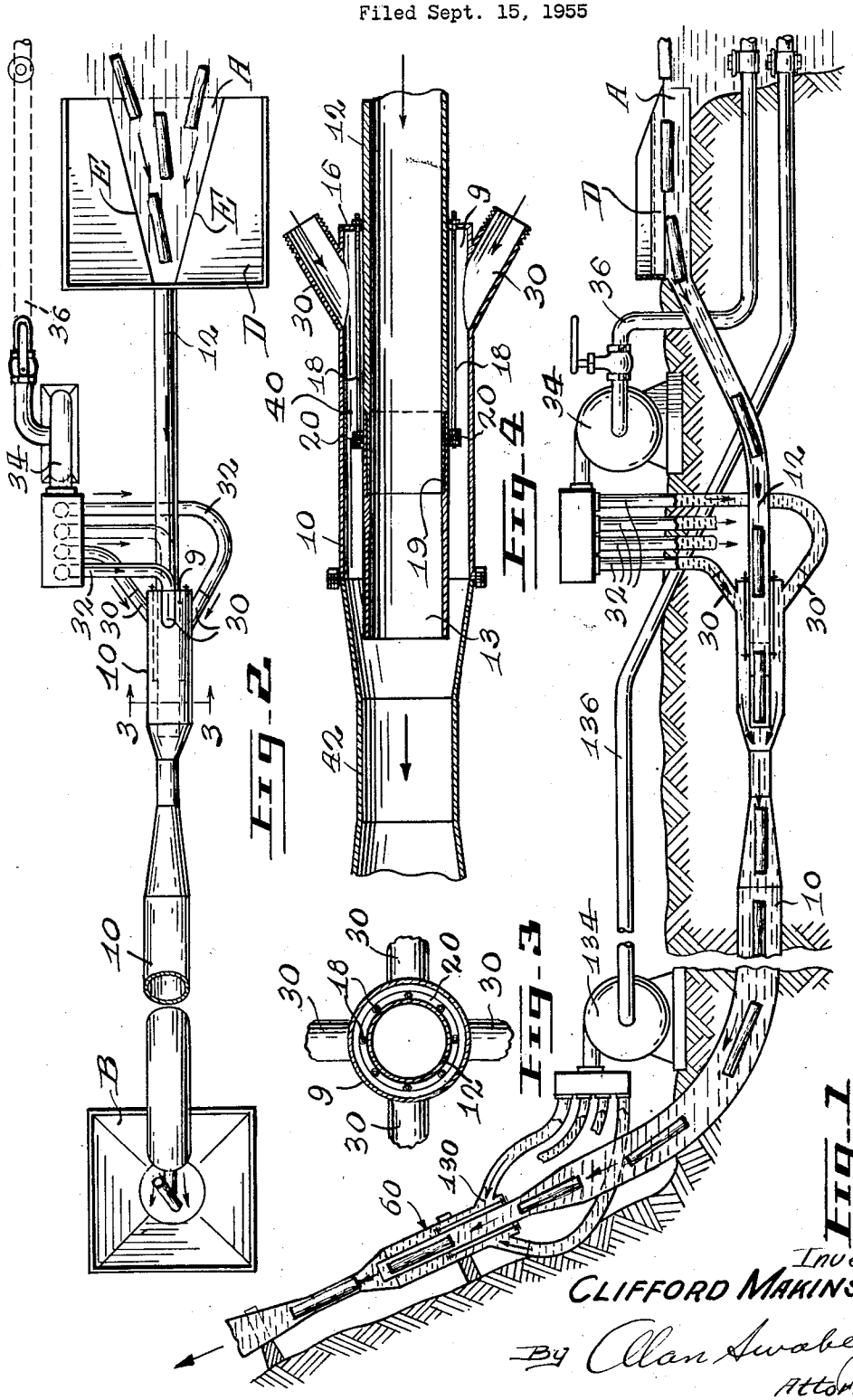


Fig. 1

Fig. 2

Fig. 3

Fig. 4

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LOG CONVEYING

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8 Claims. (Cl. 302—14)

This invention relates to a method of conveying logs.

Logs often have to be conveyed over considerable distances (hundreds of yards to miles), from a basin to which they float from the cutting area, to a terminal, for example, a mill. Sometimes they have to be carried over hills.

There are various ways in which this can be done. Carrying them by rail or by road requires picking them out of the basin, loading and subsequently unloading.

The use of sluices is usually restricted to locations where the logs are to be conveyed from a higher to a lower level since a considerable head and quantity of water is necessary for their function. Further, the building and subsequent maintenance of sluices over long distances is a time consuming and costly procedure.

The applicant has devised hydraulic means by which logs can be conveyed from a basin to a terminal whether or not they have to be carried uphill at some stage.

The applicant's method involves the steps of, creating an enclosed stream of a dimension sufficient to accommodate the diameter of the logs to be conveyed, injecting water in a jet into the stream at a point close to the basin, and preferably at booster points along the stream so as to create a continuous log carrying flow, and causing logs to enter the stream at an intake and to leave it at a terminus remote from the intake. The portions of the stream adjacent the initial loading jet and also at each booster point are constricted so as to add to the speed of the stream flow and also to prevent backwash and surges. This is an important feature in the operation of the present system.

A preferred apparatus for carrying out this method includes a conduit or pipe line which leads from a collecting point for the logs to a terminus. The preferred internal diameter of the main conduit is such that it will accommodate logs varying in diameter from about 6" to about 12" or standard pulp logs. The collecting point may be a basin to which the logs are driven and in which a platform is preferably provided including a deck for the logger and confining means forming a channel for receiving the logs and directing them to the entrance of the conduit.

At a point not far from the collecting point, the conduit is provided with means for creating a forced flow of the stream so as to draw the logs into the entry end of the conduit and to subsequently carry them along the interior of the conduit. This is accomplished by a venturi type flow accelerator which, in the preferred construction, comprises a first log inlet conduit forming a part of the main conduit and having one end leading directly to the collecting point and the other end fitting concentrically within an enlargement of the main conduit. A header carrying obliquely placed jet nozzles is mounted around the end of the conduit enlargement and a pump supplies water under high pressure through these nozzles in the direction of flow into the cylindrical space between the conduit enlargement and the log inlet conduit. The

portion of the main conduit directly in front of the terminal end of the log entry conduit is reduced and then gradually tapers outwardly to the maximum diameter presenting a venturi effect increasing the speed of the stream.

A feature of the present invention resides in the preferred arrangement of the inner end of the log entry conduit relative to the flow increasing apparatus described. The attachment between the inner end of the log entry conduit and main conduit enlargement is adjustable so that the length of log entry conduit fitting within the main conduit, and consequently the relative spacing between the inner terminal end and the reduced portion of the main conduit, can be varied to achieve the maximum efficiency of the flow accelerator and to accommodate logs of varying lengths.

Preferably, similar flow accelerating arrangements are provided at booster points along the pipe line pressured by the same or auxiliary pumping means.

This apparatus is operated by feeding in logs at the collecting point to the log entry conduit. The logs are taken up in the stream created by the jets and are projected through the pipe line at a speed depending on the force of the jets, the contour of the pipe line, friction and other factors.

This application is a continuation-in-part of application, Serial No. 501,377, filed April 14, 1955.

The invention will now be described in more detail by reference to the accompanying drawings, which show a preferred embodiment and in which:

Figure 1 is a side elevational view partially in section showing diagrammatically the log conveying apparatus of the invention in operation.

Figure 2 is a view in plan showing the log entry end of the apparatus and the log discharge end.

Figure 3 is a sectional view of the structure shown in Figure 2 along the line 3—3 to show the relative spacing between the terminal end of the log entry conduit, the main conduit, and the adjustable bolts retaining the end of the log entry conduit in position.

Figure 4 is an enlarged longitudinal sectional view of the flow accelerating arrangement.

This preferred form of the device will now be described by detailed reference to the drawings.

In the diagrammatic showing of the drawings, A represents a basin from which the logs are to be conveyed to a remote terminal point, for example, a dumping chute indicated at B in Figure 2. A main conduit or pipe line **10** extends from the basin A to the terminal point B. The conduit **10** has an internal diameter sufficient to accommodate the diameter of the logs to be carried but not sufficiently great to allow the logs to twist or turn to any great degree transverse to the stream.

An intake platform D is provided in the basin A constituting a collecting point for the logs. The platform D preferably includes converging walls E with the narrow end leading directly to the mouth of a log entry conduit **12**.

In the construction shown, the log entry conduit **12** leads downwards to a connection with the main conduit **10** at a point relatively close to the basin A and means for creating an induced flow of water into the conduit **12** and a forced flow through the main conduit are provided at this point. It will be understood that the locations of the conduits **10**, **12** shown are illustrative only by way of an example and that the pipe line can take on any contour or location depending on the terrain.

With particular reference to Figures 1 and 4, the log entry conduit **12** is fitted concentrically within an end portion **9** of the main conduit **10** and is provided with a terminal portion **13** which is adjustably retained in posi-

tion by a plurality of bolts 18 which extend from an end flange 16 of the main conduit portion 9 to flanges 20 secured to the terminal portion 13 of the conduit 12. The mating end of the portion 13 slidably fits over the reduced end 19 of the conduit 12.

A plurality of jet nozzles 30 are connected obliquely into the end portion 9 of the main conduit 10 and each nozzle 30 is connected by conduits 32 to a pump 34. The pump 34 draws water from the basin "A" through a conduit 36 and discharges the water at high pressure through the nozzles 30 into the space 40 between the inner end of the conduit 12 and the conduit 10. The conduit 10 converges into a reduced portion 42 adjacent the location of the terminal end of the conduit 12 and then diverges back to its usual diameter, as shown in Figure 4. This configuration with the pressurized flow from the nozzles 30 induces and accelerates the flow of water through the log entry conduit 12 carrying the logs down and through the conduit 12 into the main conduit 10. Upon passing the terminal end of the conduit 12 the logs flow directly into the accelerated stream created by the nozzles 30 and venturi type formation of the conduit 10.

As will be appreciated, the relative position of the end portion 13 and the convergence of the conduit 10 influence the characteristics of flow acceleration at this point. Accordingly, adjustments can be made by means of the bolts 18 to achieve the desired flow characteristics or to accommodate various lengths of logs.

Similar arrangements can be inserted along the length of the main conduit 10 where necessary, for example, as shown, a flow accelerating arrangement 60 having nozzles 130 and a pump 134 drawing water through a conduit 136 from the basin "A" provides supplementary pressure and acceleration to the stream flow as the conduit 10 passes up a rise in the contour of the terrain.

To prime the log entry conduit 12, water flows in at the inlet end adjacent the basin "A" and gravitates through to this main conduit 10. The pump 34 then operates to cause high pressure jets to be projected into the conduit 10. This, together with the venturi arrangement described, causes an accelerated flow of water through conduit 12, through the uphill portion of the conduit 10, and thence to succeeding portions of the pipe line and subsequently to the terminal. This flow may be boosted at intervals by additional nozzles and further pumps in the manner shown and as required by the job ahead.

The venturi throat arrangement of the conduit 10 also prevents back pressure, and stabilizes the flow. The same action takes place at the booster points, for example, as shown in Figure 1.

When the flow has been established as described, the logger feeds logs one at a time into the log entry conduit 12. The logs are immediately taken up one by one and carried through the conduit 10 and eventually reach the terminal B. As previously mentioned, the pipe line is large enough in diameter to take the logs comfortably but not large enough to allow them to straddle the pipe line sideways so as to jam.

It will be understood, that the size of the conduit and the order of the pressure employed and other quantitative factors will have to be adjusted to the particular job at hand. The applicant prefers the following dimensions. Where the pipe is a 20 inch pipe which would be used with a 12 inch log for example, the venturi would be about 16 inches. Where the pipe is 30 inches which would be about the largest pipe employed, the venturi would be preferably around 20 inches. Generally speaking, therefore, the venturi throat should narrow down to about 3/5 to about 4/5 of the diameter of the pipe proper.

I claim:

1. An apparatus for conveying logs, comprising in combination an elongated conduit extending from a water containing log collection basin to a remote terminus, said conduit having an internal diameter sufficiently greater than the diameter of the logs to accommodate lengthwise passage only of said logs therethrough, an extension of said conduit having one end leading directly from said log collection point with the other end fitting concentrically within the main conduit, adjustable retaining means between said main conduit and said conduit extension end whereby the length of said extension fitting within said main conduit may be varied, a header surrounding said conduit adjacent the juncture between said main conduit and conduit extension and a plurality of jet nozzles leading obliquely from said header into the interior of said conduit between the inner surface of said conduit and the outer surface of said conduit extension end, a pump connected to said jet nozzles for delivering water under high pressure through said nozzles, a venturi throat in said main conduit in advance of the inner terminal end of said conduit extension, whereby a stream of water from said log collecting basin is inducted into said conduit extension and accelerated by said pressurized water injection and venturi throat to constitute a continuous stream adapted to draw logs into said conduit extension and convey them through said conduit from said log collection basin to said terminus.

2. An apparatus as claimed in claim 1 wherein supplementary headers and pressure nozzles are provided and connected into said conduit at points remote from said first pressurized water injection and a venturi throat and adjustable conduit extension is provided in said conduit at each supplementary water injection point whereby said stream flow is maintained along the length of said conduit regardless of the contour followed by said conduit.

3. An apparatus according to claim 1 in which there is provided at the entrance to the conduit, means forming a passage of decreasing width to concentrate the logs and to allow one at a time to enter the conduit extension.

4. An apparatus according to claim 1 in which the venturi throat has a diameter within the range from about 3/5 to about 4/5 of the diameter of the conduit.

5. An apparatus for conveying logs, comprising in combination an elongated conduit extending from a water containing log collection basin to a remote terminus, said conduit having an internal diameter sufficiently greater than the diameter of the logs to accommodate lengthwise passage only of said logs therethrough, an extension of said conduit having one end leading directly from said log collection point with the other end fitting concentrically within the main conduit, and adjustable retaining means between said main conduit and said conduit extension end whereby the length of said extension fitting within said main conduit may be varied, a header surrounding said conduit adjacent the juncture between said main conduit and conduit extension and at least one jet nozzle leading obliquely from said header into the interior of said conduit between the inner surface of said conduit and the outer surface of said conduit extension end, a pump connected to said jet nozzle for delivering water under high pressure through said nozzle, a venturi throat in said main conduit in advance of the inner terminal end of said conduit extension, whereby a stream of water from said log collecting basin is inducted into said conduit extension and accelerated by said pressurized water injection and venturi throat to constitute a continuous stream adapted to draw logs into said conduit extension and convey them through said conduit from said log collection basin to said terminus.

6. An apparatus as claimed in claim 5, wherein supplementary headers and pressure nozzles are provided and connected into said conduit at points remote from said first pressurized water injection and a venturi throat and adjustable conduit extension is provided in said conduit at each supplementary water injection point whereby said stream flow is maintained along the length of said conduit regardless of the contour followed by said conduit.

7. An apparatus according to claim 5, in which there

is provided at the entrance to the conduit, means forming a passage of decreasing width to concentrate the logs and to allow one at a time to enter the conduit extension.

8. An apparatus according to claim 5, in which the venturi throat has a diameter within the range from about ⅗ to about ⅘ of the diameter of the conduit.

References Cited in the file of this patent

UNITED STATES PATENTS

368,691	See	Aug. 23, 1887
1,116,971	Barber	Nov. 10, 1914
2,019,968	Holloway	Nov. 5, 1935