

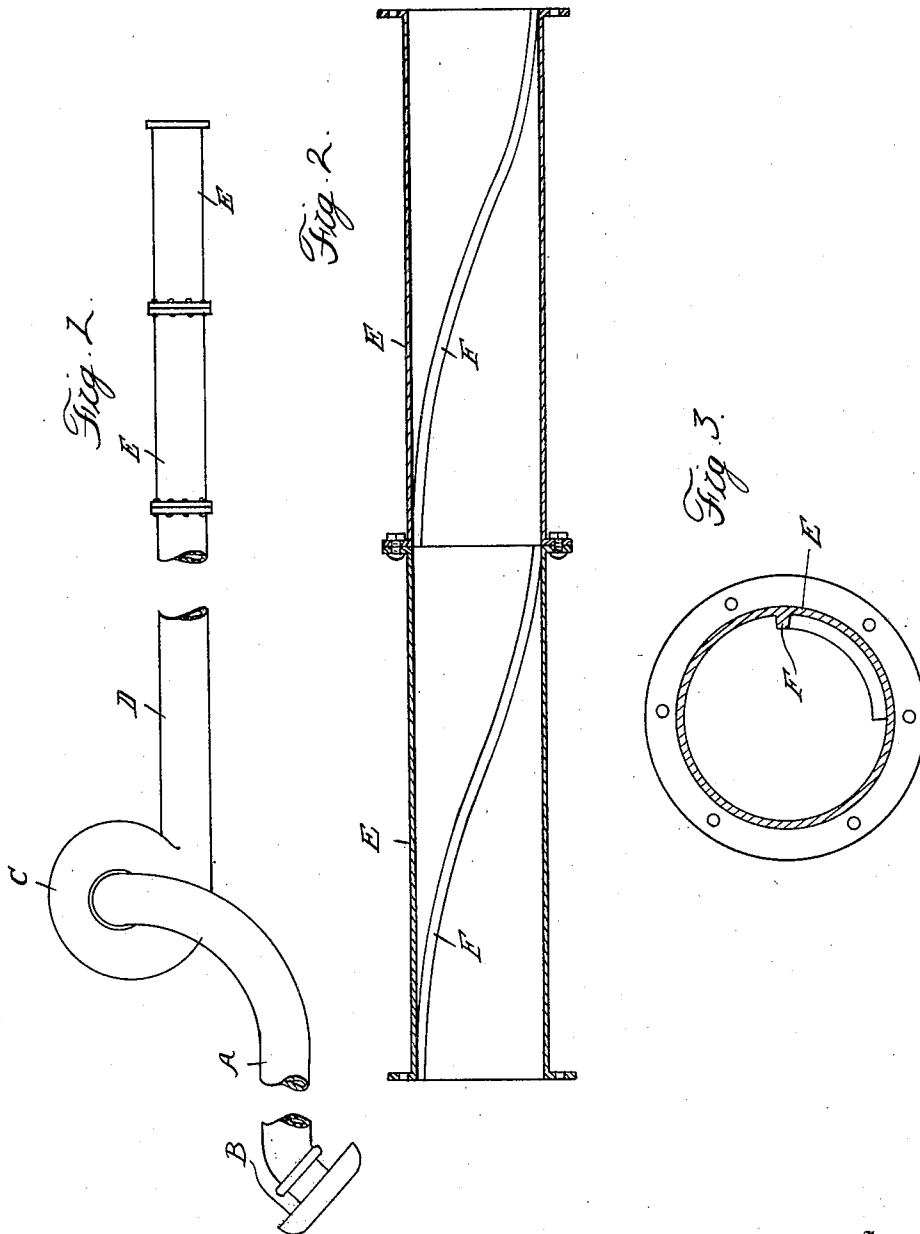
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HYDRAULIC SAND CONVEYER

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UNITED STATES PATENT OFFICE.

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HYDRAULIC SAND CONVEYER.

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The invention relates to apparatus for hydraulically conveying sand and gravel, such material being first drawn in through a suction conduit and then conveyed through a discharge conduit to the point of delivery. In the present state of the art apparatus of this character may be successfully used for the conveying of the sand and gravel a certain distance from the source of supply, but where this distance is increased there will be a tendency for the material to drop out of suspension. This results in increased friction and the slowing of the current so as to impose practical limits to the length of conduit that can be successfully used.

It is the object of the invention to obtain a construction by means of which a greatly increased length of conduit can be used without the objectionable results above referred to. To this end the invention consists in providing the conveyer conduit with means for preventing the falling out of the material and more specifically with means for imparting a rotational movement to the outer portion of the flowing stream, as hereinafter set forth.

In the drawings:

Figure 1 is a diagrammatic view of a system to which any improvements are applied;

Figure 2 is a longitudinal section through one of the conduit sections; and

Figure 3 is a cross section thereof.

A is the suction conduit of the conveyer which is provided with the usual auxiliaries, such as the pressure jets B for loosening the material drawn into the conduit by suction. C is the centrifugal pump which produces the suction, and D is the delivery conduit through which the material is conveyed to the point of discharge.

My improvement consists in applying to the delivery conduit D at certain points in its length means for imparting a rotational movement to the outer portion of the fluid column therein. This, as specifically shown, consists in introducing into the conduit D sections E, which are provided with one or more blades F extending spirally along the inner surface of the tube. These blades preferably extend inward only a short distance, so that the main body of the stream is not interfered with, but the peripheral

portion, by contact with the blade F, will be given a rotary motion which will lift any material falling out of suspension and deliver it again into the main current.

I have found by comparative tests of my improved apparatus with similar apparatus having plane conduits that the delivery distance may be very greatly increased. Thus with the same sized conduits and the same power, the distance may be increased from one to two hundred per cent, or with the same distance the power required may be correspondingly decreased.

The sections E may be arranged wherever there is a tendency for the material to fall out of suspension. Thus for a certain distance from the pump, such for instance as one thousand feet, it may be unnecessary to provide such sections and beyond this point they may be used either continuously or intermittently.

My improved construction may be used with all of the auxiliary devices which are common in this art, but I have merely illustrated the broad features of the system diagrammatically.

What I claim as my invention is:

1. In a hydraulic system for conveying material in suspension, the combination with the conveyer conduit, of an inwardly projecting spiral vane extending around the inner surface of said conduit for less than one convolution and terminating substantially at the bottom of the conduit.

2. In a hydraulic system for conveying material in suspension, the combination with the conveyer conduit, of a conduit section included therein, having an inwardly projecting spiral vane extending for less than one convolution, said vane starting substantially at the top of said conduit and terminating substantially at the bottom thereof.

3. In a hydraulic system for conveying material in suspension, the combination with the conveyer conduit, of a conduit section having an inwardly projecting spiral vane extending for substantially one-half convolution only starting at the top of said conduit and terminating at the bottom thereof.

In testimony whereof I affix my signature.

FREDERIC L. WARD.