

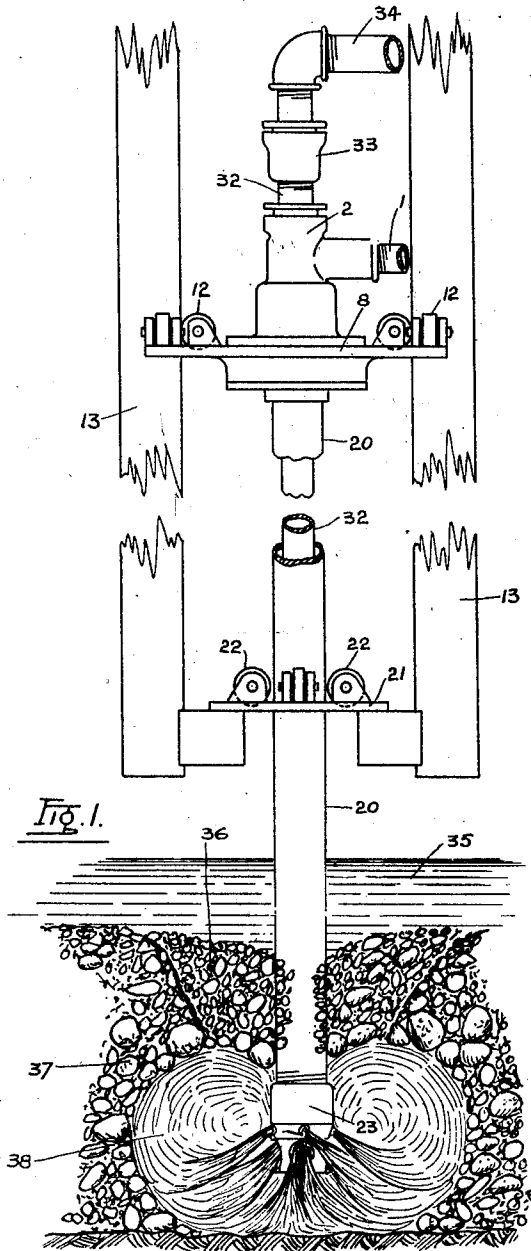
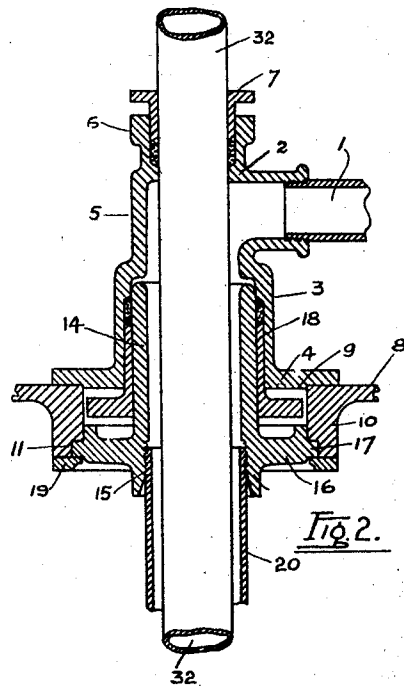
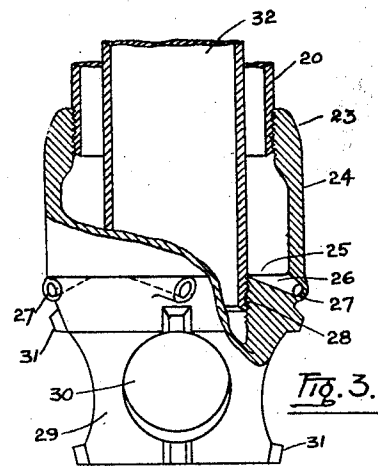
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HYDRAULIC DREDGE

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HYDRAULIC DREDGE.

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To all whom it may concern:

Be it known that I, FREDERICK AUGUSTUS ROWE, a citizen of the United States of America, and a resident of the city of Vancouver, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Hydraulic Dredges, of which the following is the specification.

My invention relates to improvements in hydraulic circulating dredges for placer mining and the drilling of test holes and the like and the object of the invention is to prevent the caving in of the dredged hole and thereby increasing the efficiency and economize working of the dredge and by forming in the water bed a pocket sealed by gravel or silt which naturally gravitates thereinto keeping the material of the dredge clear at the nozzle so as not to impede the flow of the material as it is discharged and permitting the water to travel freely to its normal level without interruption and it consists essentially of a flow pipe centrally disposed within a return pipe, and a cutting and scavenging nozzle at the bottom of the flow pipe having a discharge shoe communicating with the bottom of the return pipe as hereinafter more particularly explained.

Fig. 1 is a general view of the dredge showing the cutting and scavenging nozzle in use adjacent bedrock of a river bed.

Fig. 2 is a sectional view of the supply head.

Fig. 3 is a part sectional view of the cutting and scavenging nozzle and return pipe shoe.

In the drawings like characters of reference indicate corresponding parts in each figure.

1 represents a connection from the pump or other suitable source of water supply to the supply head 2 which head consists of a casing 3 upstanding from a circular base flange 4, the casing 3 being reduced as at 5 and having an orifice 6 at its upper end for the accommodation of the discharge pipe 32, the orifice 6 being provided with a packing gland 7 to form a watertight joint at the head of the supply head 2.

8 is a plate having a circular aperture 9 from around which depends an annular rim 10, which rim has an annular rabbet groove 11 formed at its lower extremity engaging the flange 16. Adjacent the outer edges of the plate 8 and oppositely placed is a plurality of rollers 12 suitably pivoted to the plate

to engage the sides of the vertical guides 13 to allow for vertical movement of the dredge.

14 is a sleeve with a threaded portion at its lower end as at 15 having a circular flange 16 with a tongue 17 extending from its periphery to engage the underside of the rim 10. 18 is a packing gland surrounding the sleeve 14 to ensure a tight joint between the sleeve 14 and the casing 3.

19 is a cover ring secured to rim 10 to retain the tongue 17 of the flange 16 in fixed position. 20 is the flow pipe of the dredge which is screwed into the sleeve 14 at its upper end and into the nozzle 23 at its lower end. 21 is a guide plate attached to suitable supports having rollers 22 pivotally mounted thereon to allow for the free vertical movement of the dredge. 23 represents in general the cutting and scavenging head which is shown in detail in Fig. 3 in which 24 is a body portion attached at its upper end to pipe 20. Adjacent the mid-length of the nozzle is an internal annular rim 25 on the face of which is a plurality of depressions 26 extending tangentially downwards from the inner edges, each of which terminate in a tangentially and downwardly disposed nozzle 27 extending through the wall of the body 24. The inner periphery of the rim 25 is threaded to receive the discharge pipe 32 as at 28.

The lower end of the body 24 is reduced in external diameter and is preferably formed with a longitudinal convexity, substantially as shown as at 29, the inner bore of the portion 29 being substantially similar to the bore of the return pipe 32. Disposed within the walls of the portion 29 is a plurality of apertures 30 each of which is of smaller diameter than the discharge or return pipe 32.

31 are lugs projecting from the lower portion 29 adjacent the rims of the apertures 30 for the purpose of preventing stones from being retained against the apertures through the pressure of the water entering the apertures. 32 is the return pipe which is concentrically mounted within the flow pipe 20 and is at its lower end screwed into the nozzle 23, its upper end being run through the supply head 2 and packing gland 7 of the same, and terminating in a swivel head as at 33, 34 is a connection leading from the swivel joint 33 to the outlet from the dredge. 35 represents a stream

under which the dredge is working. 36 is a sectional representation of the gap or shaft washed out from the river bed in sinking the dredge and showing the manner in which the gravel tends to cave into the dredged hole. 37 represents the undisturbed gravel and sand of the stream bed and 38 the pocket which is cut by the dredge.

Having thus described the several parts of my invention I will now briefly describe the method of operating the same.

For river dredging it will be preferred to mount the device on a scow or float erecting suitable guides 13 upon the edges of which the rollers 12 may engage. The water is forced through connection 1, flow pipe 20 and into nozzle 23 from whence it is driven tangentially downwards washing out all gravel and sand from around itself, at the same time the dredge is quickly lowered through the hole thus formed until a desired depth or bedrock is reached.

It will be apparent that in the average river bed, the thrown up gravel will soon start to fall back into the hole formed by the dredge, irrespective of the size of the hole formed or the pressure of the water used, so that the natural gravitation of the loose sand and gravel into the hole tends to form a cap and arches between the side walls and dredge pipe. On this effect taking place, the water discharged from the jets 27 continues to impinge the side walls of the hole washing the gravel loose and bringing the sand and pay dirt in its vortex to the bottom centre of the pocket, and that water together with the pay dirt, small gravel and silt is washed upwards through apertures 30 and pipe 32 to discharge connection 34 and delivered as required to sluice boxes or elsewhere.

In the use of the apparatus it is intended that the dredge shall be lowered as rapidly as operating conditions permit and that only a comparatively small quantity of water shall be delivered to the jets 27 so that the hole cut into the river bed will be relatively small to permit the caved-in material to closely surround the pipe 20 in such manner as to provide an effective seal.

It will also be noted that in view of the working pocket being virtually sealed from the river water that the several parts of the dredge and the pocket become as a unit, hence the water level in the flow pipe will be similar to that of the return pipe, making it possible to bring up pay dirt, etc., from any

depth with a small expenditure of pumping effort.

A similar mode of operation would obtain in making test holes on dry land, and in case of large stones being encountered by the downward run of the dredge, the earth from under the stones would be cut away until the stones were allowed to fall to one side to permit the dredge to continue in its downward course.

What I claim as my invention is:

1. In an hydraulic dredge, the combination with the water flow pipe and return pipe located concentrically one within the other, a head forming a chamber into which the water flow pipe is secured and leads, a nozzle into which the return pipe extends and forming the lower portion of the head having laterally directed openings and tangentially set nozzles communicating respectively with the interior of the lower head and return pipe and with the interior of the upper head and water flow pipe.

2. In an hydraulic dredge, the combination with a water flow pipe and discharge duct located concentrically one within the other, a head forming a chamber into which the water flow pipe is secured and leads, a nozzle into which the discharge duct extends formed with laterally directed openings communicating with the interior of the discharge duct and a series of tangentially set nozzles communicating with the aforementioned chamber and water flow pipe and vertical guiding means by which the device is carried.

3. A dredge comprising a cutting head provided with a hollow chamber and with a central bore leading downwardly from the bottom of the chamber to the lower end of the head, said bore having lateral inlet openings formed in the wall thereof below said chamber, a return pipe connected with the upper end of said bore, a flow pipe surrounding the return pipe and connected with the upper end of said chamber, and a plurality of outwardly directed nozzles formed in the wall of the chamber at the bottom thereof.

Dated at Vancouver, B. C. this 24th day of March, 1922.

FREDERICK AUGUSTUS ROWE.

Witnesses:

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