C. R. OLBERG.

PUMPING SYSTEM.

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1,356,554. Patented Oct. 26, 1920.

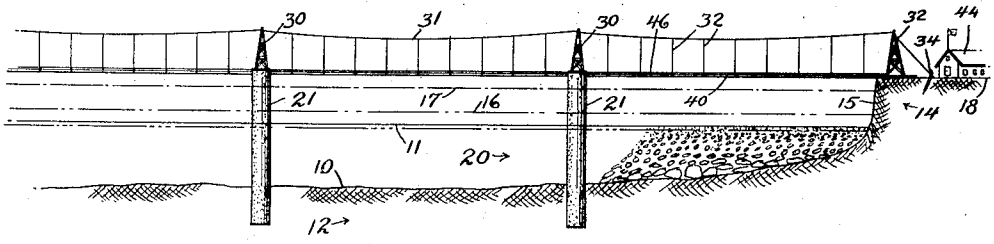


Fig 1.

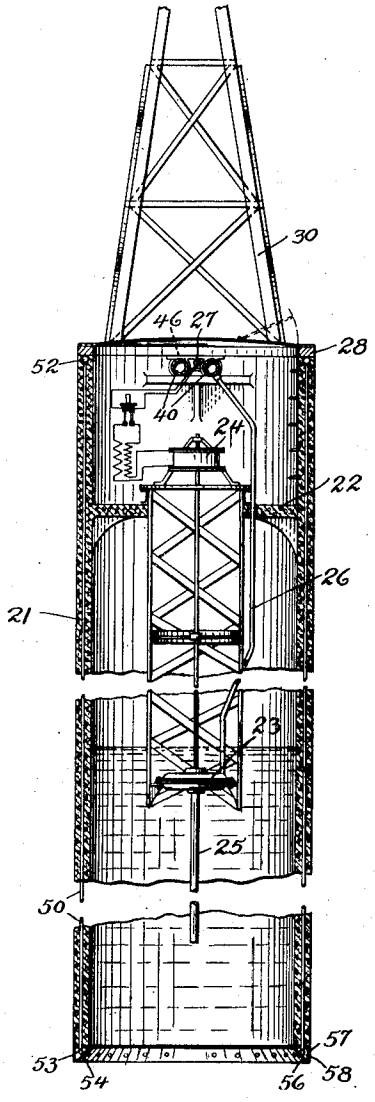


Fig. 2.

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PUMPING SYSTEM.

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To all whom it may concern:

Be it known that I, CHARLES R. OLBERG, a citizen of the United States, residing at Alhambra, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Pumping Systems; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a system of securing water for irrigation or for other purposes and has for its object the provision of means for securing a plentiful and constant supply of pure water from the beds of intermittently flowing rivers or streams.

In the south-western portion of this country there are a number of rivers which are of fair size for a portion of the year, but become dry or nearly so during certain seasons and for a short period of the year are apt to increase enormously in size due to flood waters at which time these streams scour very deeply, the water, silt and mud moving at a sufficient speed and with enough power to carry away ordinary obstructions. If a caisson were erected in the bed of one of these rivers and it were attempted to pipe away the water from such caisson the two known ways each fail during part of the year; that of laying the pipe on the bed of the river fails because such pipes are invariably carried away by the scouring effect of the river, and the second way, that of burying the pipes fails because the pipes are not laid at sufficient depth to reach the non-movable ground, since the cost of laying these pipes below the scouring area is absolutely prohibitive.

In the south-western region it has also been attempted to sink caissons to one side of rivers or streams and this is fairly practicable, save in that there is not a sufficient quantity of water always available and if one goes a short distance away from the edge of the stream the water obtained is for some geological reason too salty for use for irrigation. There is at all times a more or less plentiful supply of pure, sweet water to be obtained in the beds of these dry rivers in the States of Arizona and New Mexico, but up to the present time no method has been found to satisfactorily bring this water to the shore by any permanent means, and the principal object of the present invention is to provide such means.

Referring now to the drawings:

Figure 1 is a sectional elevation of a typical south-western river showing the dry bed, and also indicating in dotted lines the average stream and the maximum high water and also showing my system in its preferred form in elevation.

Fig. 2 is a vertical section through one of the caissons at right angles to Fig. 1 and on a considerably larger scale.

The line 10 represents roughly the lower margin of the scouring effect of the river, bearing in mind that such a line does not actually exist, since in streams of the character described the mass is sorted out by the stream and the top of the bed 11 is composed of extremely fine sand which constantly increases in size as we go down into the bed, becoming in turn coarse sand, fine pebbles, stones and finally at near the margin 10, boulders often of huge size. The area 12 beneath the rather undefined line of scouring is of the same character as the general soil of the banks 14. The vertical distance between the bed 11 and the line 10 may be taken at approximately forty feet for such a river as the Gila River in Arizona which would mean that if a caisson were sunk to a distance of, say, sixty feet, it would be a permanent structure and if its size were as great as from six to ten feet in diameter, the sinking of it to such a depth would be sufficient to preserve it against even the great floods that might descend such a stream. The edge 15 of the banks is practically vertical as is illustrated and the normal water line 16 and the maximum water level 17 are not in true scale in Fig. 1 as these vary considerably with different streams, some of which like the Colorado cut enormous chasms or canyons often hundreds of feet below the general surface 18.

It has been found by actual experiment that there is at all times a vast amount of water, which is good pure, sweet and clean imprisoned in the space 20 below the bed 11 and it is proposed to pump this water out of such space during the dry season, as well as during the period of the year when water is actually flowing in the river, and

for this purpose a number of caissons 21 of reinforced concrete or other suitable material and of sufficient size say, ten inches thick by ten feet in internal diameter to remain permanently in place during the most adverse conditions are sunk to a depth of twenty feet or more below this line 10. In each of these caissons I mount a floor 22 at or about the level of the bed of the stream and from it suspend a pump 23, of an desired type preferably a centrifugal pump driven by an electric motor 24 and having the usual central suction pipe 25 and the side discharge pipe 26. Current for the various motors 24 is supplied by leads 27 from any suitable power house or other source of electric current.

On top of each of the caissons 21 is mounted a frame work 28 supporting a tower 30 of any desired type preferably an ordinary wooden derrick, however, and from these various towers 30 is suspended a strong cable 31 the ends of which are led over suitable towers 32 on the bank to the usual deadmen 34. A pipe or duct 40 of flexible metal sections is suspended from the cable 31 by means of stringers 32 at such a height as to clear the extreme high water line 17 by at least six or eight feet in order to prevent damage to the duct by reason of floating debris.

The centrifugal pumps 23 are preferably sufficiently under water so as to require no priming but they may be connected if desired to suction pipes extending as far down as may be found necessary depending upon the nature of the surface soil. The water for irrigating or other purposes is drawn through the suction pipe 25 and delivered by way of the pipe 26 to the duct 40 and is then pumped through the usual pumping house 44 to the fields to be irrigated, such pumping house having within it the necessary means for putting a head on the water and also for supplying current to the motor 24, the leads 27 which are mounted upon or carried by the duct 40 which for convenience and for cheapness of cost is usually made of two or more separate pipes bound together as shown and carrying a wooden footpath 46 if desired.

Since it is necessary to use pipes of considerable size for reinforcing the concrete of the caisson 21 I utilize these pipes 50 for providing the necessary means for putting the caisson in place initially, and with this in mind I place in the upper portion of the caisson an annular horizontal pipe 52 connected to each of the vertical pipes 50 which at their latter ends again merge into an annular pipe 53 provided at its lower surface with a plurality of short nipples 54 for washing away the soil as the caisson descends. It will naturally be understood by those skilled in the art that the lower end of the caisson is to be beveled as shown at 56 or is provided with some other way for facilitating its entry into the soil, as for example by an annular angle iron 57 filled in as at 58 with concrete or other material.

While I have explained my invention in detail I wish it distinctly understood that I do not limit myself to such details but wish to protect the general system whereby it will be possible to withdraw irrigating water from the streams of the dry arid regions of the far west at all seasons of the year, the essential elements of which consists in a permanent caisson in combination with a water-way elevated above the high water line of the river.

What I claim is:

1. In a pumping system, the combination with a plurality of caissons sunk in the bed of a river, means carried by said caissons for withdrawing water from beneath the bed of such river, and means suspended above the bed of such river for conveying such water to the shore.

2. In a pumping system, a plurality of permanently erected caissons, pumping means carried by one of said caissons, towers carried by said caissons, a cable connecting said towers, and means for carrying the water from said pumping means to the shore of said river.

3. In a pumping system, a caisson sunk in the bed of a river and extending beneath the scouring limit of said river, pumping means suspended within said caisson below the level of the bed of said river, a duct suspended from said caisson, and means for delivering water from said pumping means to said duct.

CHARLES R. OLBERG.