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WELL TUBING

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Fig. 1.

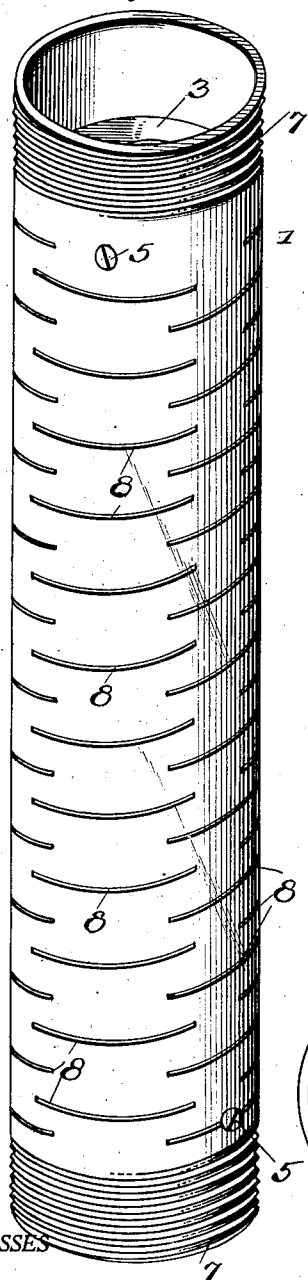


Fig. 2.

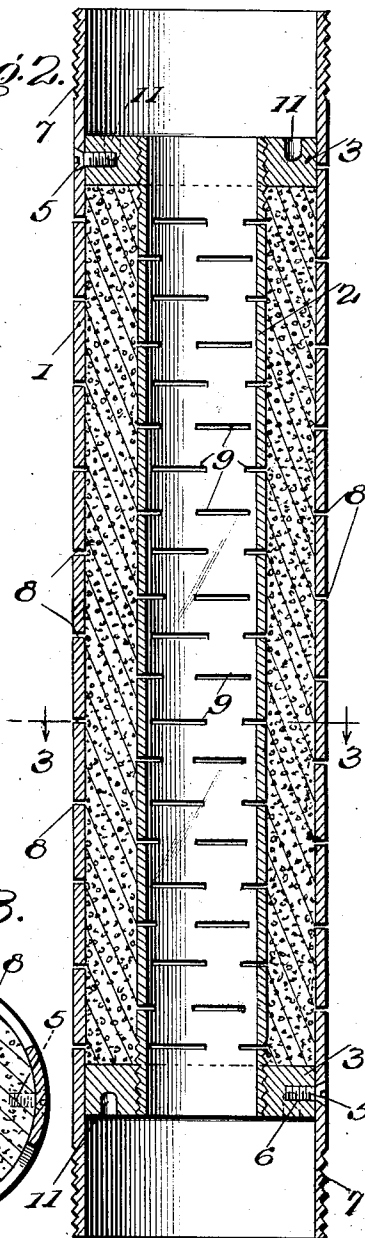
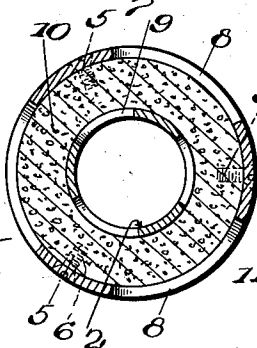


Fig. 3.



WITNESSES

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WELL TUBING.

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Our invention relates to improvements in well tubing, more particularly to improvements in screening devices adapted to be incorporated in well tubing and carried at the lower end of the latter, and it consists in the combinations, construction and arrangements herein described and claimed.

An object of our invention is to provide a tubular screening device which is adapted to be embodied in a well tube of any usual construction and which is formed in such manner as to permit the infiltration of liquid through the side walls thereof into the interior thereof.

A further object of the invention is to provide a device of the character described which affords facilities for thoroughly filtering and cleansing the liquid admitted to the interior thereof.

A still further object of the invention is to provide a screening device of the character described, which is adapted because of its construction to withstand all the stresses to which it is likely to be subjected when a well tube or casing in which it is incorporated, is inserted or "set" in a well bore in the usual manner.

Other objects and advantages will be apparent from the following description, considered in conjunction with the accompanying drawings, in which:—

Fig. 1 is a perspective view showing a screening device embodying our invention,

Fig. 2 is a longitudinal section through the screening device, and

Fig. 3 is a section along the line 3—3 of Fig. 2.

As is well known, considerable difficulty is frequently encountered in "setting" a well tube or casing having the screen at the lower end thereof, for the reason that the screen is not sufficiently strong to withstand the stresses to which it is subjected when the well casing is being inserted in the earth.

Of course, such screens are not capable of performing the functions for which they are intended when they have been broken during the operation of placing the well casing in position. A screening device embodying our invention is adapted to be incorporated in a well casing of otherwise ordinary construction and to then be inserted in a well bore in the usual manner without there being any possibility that the screening device will be broken or rendered unserviceable when subjected to the stresses

which are likely to occur during the operation of placing the well casing in position. Moreover, the screening device embodying our invention does not offer any obstruction to the passage of the inserted portion of the well casing in the well bore and when in inserted position, affords facilities for filtering and thoroughly cleansing all liquid admitted therethrough to the interior of the well casing.

A well screening device embodying our invention in the form now preferred by us, comprises an outer tubular member 1, an inner tubular member 2, flanges or annular spacing members 3 removably mounted on the end portions of the inner tubular member 2 and adapted to closely interfit the outer tubular member 1, the inner tubular member being somewhat shorter than the outer tubular member and having an outer diameter considerably less than the inner diameter of the latter. In the embodiment of the invention illustrated, the inner tubular member 2 is provided with external screw threads at its ends adapted for engagement with screw threads on the inner walls of the flanges 3. When the flanges 3 have been mounted on the end portions of the inner tubular member and the latter with the flanges thereon, is disposed within the outer tubular member 1, an annular chamber 4 will be defined by the flanges 3 and the portions of the inner and outer tubular members extending between the flanges, which annular chamber is closed at its ends by the flanges 3 which also serve to hold the inner tubular member 2 in spaced concentric relation to the outer tubular member 1. Set screws 5 are projected through openings in the walls of the outer tubular member 1 into threaded engagement with sockets 6 in the periphery of the flanges for the purpose of holding the flanges and the inner tubular member as a unit against movement longitudinally of the outer tubular member 1, the heads of the set screws 5 preferably being countersunk in respect to the peripheral wall of the outer tubular member 1.

The construction described may be considered as constituting an annular casing having the outer wall thereof extended at the ends of the casing and being adapted for connection, as by means of the screw threads 7, with suitable tubular members with which the casing is to be associated.

For example, the casing formed in the manner described may be attached at one end to a length of well casing and at the other end to a foot valve and drill bit construction such as is ordinarily employed in well drilling operations.

The portion of the outer tubular member constituting the outer wall of the annular chamber 4, is perforated, preferably by elongated openings or slits 8 arranged in spaced-apart rows extending circumferentially of the outer tubular member, the respective openings in each row preferably being alined and the perforations of adjacent rows being in staggered relation in respect to each other. The portion of the inner tubular member constituting the inner wall of the annular chamber 4, likewise is perforated by elongated openings or slits 9 arranged in spaced apart rows extending circumferentially of the inner tubular member, the respective openings 9 of each row also being in alinement in respect to one another and the openings 9 of adjacent rows being in staggered relation in respect to each other. The inner tubular member preferably is disposed within the outer tubular member so that the openings 9 of the former will be out of registration with, or, in other words, in staggered relation to the corresponding openings 8 of the outer tubular member, that is, the corresponding openings through the outer and inner tubular members will be out of radial alinement or in staggered relation in respect to each other.

The space within the annular chamber 4 is filled with sand, gravel, or like granular material, as indicated at 10, to filter and cleanse liquid admitted to the chamber 4 through the openings 8 before such liquid is permitted to pass from the chamber 4 through the openings 9 to the interior of the inner tubular member 2, which of course will be in open communication with the tubular members with which the outer member 1 may be connected at its ends.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. In assembling the device, one of the flanges 3 is mounted on one end portion of the tubular member 2 and the latter with the flange mounted thereon, is inserted in the outer tubular member until the flange is in position to be secured to the outer tubular member through the agency of one of the set screws 5. Sand, gravel, or the like, is then inserted between the inner and outer tubular members at the open end of the annular space defined between such members. When the desired quantity of sand, gravel or the like has been placed within the annular space 4, the latter is closed at the open end thereof by inserting the second flange 3 into the outer tubular member and then manipulat-

ing the second flange until it is mounted upon the adjacent end portion of the inner tubular member 1 in position to be secured by certain of the set screws 5 to the outer tubular member. The flanges 3 may have sockets 11 in their outer faces adapted to be engaged by a suitable tool and thus manipulated conveniently to effect movements thereof from or to the position shown.

The outer tubular member 1 is made of a material possessing considerable inherent strength, such as steel, and the walls thereof are sufficiently thick to adapt it to be incorporated in a well casing and to withstand the stresses to which it is likely to be subjected as a section of a well casing, without causing any strain on the outer tubular member or such distortion or bending thereof as will result in any change in the form thereof or of the openings 8 with which it is provided.

Obviously, our invention is susceptible of embodiment in forms other than that illustrated in the accompanying drawings and we therefore consider as our own, all modifications and adaptations of the form of the device illustrated herein which fall within the scope of the appended claim.

We claim:—

A screening device for well tubing comprising an outer tubular member having the end portions thereof provided with screw threads whereby the outer tubular member may be attached to other tubular parts of the well tubing, an inner tubular member having an outer diameter considerably less than the inner diameter of the first mentioned tubular member and being of less length than the latter, flanges in threaded engagement with the end portions of the inner tubular member and engaging with the inner wall of the outer tubular member to hold the inner tubular member in adjusted spaced concentric relation to the outer tubular member and for closing the ends of the annular chamber thus defined within the outer tubular member, each of said flanges having a socket in its outer face adapted to be engaged by a suitable tool for turning said flange about its axis, said outer tubular member and said inner tubular member having longitudinally extending series of circumferentially extending narrow openings, the openings of adjacent series being staggered and the openings of the inner tubular member being out of alignment with the openings of the outer tubular member, said annular chamber being adapted to hold sand or like granular material, and set screws carried by the outer tubular member for engaging said flanges to hold the latter and the inner tubular member as a unit against movement longitudinally of the outer tubular member.

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