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2,217,327

METHOD OF PRODUCING WELL SCREENS

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Fig. 1.

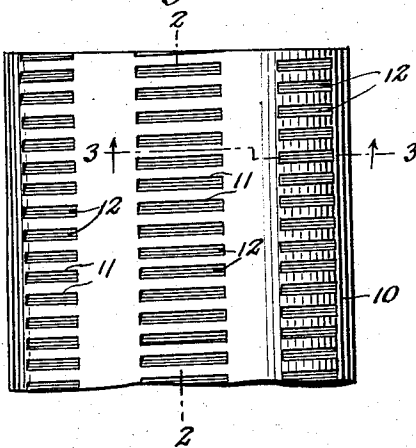


Fig. 2.

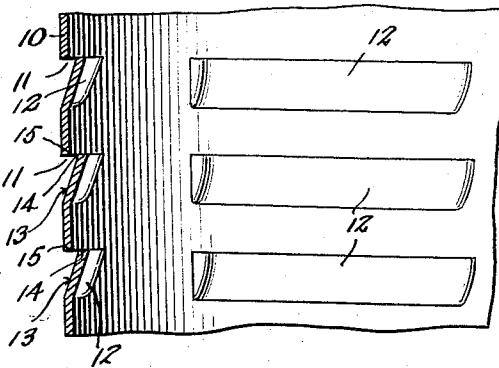


Fig. 3.

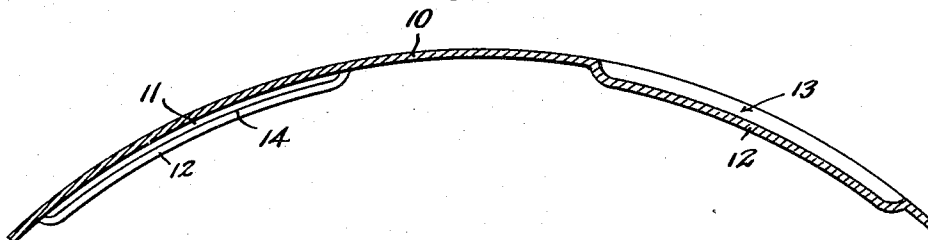


Fig. 4.

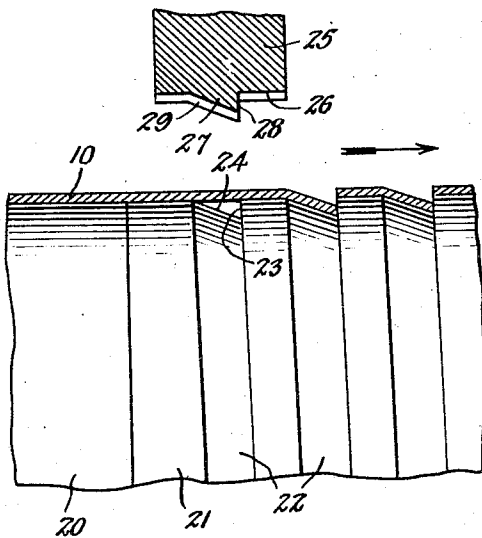
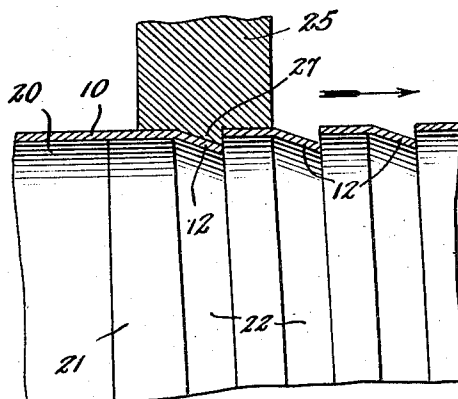


Fig. 5.



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METHOD OF PRODUCING WELL SCREENS

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2 Claims. (Cl. 29—163.5)

This invention relates generally to well screens and refers more particularly to an improvement in the structure thereof and to a method of producing the same.

5 The invention broadly comprehends an improved well screen which is so constructed and arranged as to provide a slotted screen structure which functions to practically eliminate clog-
10 ging of the slots by forming the same in such a manner as to render them self-cleaning and inherently resistant to clogging.

More particularly the invention resides in an improved well screen wherein the tubular wall thereof is formed with circumferentially spaced
15 rows of circumferentially extending slots, each of which is defined by an angularly disposed circumferentially extending lip offset with reference to the wall whereby the slot opens in a horizontal plane with an inclined surface of the
20 lip disposed adjacent thereto for effecting an inherent gravitational movement and deflection of the sand away from the slot.

The invention is further directed to an improved method of economically and expeditiously producing a well screen structure which
25 consists in punching a tubular element so as to form the slots and lips adjacent thereto.

More particularly the method resides in heli-
30 cally feeding a tubular element intermittently over a fixed mandrel provided with a hob having a helical groove and punching the slots and forming the offset lips by means of a cutting and forming die, when the tubular element is at
35 rest between the periods of intermittent motion.

With the above enumerated and other objects
40 in view, reference is made to the following specification and accompanying drawing which illustrates one form of the invention, while the appended claims cover variations which fall within
45 the scope of the invention.

In the drawing:

Fig. 1 is a fragmentary side view of a well
screen constructed in accordance with the inven-
50 tion.

Fig. 2 is an enlarged fragmentary vertical sectional view therethrough taken approximately on
the line 2—2 of Fig. 1.

Fig. 3 is an enlarged fragmentary horizontal
sectional view taken on the line 3—3 of Fig. 1.

55 Figs. 4 and 5 are diagrammatic sectional views illustrating the method of producing the well screen.

Referring to the drawing by characters of reference, the well screen constituting the present
60 invention comprises a tubular body 10 which is

formed with a plurality of circumferentially spaced rows of circumferentially extending slots 11, the slots in the direction of their length being preferably arranged in a helical path with adjacent slots in each row spaced apart a distance coinciding with the pitch of said helical path.

Each slot 11 is defined by an angularly disposed circumferentially extending lip 12 which is offset with reference to the wall whereby the slot
10 11 opens in a horizontal plane with the inclined surface 13 of the lip providing a face which functions to effect an inherent gravitational movement of the sand or other solid material away from the slot to practically eliminate clog-
15 ging of the slots. The offsetting of the body to form the lip 12 disposes the corner 14 of the free edge of the lip in substantially horizontally spaced relation to the corner 15 of the slitted portion of the body so that the slot is framed
20 by said corner edges and is so arranged as to be protected by an overhanging portion of the wall structure.

In producing the well screen, the tubular body
10 is arranged over a mandrel 20 which is of 25 the same diameter as the internal diameter of the body 10 and which mandrel is provided at one end with a hob or forming tool 21 which is also of the same diameter as said mandrel and is provided with a helical groove 22 of substan-
30 tially V-shaped formation in cross section having one wall 23 thereof in a plane substantially perpendicular to the axis of the hob or forming tool and the other wall 24 at an angle thereto. A cutting and forming die 25 is employed which
35 is provided on its lower surface 26 with a rib 27 corresponding in cross sectional shape to that of the helical groove 22 and provided with a vertical face 28 and an inclined face 29 which coincide respectively with the perpendicular and angular
40 walls 23 and 24 of the helical groove of the hob.

In carrying out the method, the tubular body 10 is positioned over the mandrel and hob and the die 25 is moved downwardly from the position shown in Fig. 4 to the position shown in Fig. 5 thereby
45 slitting the body circumferentially and perpendicular to the axis thereof to produce the slots 11 and at the same time to form the offset lips 12. The rib 27 of the die 25 is of a pre-determined length to produce a slot of the desired
50 length and is of a pitch coinciding with the pitch of the helical groove 22 whereby the slots thus produced and the lips 12 in the direction of their length are arranged in a helical path with adjacent slots in each row spaced apart a distance 55

coinciding with the pitch of the helical path. After the first slot and lip are formed, the lip cooperates with the helical groove in the hob as a means for advancing the tubular body in the direction of the arrows in Figs. 4 and 5 as the body is rotated. After each slot and lip is formed, the tubular body is turned a sufficient distance to space the succeeding slot and lip in the direction of its length from the previously formed one to dispose the slots in circumferentially spaced rows. After the die has cut a slot 11 and formed a corresponding lip 12, the same is raised to the position shown in Fig. 4 and as the die is raised, the tubular body is turned and helically fed over the mandrel and hob, while during the downward stroke and cutting and forming operation of the die, the tubular body is at rest.

The method employed, therefore, consists in helically feeding the tubular element 10 intermittently over the fixed mandrel 20 provided with the hob 21 and successively punching said body to slit the same and form the slots 11, while offsetting the body at one side of the slitted portion to form the lip 12 by means of the cutting and forming die 25 when the tubular element 10 is at rest between the periods of intermittent motion.

What is claimed is:

1. A method of producing a well screen consisting in disposing a hollow cylindrical element in surrounding relation to a fixed helically

grooved cylindrical mandrel, intermittently rotating the hollow cylindrical element on said mandrel, cutting and forming successively in said element by means of a cutting and forming die a series of helically disposed slits with an offset lip adjacent each slit struck inwardly against a wall of the mandrel groove as a backing surface for the lips while the hollow cylindrical element is at rest between the periods of intermittent rotation and employing said lips as means engaging said helical groove for effecting helical feeding of the cylindrical element over the mandrel.

2. A method of producing a well screen consisting in disposing a hollow cylindrical element in surrounding relation to a fixed helically grooved cylindrical mandrel, intermittently rotating the hollow cylindrical element on said mandrel, cutting and forming successively in said element by means of a cutting and forming die, a plurality of circumferentially spaced rows of circumferentially extending helically disposed slits with an offset lip adjacent each slit struck inwardly against a wall of the mandrel groove as a backing surface for the lips while the hollow cylindrical element is at rest between the periods of intermittent rotation, and employing said lips as means engaging said helical groove for effecting helical feeding of the cylindrical element over the mandrel.

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