May 24, 1932. J. H. McEVOY, JR 1,859,311

PIPE JOINT

Filed June 1, 1926

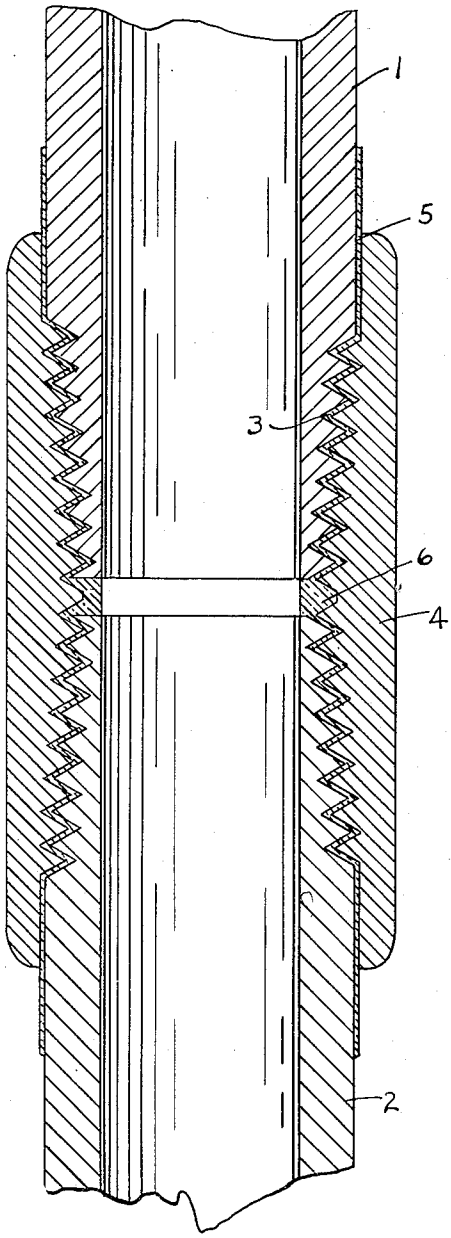


Fig. 1

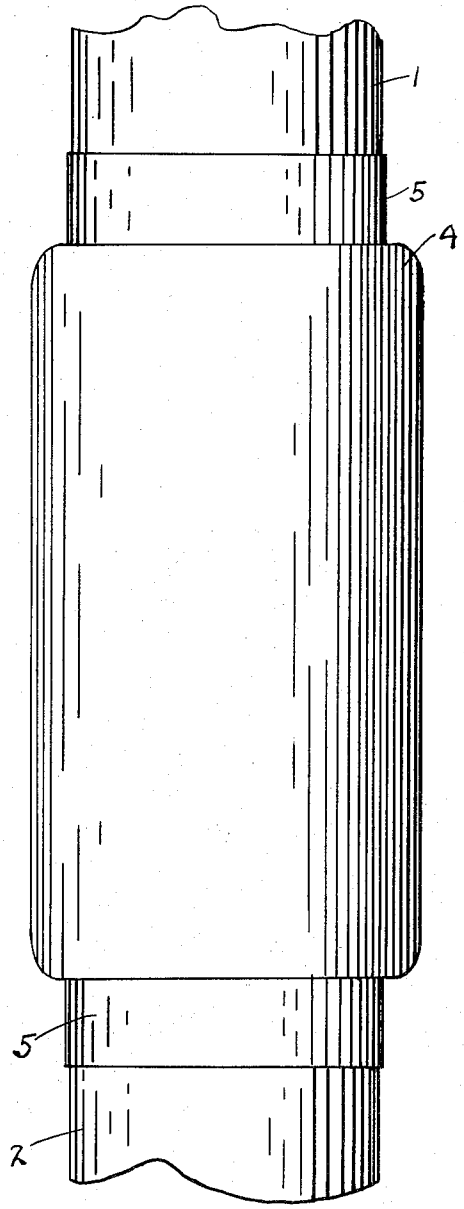


Fig. 2

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1,859,311

UNITED STATES PATENT OFFICE

JOSEPH H. McEVOY, JR., OF HOUSTON, TEXAS

PIPE JOINT

Application filed June 1, 1926. Serial No. 112,736.

My invention relates to the construction of pipe joints for use particularly in deep well operations.

In equipping an oil well or a deep water well for production, it is common to provide a casing or liner of iron or steel pipe extending from the surface to the producing stratum; and to connect, at the lower end of the pipe, a strainer or well screen which may be of a different material from that of the pipe. The strainer may be of perforated pipe wound with screen wire, or may have strainer buttons in the perforations, or may assume other forms. But the strainer may be of a better and different composition of steel from that of the pipe to which it is connected, or may be of brass, or some different alloy adapted to resist the action of moving sand and the corrosion of acids or other fluids in the well.

It has been found that, when metals of different composition, or of different solution pressures, are submerged in the liquid in the well, a difference of electrical potentials is set up causing electrolysis between the different pipe sections. Metal from a pipe of one composition is eaten away and carried away in the electrolyte. This is due to the presence of foreign substances in the liquid in the well forming an electrolyte. Sulphur, salt water, and similar elements in the liquid serve to produce such a result.

The usual cause of this electrolytic action is that the pipe sections form electrodes of large surface areas so that a strong galvanic current is set up flowing from one section to another of different potential. It has been found that the metal of the pipe section adjacent the strainer, being of different composition from the strainer, will act as one electrode and the strainer as the other, and that a marked disintegration of one or the other of the metals at the joint will occur, soon acting to cause holes in the pipe or strainer at the joint destroying the connection between them and allowing the entrance to the pipe of sand and other sediment.

While a strong electric current is produced in this way, the difference of potential between adjacent sections is not great and I have found that if the sections are separated by a thin layer of electrically insulating material, the electrolytic action may be largely avoided.

It is an object therefore to provide a joint or coupling for pipe so constructed and insulated that electrolytic disintegration of the pipe at the ends of adjacent sections will be overcome to such an extent that the life of the joint will be indefinitely prolonged.

Referring to the drawings herewith, I have shown in Fig. 1 a central longitudinal section through a pipe joint illustrating the application thereto of my invention. Fig. 2 is a side elevation of the joint shown in Fig. 1.

It is to be understood that my invention is applicable to pipes for different uses which are adapted to be submerged in liquids, and particularly to pipes wherein some of the sections of the said pipes are of different composition as to metallic constituents from the other adjacent sections. This difference occurs particularly in oil well operations where the strainer employed is of a different quality of steel or is made up of brass, or other similar metal. In the drawings, I have shown my joint as applied to two sections of pipe—1 and 2—the adjacent ends of which are threaded with a coarse thread 3. A coupling or collar 4 is provided for connecting together the ends of the adjacent sections of pipe and said collar is threaded to engage with the threads 3 upon the pipe. I have shown the threads as being formed upon a tapered surface, as this is the most common method of forming the threads upon the pipe, the advantage being that the pipe sections are connected and released from each other by a fewer number of turns of the coupling.

Under ordinary circumstances where the section 2 is made of a different metal from that in the section 1, the electrolytic action, which has been previously described, is set up. I have provided against the disintegration of the metals through this action by forming upon the ends of the pipe sections a thin layer of electrically insulating material 5. This material may be of various kinds; it may be of some treated fabric com-

position or it may even be a coating of some insulating material applied thereto with a brush and allowed to set. It is contemplated that the coating of whatever material is employed will be applied to the pipe ends or to the coupling and the ends will then be inserted within the coupling. It is obvious, of course, that the insulating coat need not be applied to both sections of the pipe. It will be only necessary in order to properly insulate the joint that the connection between the coupling and the pipe be broken at one end of the said coupling, and while I have shown the insulating material as applied to both sections of pipe, it is to be understood that this idea is only optional. As will be noted, the insulating coat is extended slightly beyond the ends of the coupling so as to provide against the passage of the current from the pipe 1 above the end of the insulating sleeve around to the adjacent end of the coupling 4. I have also shown the insulating material as being placed somewhat more thickly at the central point 6 upon the coupling to fit between the adjacent ends of the pipe. This has the advantage of effectively separating the pipe ends and preventing the passage of electric current from one section to the other.

It is believed that the operation of the invention will be clear from the description already given. It is the substance of the invention to provide an insulation between the adjacent ends of pipe sections of different material and particularly the invention is designed for use in the coupling joining the well pipe to the upper end of the well screen. It is necessary in many installations to form the screen of much more expensive and costly material than that employed in the construction of the pipe. The use of a more expensive and durable material in the well screen, however, is largely overcome as an advantage where the connection between the pipe and the screen is soon disintegrated and worn. By the use of this type of joint described and shown herein, the connection between the pipe and the screen may be made durable and lasting and the life of the screen may be extended for a long period of time.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. An electrically insulated pipe joint comprising, threaded pipe members, a threaded coupling member, a coating of electrical insulating material of less thickness than the depth of the threads upon at least one of said members, and a ring of insulating material between the ends of said pipe members.

2. A connection between a section of strainer pipe and well tubing formed of different electrolytic compositions, comprising a coupling adapted for threaded connection to adjacent ends of said pipe and said tubing, and a thin layer of dielectric placed between said coupling and said pipe and tubing, the thickness of said dielectric being less than the depth of the threads on said coupling, pipe or tubing.

3. A connection adapted to prevent electrolysis of adjacent pipe ends of different electrolytic composition including a coupling, interengaging threads on said pipe and said coupling, a thin layer of dielectric covering said threads and adapted to prevent an electrical contact between said ends and said coupling, and a dielectric ring abutting the adjacent pipe ends.

In testimony whereof I hereunto affix my signature this 28 day of May, A. D. 1926.

JOSEPH H. McEVOY, Jr.