

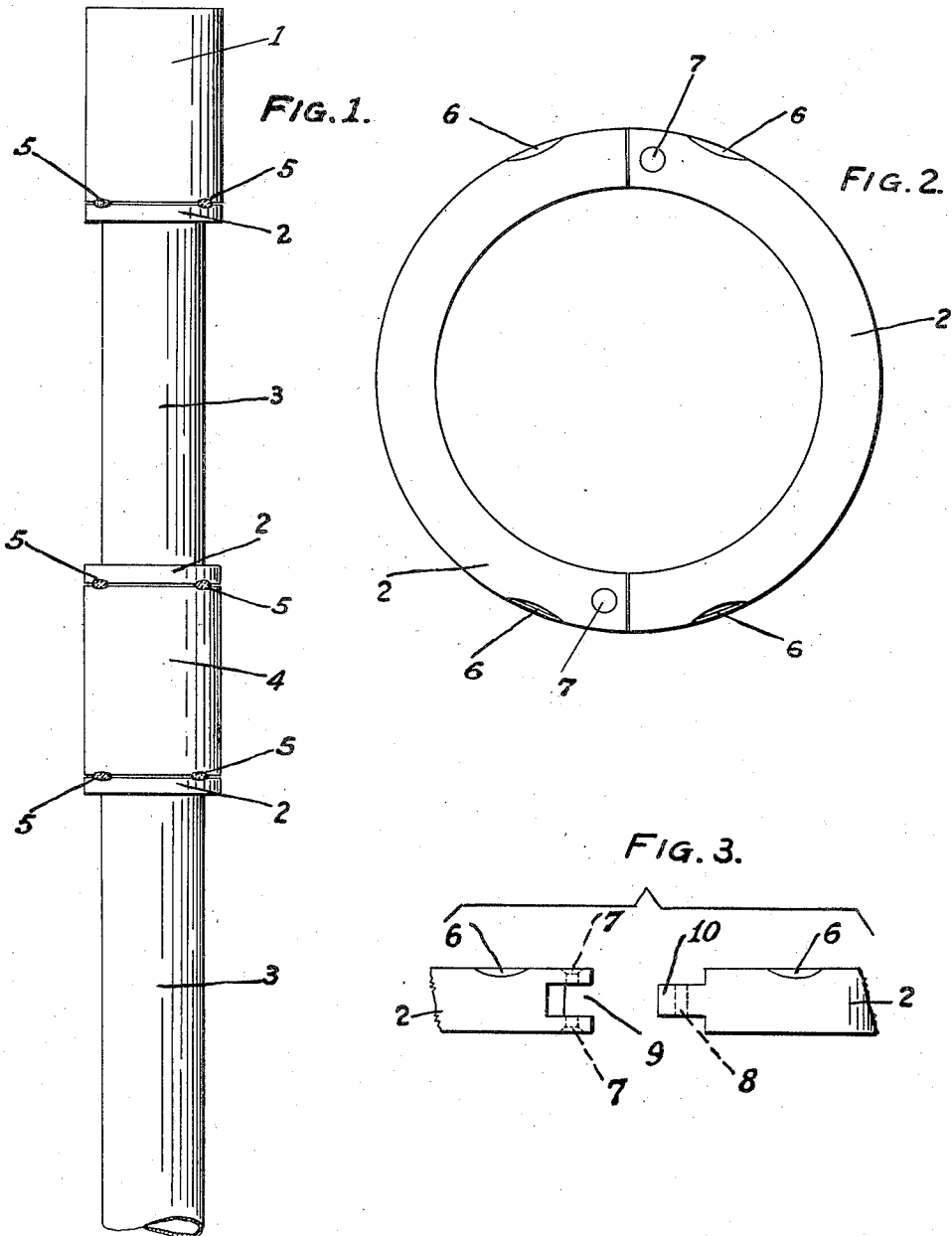
Aug. 9, 1938.

H. C. W. MILLER

2,126,405

PROTECTIVE DEVICE FOR DRILL PIPE

Filed July 8, 1935



Henry Clay Weaver Miller
INVENTOR

UNITED STATES PATENT OFFICE

2,126,405

PROTECTIVE DEVICE FOR DRILL PIPES

Henry Clay Weaver Miller, Los Angeles, Calif.

Application July 8, 1935, Serial No. 30,270

3 Claims. (Cl. 308—4)

My invention relates to improvements in the methods and means used in drilling wells, with the primary objective of lengthening the useful life of a string of drill pipe by preventing and reducing, under all operating conditions, abrasion of the drill pipe coupling and joint shoulders which results from the scouring and wearing action of the mud, gravel, water, oil and other materials standing in the well, combined with the grinding action of the formation materials caused by contacting the sides of the hole within which the drill pipe revolves and otherwise functions.

Another object of my invention is to provide new shoulders which can be readily attached to the worn ends of couplings and joints of all types, thus rendering the couplings and joints fit for further useful life.

A further object of my invention is that my device is so constructed as to be readily removable and replaceable when worn so that the coupling and joints to which it is attached may be used to the limit of their useful life, dependent upon inherent qualities other than the condition of the shoulders.

One of my basic reasons for desiring to prevent and reduce the wear of joint shoulders is that such shoulders are the only bearing and contacting surface on which the elevator or pipe clamping, lifting and supporting device engages and depends for its successful operation when the lifting and supporting force is applied during the lowering, raising and suspending operations of a pipe string, whether the contemplated use of the pipe string is that of drilling or other prior or subsequent operations.

Without the use of my device the shoulders through constant abrasion by contact with the surrounding materials become worn, rounded and sloping. In this condition an increasingly excessive strain is placed on the jaw closing and holding mechanism of the elevator in that the load-supporting surfaces of the elevator can not engage with the full shoulder width, but tend to slide up over and around the sloping shoulders of the worn joints. When sufficiently worn the sloping shoulders allow the elevator jaws to slip to a greater degree and thus produce a wedging and separating force in excess of the capacity of the jaw mechanism, consequently the elevator jaws slide up on to the barrel of the joint where, due to lack of adequate load-supporting means, its weight causes the pipe string to slip through the elevator jaws and it starts falling, which action places a dangerous load on the latching device and other parts of the elevator.

Another of my basic reasons for desiring to prevent and reduce the wear of coupling and joint shoulders is that the grinding and scouring action quickly reduces the cross-sectional area of the walls of the couplings and joints, approaching nearer to the pipe threads on the interior surface, until the remaining effective tensile strength is insufficient to support the load and the coupling or joint fractures and breaks resulting in the falling away and dropping of the pipe string below the point of separation.

Without the use of my device frequent inspections are required to determine the available tensile strength in the remaining cross-sectional area under various conditions of shoulder wear and when dangerous conditions are found each entire coupling and joint with excessively worn shoulders must be replaced by a complete new part.

My invention will allow the attainment of the normal full useful life of new couplings and joints and restore partially worn couplings and joints to a further period of use by preventing excessive wear on the shoulders of such couplings and joints in that the full load-supporting force and the destructive abrasive actions are borne by my device which is constructed of suitable wear resistant material and is readily adjusted and attached to new and worn couplings and joints.

Other objects of my invention will be apparent from the following description thereof, taken in connection with the accompanying sheet of drawing in which—

Figure 1 is a front view of a typical section of a standard string of pipe equipped with my load-bearing, protecting and abrasion-resisting tab rings.

Figure 2 is a plan view of my load-bearing, protecting and abrasion-resisting tab rings.

Figure 3 is a front elevation of the connecting joint, separated to disclose the construction and arrangement of the male and female members of my load-bearing, protecting and abrasion-resisting tab rings.

Referring now in detail to the drawing, Figures 1 to 3 inclusive, my invention as here illustrated for descriptive purposes comprises a tool joint box end 1, with one set of my rings 2, attached thereto; one length of pipe 3, connected between the tool joint box end 1 and the coupling 4; one coupling 4, with two sets of my rings 2, attached thereto; one length of pipe 3, connected to the other end of the coupling 4. The string of pipe is assembled in the normal manner and my

rings 2 are attached to the respective tool joint box end 1 and the coupling 4 by welds 5 or other suitable means.

Referring now to Figures 2 and 3 it will be seen that my device consists of a set of identically duplicate semi-circular shaped sections of a ring 2. Each section 2 is provided with the same number of ground out or machined indentations 6 at the welded points on the outside circumferential surface and the adjoining side surfaces which butt against the shoulders of the tool joint box end 1 and the shoulders of the coupling 4. Each section 2 is provided with a male member 10 at one end and a female member 9 at the other end to facilitate attachment to assembled pipe strings and individual unassembled tool joint box ends 1 and couplings 4. Through the male member 10 a hole 8 is drilled matching a similar countersunk hole 7 drilled in the female member 9 of each section 2, for the purpose of riveting the sections 2 together in order to prevent the sections 2 from separating and slipping off the drill pipe 3 in case the welds 5 should fracture.

While a form of my invention is illustrated in the accompanying sheet of drawings and the above description, I realize that I have shown and described only one practical embodiment of my invention and I am aware that many changes can be made in the details of construction and arrangement thereof without departing from the spirit and scope of this invention and I do not therefore limit my invention to the details shown except as limited by the spirit and scope of my invention as indicated above and in the following claims.

I claim as my invention—

1. In combination with a string of drill pipe

formed of sections of pipe joined together with coupling members, a ring formed of wear resistant material and in two sections, means for connecting the sections together while embracing the pipe, said ring being substantially the same external diameter as the coupling, and means substantially flush with the exterior of the ring securing it to the end of a coupling member to form a wear resistant shoulder therefor.

2. In combination with a string of drill pipe formed of sections of pipe joined together with coupling members, a sectional ring of wear resisting material adapted to embrace the pipe, means securing said sections together about said pipe, there being indentations on the outer surface of the ring, and means in said indentations securing the ring to the end of a coupling member, said ring, coupling member and means securing them together being substantially flush on the outside.

3. In combination with a string of drill pipe formed of sections of pipe joined together with coupling members, wear resisting means for said pipe and couplings, said wear resisting means being adapted to embrace the pipe and comprising a pair of relatively thin substantially semi-circular sections of wear resistant material, each of said sections having attachment ears formed at the ends thereof, means engaging the ears and adapted to secure the ring sections together about the pipe, each of said sections having a portion of its exterior surface cut away near its ends, and welding material in said cut away portion to secure the ring to the end of a coupling member, said ring and coupling being substantially of the same external diameter.

HENRY CLAY WEAVER MILLER.