March 24, 1942. E. J. SARGENT 2,277,356

VALVE SEAT AND METHOD OF MAKING SAME

Filed March 30, 1940

Fig. 1.

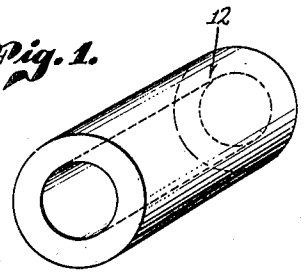


Fig. 2.

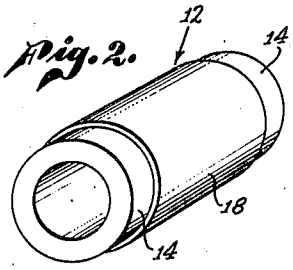


Fig. 3.

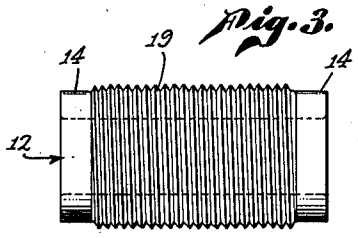


Fig. 4.

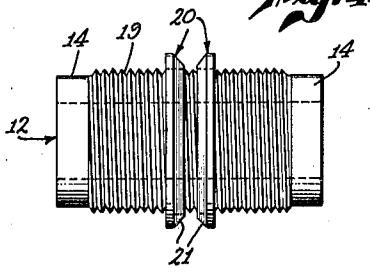


Fig. 5.

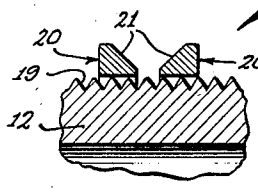


Fig. 6.

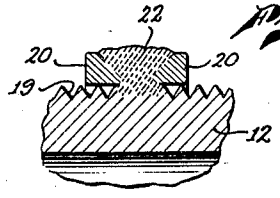


Fig. 7.

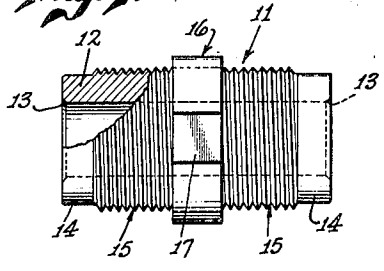
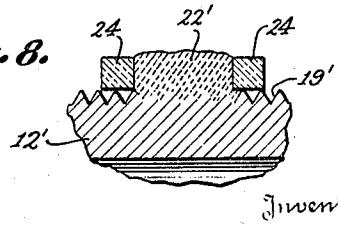


Fig. 8.



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VALVE SEAT AND METHOD OF MAKING SAME

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Application March 30, 1940, Serial No. 327,053

8 Claims. (Cl. 29—157.1)

This invention relates generally to valve seats of the type employed in oil well pumps and more particularly relates to externally threaded reversible valve seats which are screwed into adjacent parts of a pump and are removable for refacing.

Valve seats now in use of the general type contemplated by this invention are formed of a tubular member provided with external threads so that the seat may be removably mounted within the pump. Some seats are provided with an external wrench flange intermediate the ends of the seat to facilitate removal without injury to the threads. Such valve seats are formed of a single piece of material and are machined to provide the external wrench flange and reduced portions on each side thereof. The reduced portions of the valve seat are threaded, however, because of the wrench flange intermediate the ends of the member, it is impossible to cut screw threads clear up to the wrench flange. As a result, there is left an unthreaded portion of the seat immediately adjacent the flange on each side thereof. It is the ordinary practice to provide a groove intermediate each of the threaded portions and the wrench flange so that there will be no difficulty in threading the member into adjacent parts of the pump.

Valve seats of the type just described are renewable by removal and grinding of the end faces and providing new valve seat faces in the ends. Since this operation necessarily reduces the overall length of the member, after one or two such operations the valve seat when placed back into the pump is screwed farther into the adjacent parts of the pump with the result that the adjacent parts extend over the grooved parts of the valve seat thereby forming a trap which soon becomes packed with silt and sand such as is present in the well. It is also true that it is often necessary to machine the flange on each side to reduce its width and to widen the grooves in order to provide sufficient length of valve seat for threading into adjacent parts of the pump. As a result of the sanding up of the groove, it is very difficult to remove the valve seat from the pump without damage to some part.

It is also true that the grooved construction considerably weakens the member and since the valve seat itself in many types of pumps forms an integral connecting unit in the pump, failure or breakage of the seat often occurs in the region of one of these grooves. A further disadvantage of this type of valve seat is the waste of material in manufacture since it is necessary to begin with a tubular member having an over-all diameter of the wrench flange and to machine it down to the desired diameter of the threads.

It therefore is a primary object of this invention to provide a new and improved reversible externally threaded valve seat having a central wrench flange which does not have the above discussed disadvantages and to provide a new and improved method of making such a seat.

It is a particular object of this invention to provide an externally threaded valve seat member in which the threads extend up to the wrench flange.

It is also an object of this invention to provide a valve seat member which is of simple construction and which may be readily manufactured embodying an externally threaded body and either a composite welded on wrench flange, or a wrench flange consisting entirely of a weld.

It is a further object to provide a valve seat which may be made shorter in over-all length than the ordinary valve seat embodying an external wrench flange and yet permit of the same amount of renewing as the ordinary type seat.

It is also an object to provide a new and improved method of making the valve seat member of this invention which is simple, inexpensive and saves material.

These and other objects will be apparent from the drawing and the following description. Referring to the drawing which is for illustrative purposes only—

Fig. 1 is a perspective view of a piece of tubular stock employed in the manufacture of the article of this invention;

Fig. 2 is a view similar to Fig. 1 showing the tubular member after it has been machined;

Fig. 3 is a side elevation of the tubular member of Fig. 2 after it has been screw threaded;

Fig. 4 is a side elevation of the member of Fig. 3 showing a pair of rings thereon;

Fig. 5 is a fragmentary detailed sectional elevation of the tubular member and rings of Fig. 4;

Fig. 6 is a view similar to Fig. 5 showing welding material between the rings;

Fig. 7 is a side elevation partly in section of the completed valve seat member; and

Fig. 8 is a fragmentary sectional elevation of a portion of a valve seat member during construction showing one of the steps in the method of making another form of valve seat member.

More particularly describing the invention, reference numeral 11 (see Fig. 7) generally indicates the valve seat member of this invention

which comprises a tubular member 12 which is provided with a beveled valve seat face 13 at each end. The tubular member 12 has reduced end portions 14, screw threaded portions 15 and a centrally disposed wrench flange 16 which is circular in cross section except for oppositely disposed flat surfaces 17 formed thereon.

The exact construction of the valve seat member as illustrated in Fig. 7 is more readily apparent from a description of the method of making the same and accordingly reference is made to Figs. 1 to 6 showing the steps in the method of making the valve seat member.

The method contemplated by this invention comprises first the provision of a tubular member 12 as shown in Fig. 1 of the desired dimensions. This member is machined at each end to provide reduced portions 14 and an intermediate portion 18 as shown in Fig. 2. The member as shown in Fig. 2 is then screw threaded on the portion 18 to provide a continuous screw thread 19 intermediate the reduced end portions 14. After this operation has been performed two rings 20 of suitable material are provided. These rings each have an internal diameter slightly greater than the external diameter of the screw thread 19 in order to permit installation of the rings in place on the screw thread 19 in spaced relation as shown in Fig. 4. Preferably the rings are provided with a beveled face 21, the rings being positioned on the tubular member 12 so that the beveled faces 21 face each other. Any suitable means are then provided for maintaining the rings 20 in spaced relation as shown in Figs. 4 and 5 and the rings are then welded together and to the tubular member 12 by an annular weld 22.

This construction forms a composite flange intermediate the ends of the tubular member in which the screw threaded portions of the tubular member extend up to and actually extend under the sides of the flange as best shown in Fig. 6.

After the weld 22 has been made the composite flange is machined to provide a smooth outer surface with oppositely disposed flat side portions 17 or any other suitable wrench holding surfaces to form the wrench flange 16 as shown in Fig. 7.

It is apparent that with this method a valve seat member is produced which has external threads extending up to and even under a centrally disposed wrench flange. The reduced end portions 14 of the tubular member are provided for the purpose of refacing the ends and providing a new beveled seat 13 after the same has become worn. After the ends of the valve seat have been ground down considerably by several renewal operations, the width of the wrench flange may be reduced and it is apparent that the valve seat member may be threaded into adjacent parts of the pump without leaving any sand pockets or grooves as is necessitated by the ordinary construction.

It is also apparent that the valve seat member of this invention is stronger than the groove type, that it has a longer threaded portion relative to the entire length of the member thereby permitting a reduction in the overall length of the member while maintaining the same amount of available threads for attachment to adjacent parts of a pump. Another advantage of the present method of making the valve seat is the fact that the screw threaded portions on each side of the wrench flange are made by a continuous single screw threading operation thereby assuring that these portions will be in alignment as distinguished from the possibility that they will be out of alignment in valve seat members by a method necessitating two threading operations.

Although the valve seat member may be made of any suitable material, it is contemplated that in order to provide a very durable and corrosion resistant valve seat member that the body of the valve seat be made of stainless steel and that the rings which are put over it and become a part of the wrench flange after the welding operation, can be made of ordinary carbon steel.

It is also contemplated that a valve seat member of the general type described may be made by providing a wrench flange made entirely of a weld. Thus, in Fig. 8 there is illustrated a fragmentary section of another form of the invention, the view being similar to Fig. 6. In this form of the invention, suitable heat resisting retaining rings 24 are mounted in spaced relation on the tubular member 12' and weld 22' is applied intermediate these rings, the rings serving to confine the lateral extent of the weld. Subsequently the rings 24 may be removed and the weld machined to provide a ring flange.

Although the preferred embodiment of the invention has been particularly shown and described, it is contemplated that various changes might be made without departing from the scope of the invention and it is intended to cover such changes as come within the claims.

I claim as my invention:

1. A valve seat member comprising a tubular body having an external screw thread extending substantially from end to end, and a composite wrench flange mounted intermediate the ends of said member, said flange comprising a pair of spaced rings of greater internal diameter than the external diameter of said tubular member joined together and to said tubular body by an annular weld, said weld interrupting said screw thread, said thread extending under said rings.

2. A valve seat member comprising an externally threaded tubular body of stainless steel, and a composite wrench flange mounted intermediate the ends of said member, said flange comprising a pair of spaced carbon steel rings of greater internal diameter than the external diameter of said tubular member joined together and to said tubular body by an annular weld, said weld interrupting said thread, said thread extending under said rings.

3. A valve seat member comprising a tubular body having reduced end portions and having a screw threaded portion intermediate the reduced end portions, and a composite wrench flange on said body intermediate its ends comprising a pair of spaced rings of greater internal diameter than the external diameter of the threaded portion joined together and to said body by an annular weld, said weld interrupting said thread.

4. In the method of making an externally threaded valve seat member having a wrench flange thereon, the steps of providing a tubular member, cutting a continuous screw thread on said member substantially from end to end, welding material to said body intermediate its ends to form an external flange interrupting said thread, and machining said flange to form a desired outer contour thereon.

5. In the method of making an externally threaded metal valve seat member having a composite wrench flange thereon, the steps of providing a tubular member, cutting a continuous screw thread on said member, providing a

pair of rings having an internal diameter greater than the external diameter of the threaded tubular member, positioning said rings over said tubular member intermediate the ends thereof and holding said rings in spaced relation thereon, welding between said rings to provide an annular weld securing said rings together and to said tubular body thereby providing a composite flange, and machining said flange to the desired shape.

6. In the method of making an externally threaded valve seat member having a composite wrench flange thereon, the steps of providing a tubular member, machining said member to form reduced end portions thereon, cutting a continuous screw thread on said member between said reduced end portions, providing a pair of rings having an internal diameter greater than the external diameter of the threaded tubular member, positioning said rings over said tubular member intermediate the ends thereof and holding said rings in spaced relation thereon, welding between said rings to provide an annular weld securing said rings together and to said tubular body, thereby providing a composite flange, and machining said flange to the desired shape.

7. A valve seat member comprising a tubular body having an external screw thread extending substantially from end to end, and a composite wrench flange mounted intermediate the ends of said member, said flange comprising a pair of spaced rings joined together and to said tubular body by an annular weld, said weld interrupting the screw thread, said thread extending under said rings.

8. A valve seat member comprising an externally threaded tubular body having an integral wrench flange comprising an annular weld intermediate the ends of said body, the threads of said tubular body extending outwardly from each side of said flange toward the ends of the body.

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