W. KIESER.

ATTACHING MEANS FOR NOZZLES.

APPLICATION FILED FEB. 21, 1914.

1,154,777.

Patented Sept. 28, 1915.

Fig.1.

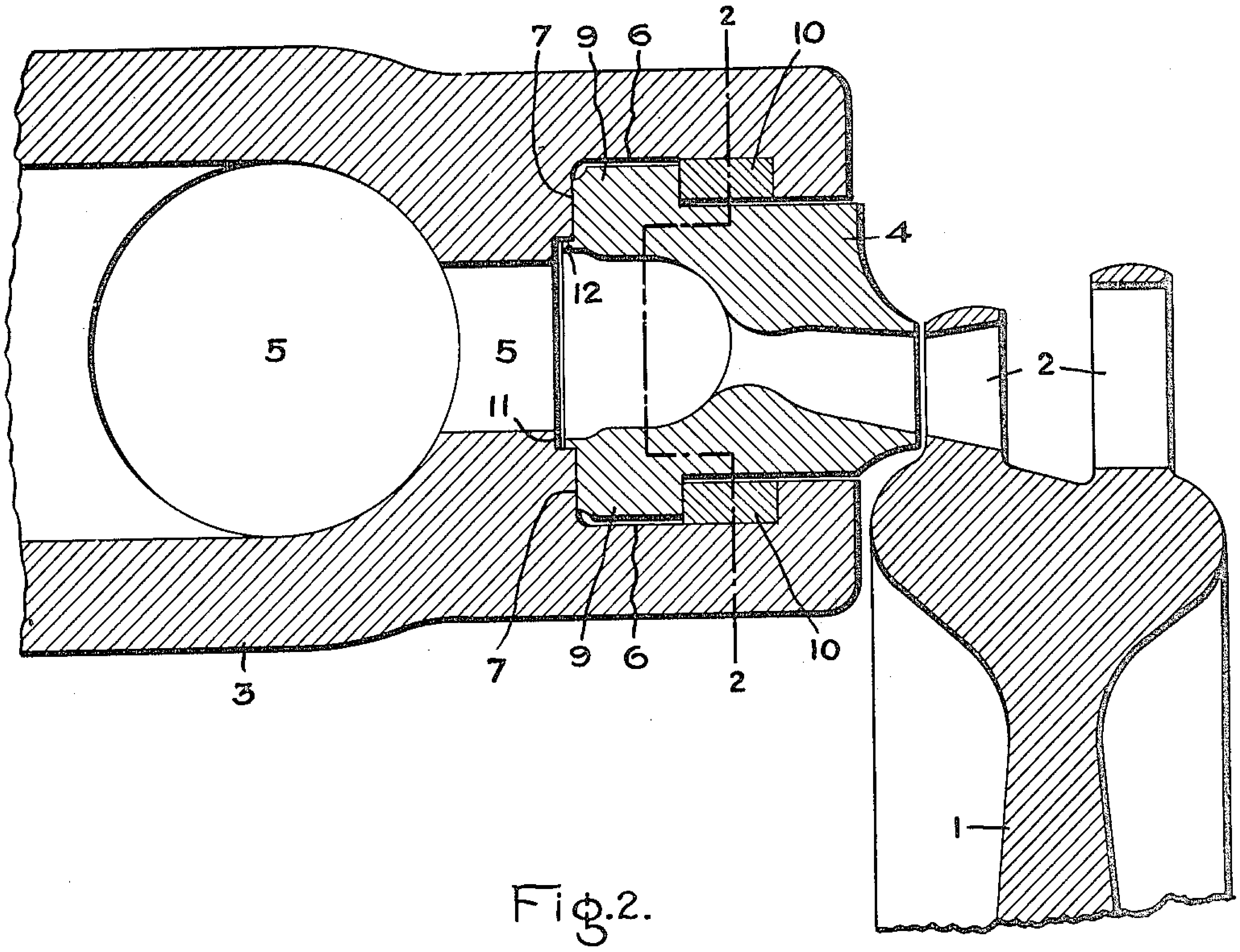
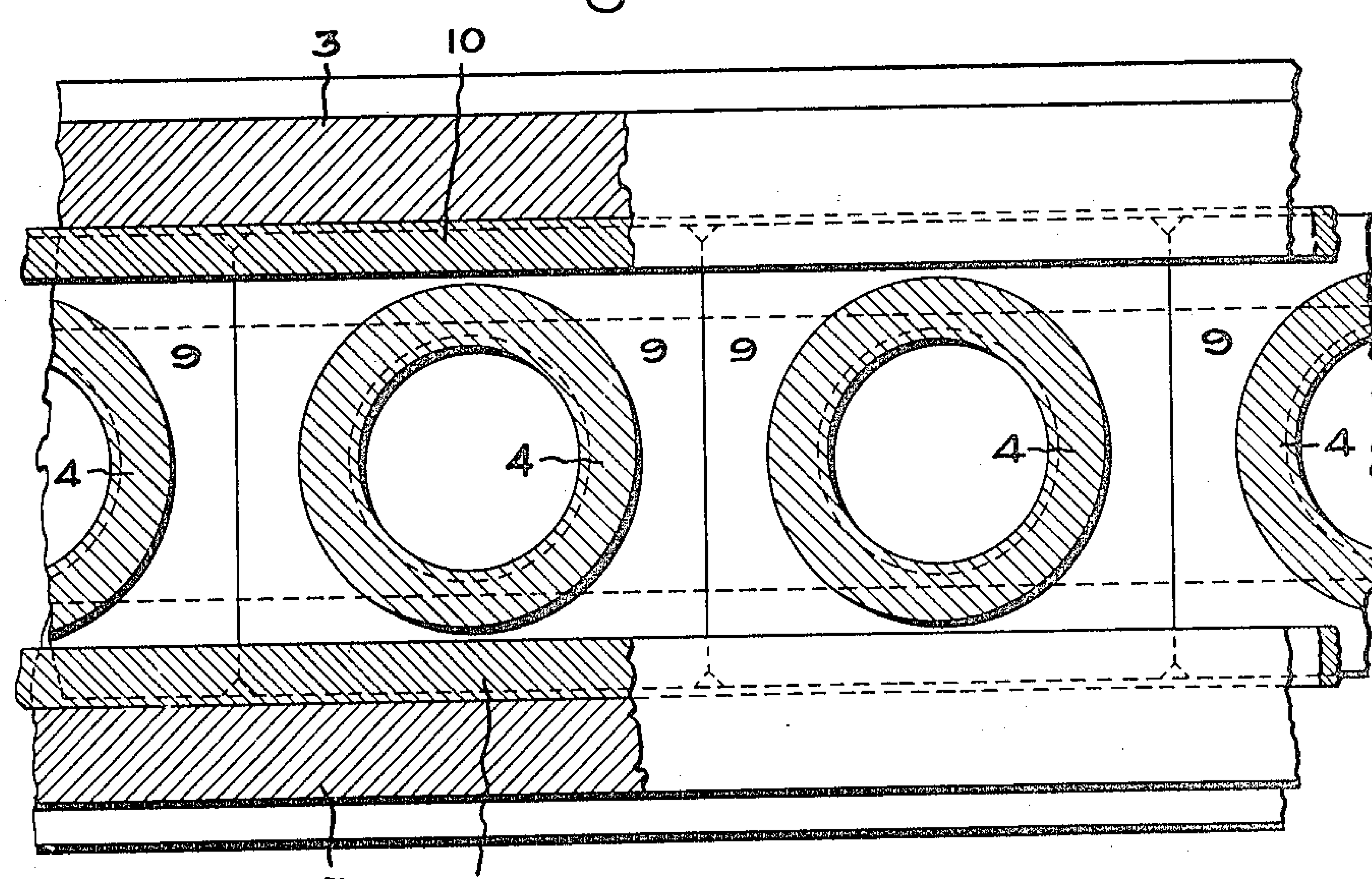


Fig.2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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ATTACHING MEANS FOR NOZZLES.

1,154,777. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed February 21, 1914. Serial No. 820,327.

To all whom it may concern:

Be it known that I, WALTER KIESER, a citizen of the Swiss Republic, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Attaching Means for Nozzles, of which the following is a specification.

My invention relates to turbines and particularly to nozzles and to the means for attaching them to their holders.

In manufacturing turbines it is desirable for various reasons to construct the nozzles from a material different from that of which the holder is constructed. In arrangements as heretofore used, however, this has often led to warping and deformation due to difference in the coefficients of expansion of the respective members, the nozzles, in general, having a higher factor of expansion than that of the holder. This trouble has been experienced particularly where nozzle holders having undercut annular slots for the reception of the nozzles have been used.

The object of the present invention is to provide an attaching means of the type referred to whereby I avoid any possibility of deformation occurring due to the different coefficients of expansion of the materials used in constructing the respective parts.

Referring to the drawing wherein I have illustrated a form which my invention may take, Figure 1 represents a longitudinal section through a fragment of a turbine, and Fig. 2 is a development on lines 2—2 of Fig. 1.

Located in operative relation to the bucket wheel 1 carrying the rows of buckets 2 is shown a nozzle holder 3 to which are attached nozzles 4 after the improved manner of my invention. The nozzle holder is provided with suitable passages 5 for the flow of motive fluid and with the undercut annular groove 6 which has one surface, as surface 7, ground to form a true seat.

The nozzle 4 is formed with the flange 9 and fits into the groove 6, the flange extending into the undercut portion thereof. As best shown in Fig. 1, the nozzle 4 is of lesser dimension than the groove so as to slide loosely therein and is formed with a ground packing surface which fits against the ground surface 7 of the groove to form a tight packing. The flange 9 is of materially less thickness in an axial direction than the axial depth of the undercut portion of the groove and in order to hold the packing surface of the nozzle on to the surface 7 I provide suitable members as shown at 10. These members are preferably formed of a slightly yielding material and may take the form of wedges or other desired shapes. Usually they will be longer than the flanged portion of each individual nozzle section. For guiding and centering the nozzle with relation to its holder suitable projections or lips may be formed on one of such members for cooperating with the other member.

In the drawing I have shown the base of the groove 6 as formed with a second annular groove 11, in contact with the sides of which are the flanges or lips 12 carried by the nozzles, which flanges are formed of less axial depth than is the groove 11. I desire to have it understood, however, that my invention is by no means limited to this arrangement as various other arrangements may be used.

By my invention it will be clear that the nozzles may expand to a greater or less extent quite independently of the holder thereby avoiding any possible deformation due to the unequal expansion of the nozzles and holder.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a nozzle fastening means, a holding member having an undercut groove, a nozzle member having a flange projecting into the undercut portion of said groove, said nozzle member and flange being of lesser dimension than the groove, means carried by one of said members and coöperating with the other for centering and guiding the nozzle member with relation to the groove so that it is spaced from the opposite sides thereof, and means for holding the flange of the nozzle member against the bottom surface of the groove.

2. In a nozzle fastening means, a holding member having an undercut groove, a nozzle member having a flange projecting into the

undercut portion of said groove, said nozzle member and flange being of lesser dimension than the groove, means carried by one of said members and coöperating with the other for centering and guiding the nozzle member with relation to the groove so that it is spaced from the opposite sides thereof, and yielding means for holding the flange of the nozzle member against the bottom surface of the groove.

3. In a nozzle fastening means, a holder having an undercut groove and a centering groove, a nozzle having a flange projecting into the undercut portion of said groove, said nozzle and flange being of lesser dimension than the groove, projections carried by the nozzles and coöperating with the centering groove for guiding and centering the nozzles, and yielding members for holding one surface of the flange against a surface of the groove.

4. In a nozzle fastening means, a holder member having an undercut groove, a nozzle member having a flange projecting into the undercut portion of said groove, said nozzle member and flange being of lesser dimension than the groove, spaced means carried by one of said members and engaging the other for centering the same, and yielding means for holding at least one surface of the flange against a surface of the groove.

5. In combination, a holder having an undercut groove, a plurality of nozzles each having a flange that projects into the groove for holding it, the flanges of two adjacent nozzles also serving as spacing devices, means for positioning the nozzles in the groove so that they are spaced from the sides thereof, and means for forcing the said flanges against the bottom of the groove.

6. In combination, a holder having fluid passages and an undercut groove, a plurality of nozzles each having a flange extending entirely around it for holding the same within the groove, said flanges also serving as spacing devices, means for positioning the nozzles so that the passages therein will register with those in the holder, and means for forcing the said flanges against one wall of the groove and preventing the leakage of motive fluid from the passages.

In witness whereof, I have hereunto set my hand this 5 day of February, 1914.

WALTER KIESER.

Witnesses:

ERICH ÜBERLÉE,

GUST. HÜLBROCK.