June 3, 1930. J. P. EASTMAN 1,761,521

MACHINE FOR CONTRACTING FERRULES

Filed Nov. 24, 1924

Fig. 1.

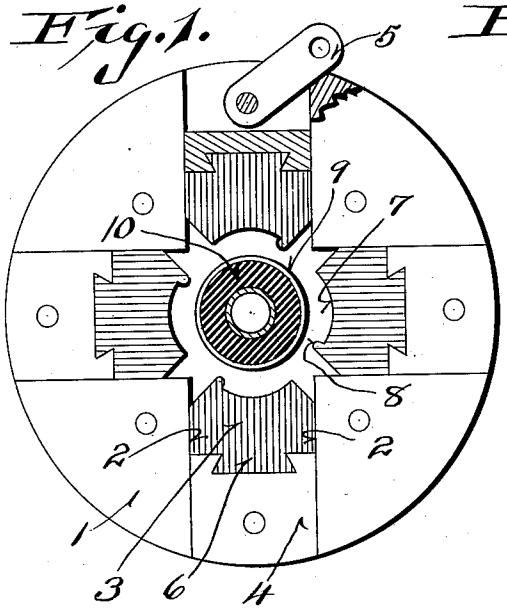


Fig. 2.

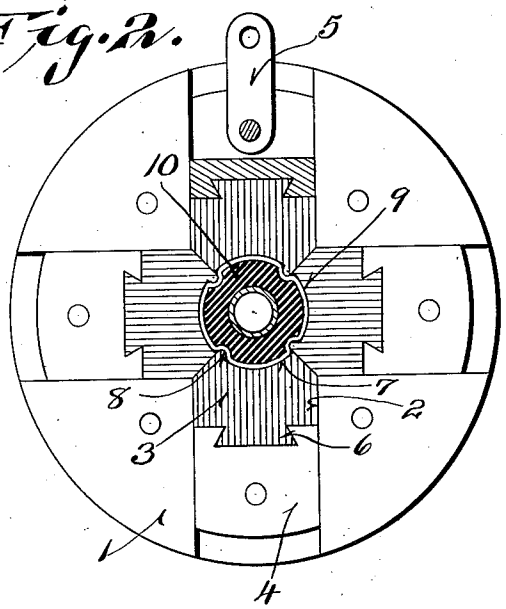


Fig. 3.

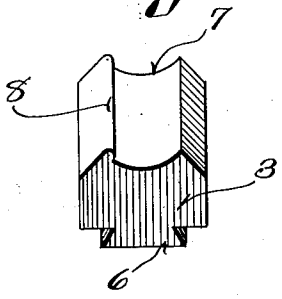
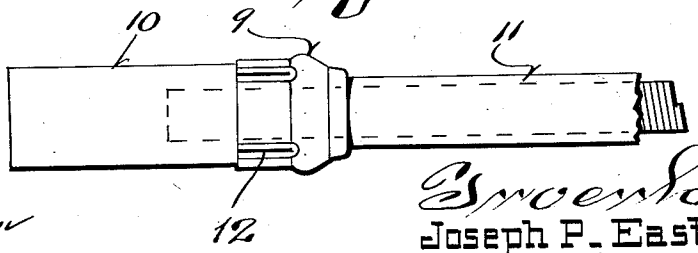


Fig. 4.



Inventor
Joseph P. Eastman

Witness
G. P. Britt

Witness

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UNITED STATES PATENT OFFICE

JOSEPH P. EASTMAN, OF MANITOWOC, WISCONSIN, ASSIGNOR TO EASTMAN MFG. CO., OF MANITOWOC, WISCONSIN

MACHINE FOR CONTRACTING FERRULES

Application filed November 24, 1924. Serial No. 751,954.

This invention relates to machines for contracting ferrules and similar members, and is particularly directed to the construction of face pieces or dies for such machines.

In general this invention is an improvement over that disclosed in United States Patent No. 758,195 issued April 26, 1904 to Schweinert et al.

In contracting ferrules such for instance as those employed in holding a flexible end upon a pipe it has been the practise to provide circularly recessed face pieces or dies, as disclosed in the above noted patent. These dies when fully contracted were designed to produce a circular contracted ferrule, but it was found in actual practise impossible to contract the ferrule to a perfect cylindrical contour. The metal gave at its weakest points and would not flow as was intended and consequently oval and other shapes were produced instead of cylindrical. In addition to this numerous irregularities were formed in the ferrule and a consequent insecure gripping action thereof was the result.

This invention is designed to overcome the above noted defects and objects of such invention are to provide a ferrule contracting machine which is so constructed that the ferrule is uniformly contracted, and corrugations are provided to take up the excess metal in the ferrule and to thus secure the desired contraction in addition to the shaping of the ferrule to a cylindrical contour, thus insuring uniform binding of the ferrule upon the flexible end of the pipe.

Further objects are to provide dies which may be employed to replace the dies now in use in ferrule contracting machines and to provide the dies with means which will form the depressions in the ferrule and will thus uniformly and evenly contract such ferrule.

An embodiment of the invention is shown in the accompanying drawing, in which:—

Figure 1 is a front view of the machine partly in section showing merely the essential portions thereof and showing the dies in open position.

Figure 2 is a view corresponding to Figure 1 showing the dies contracted, and showing the ferrule when it has been contracted by the dies.

Figure 3 is a view of a die removed from the machine.

Figure 4 is a fragmentary view showing the end of a gas pipe with the flexible end piece held in position by the contracted ferrule.

In the drawings, the operating ring similar to that disclosed in the above noted patent has been omitted for the sake of clearness, as such operating means is identical with that disclosed in such patent. The machine is provided with guiding members 1 which are circular exteriorly, and which provide flat faces 2 between which the several dies 3 slide. These dies are carried in crosshead members 4 which removably receive such dies, and which are operated by means of toggle links 1 such as indicated at 5 in Figures 1 and 2. Such toggle links when moved to positions shown in Figure 2, force the dies inwardly into their most contracted position.

The dies or face pieces 3 are preferably provided with a dovetailed portion 6 which slidably fits into a corresponding part of the crosshead, as shown in Figures 1 and 2.

The dies, it will be noted, are provided with cylindrical surfaces 7 which are contoured to the exact size desired for the contracted ferrule. Each die is provided, preferably adjacent one end, with a lip or ridge 8. This lip or projection is preferably rounded so as to avoid cutting the metal ferrule 9.

In using the device, the end piece 10, which is usually of rubber or similar material, is slipped over the pipe 11, and the ferrule 9 is slipped over the rear portion of the end piece 10. Thereafter, the assembled parts are positioned in the machine with the ferrule between the expanded dies. The machine is operated to cause the dies to move inwardly into engagement with the ferrule, and the tongues 8 depress regularly spaced portions of the ferrule and take up the metal of the ferrule while it is being contracted, the cylindrical surfaces 7 insuring a uniform cylindrical shape for the contracted ferrule.

The contracted ferrule appears, as shown in Figure 4, and it will be noted that such

ferrule is provided with regularly spaced depressed portions 12 which not only take up the excess metal of the ferrule, but also project into the rubber end piece 10, as shown in Figure 2, thus securely gripping the end piece and also insuring a uniform contraction of the ferrule with consequent binding of the end piece upon the pipe.

It will thus be seen that means have been provided for uniformly contracting a ferrule upon the end member of a pipe and that such ferrule will be free from irregularities and uneven binding of the end piece upon the pipe will be wholly avoided.

It will further be seen that an improved form of die has been provided for ferrule contracting machines which may be readily substituted for the dies now in use, and which will function in a new and effective capacity to prevent the formation of irregular shaped ferrules.

Although the invention has been described in considerable detail, it is to be understood that the invention may be variously embodied and is, therefore, to be limited only as claimed.

I claim:

1. A die for a ferrule contracting machine comprising a body portion provided with a cylindrical shaping surface adapted to engage the ferrule, said surface having a smaller radius of curvature than the initial radius of curvature of the ferrule and having a projecting rib adapted to extend into the ferrule and take up excess material in said ferrule when such ferrule is contracted.

2. In a ferrule contracting machine, the combination of a plurality of radially arranged crossheads, guides therefor, means for moving said crossheads inwardly towards a central point, and a plurality of dies carried by said crossheads and adapted to slide between said guides, each of said dies having a cylindrical inner face provided with a rib having a rounded end, said ribs being adapted to form inwardly directed corrugations in said ferrule.

3. In a ferrule contracting machine, the combination of a plurality of radially arranged crossheads, guides for said crossheads, means for moving said crossheads inwardly towards a central point, a plurality of dies carried by said crossheads and adapted to slide between said guides, each of said dies having a cylindrical surface which together define the surface of a cylinder when said dies are in their contracted position, and each of said dies having a rounded rib projecting from one corner thereof, said ribs being spaced in a regular manner when said dies are in their contracted position whereby the ferrule is formed with a cylindrical portion and with a plurality of longitudinally extending depressions.

4. A ferrule contracting machine comprising a plurality of dies, each die having a body portion provided with a cylindrical face for contacting with and shaping the ferrule and having means for forming inwardly depressed portions in the ferrule, said dies being adapted to leave the ferrule in the form of a generally cylindrical shell directed inwardly only from the generally cylindrical body of the ferrule and of smaller diameter than the initial diameter of the ferrule, and means for simultaneously forcing said dies inwardly.

5. In a ferrule contracting machine the combination of a plurality of radially movable dies adapted to form a generally cylindrical ferrule, means for moving said dies inwardly, and means for preventing the surplus metal of the ferrule from forming outwardly projecting crimps between the dies during the inward travel of the dies, said means comprising a rib adjacent each of the several interspaces between the dies, whereby the excess metal is started inwardly by said ribs and only inwardly depressed channels are formed in the contracted ferrule.

6. In a ferrule contracting machine, the combination of a plurality of radially movable dies adapted to form a generally cylindrical ferrule, means for moving said dies inwardly, said dies each having a single rib thereon located adjacent the interspaces between the dies with the ribs of successive dies non-contiguous.

7. A ferrule contracting machine comprising a set of ferrule contracting dies adapted to contract a ferrule into a generally cylindrical form around an article of yielding material, such dies having means for producing inwardly depressed longitudinally extending projecting ribs in the ferrules, whereby such ribs intrude into the yielding material, said dies having concave surfaces for shaping the outer surface of the ferrule and means for simultaneously moving said dies inwardly.

8. A ferrule contracting machine comprising radially moving dies, such dies comprising elements adapted to form inwardly projecting longitudinal ribs in the ferrule, and elements adapted to form the ferrule into a generally cylindrical shape, such first-named elements being arranged to meet the ferrule earlier than such second-named elements, during the inward journey of the dies.

9. A ferrule contracting machine comprising a set of ferrule contracting dies having concave surfaces adapted to contract a ferrule into a generally cylindrical form around an article of yielding material, said dies having means for producing inwardly depressed longitudinally extending projecting ribs having abrupt shoulders spaced inwardly from the outer edge of the ferrule, whereby said ribs intrude into the yielding material and the shoulders form abrupt stops to prevent withdrawal of the yielding material, and

means for simultaneously moving said dies inwardly.

In testimony that I claim the foregoing I have hereunto set my hand at Manitowoc, in the county of Manitowoc and State of Wisconsin.

JOSEPH P. EASTMAN.