March 2, 1937. N. T. McKEE 2,072,680

SWAGING MACHINE

Filed Nov. 23, 1935 2 Sheets-Sheet 1

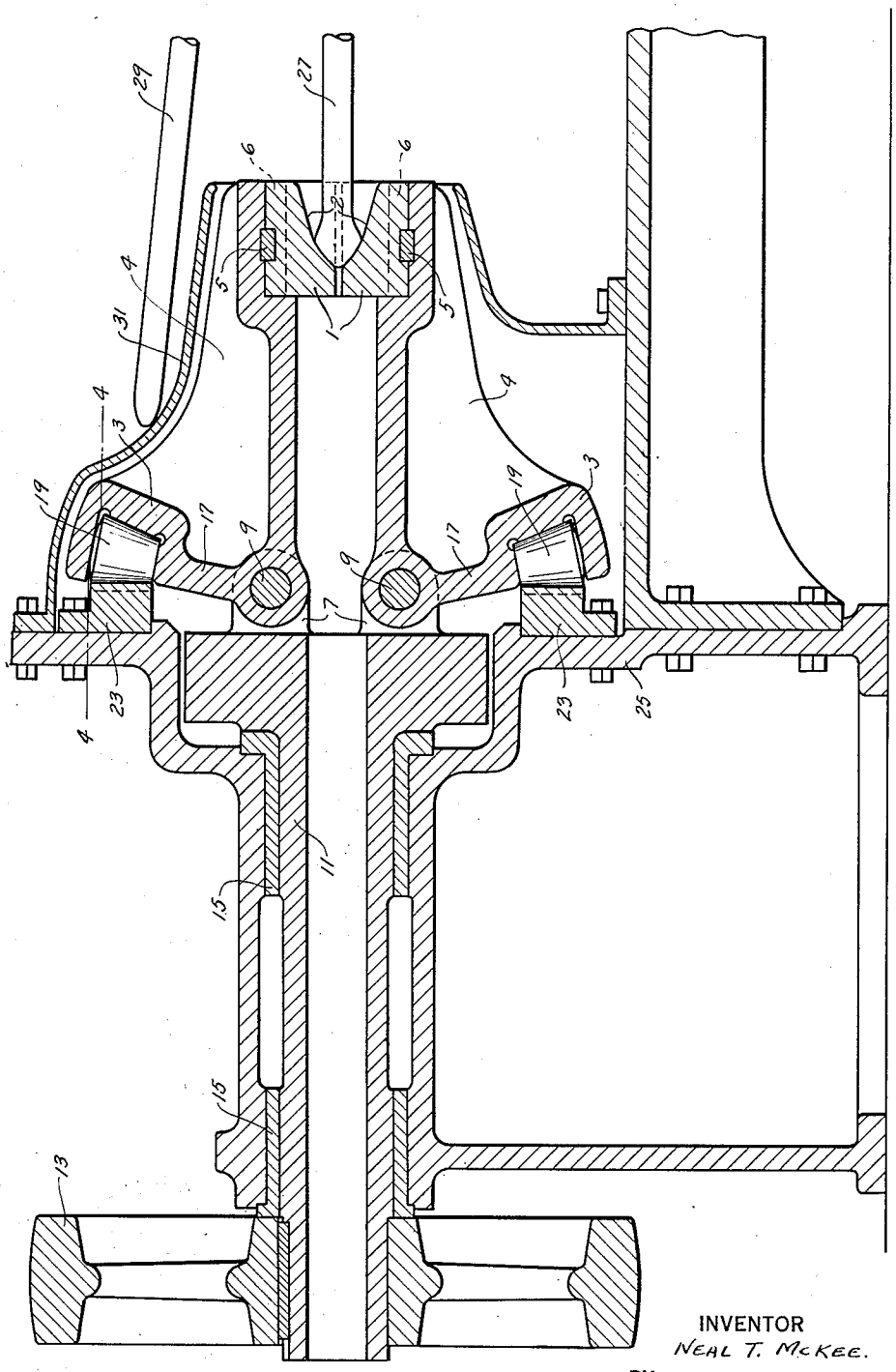



FIG. 1.

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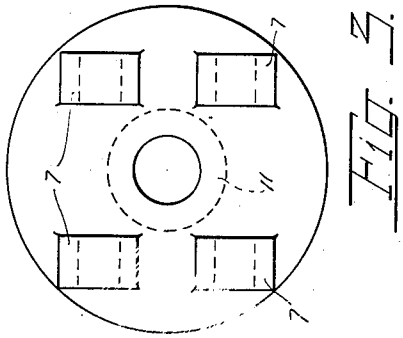



Fig. 3.

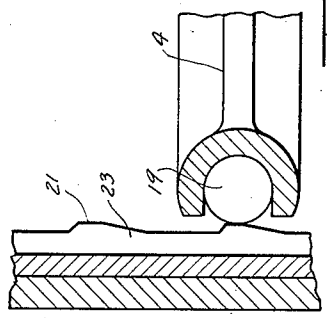



Fig. 4.

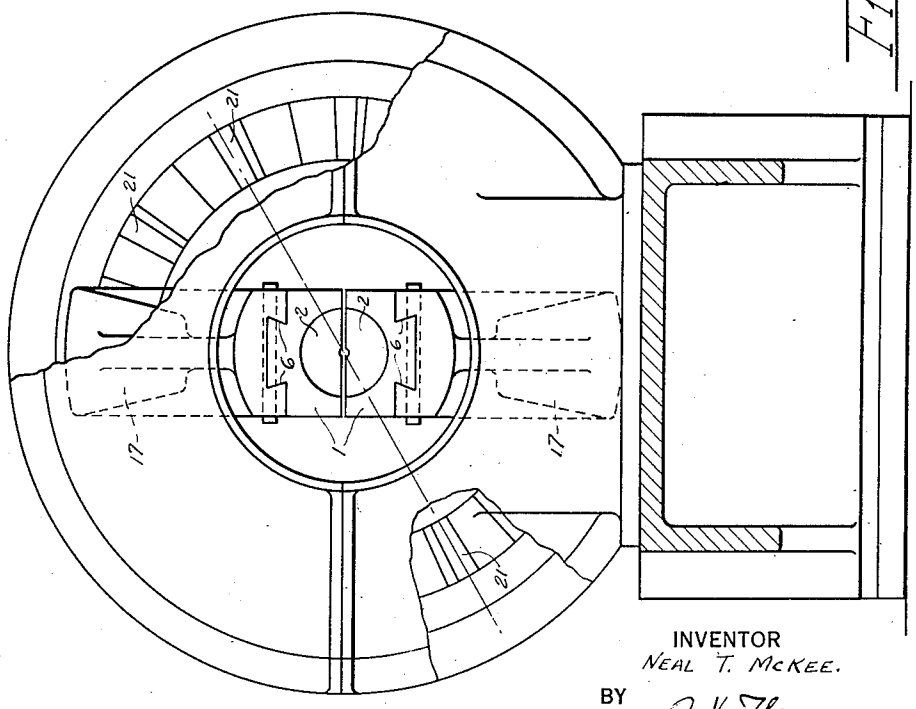



Fig. 2.

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Patented Mar. 2, 1937

2,072,680

# UNITED STATES PATENT OFFICE

2,072,680

## SWAGING MACHINE

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Application November 23, 1935, Serial No. 51,187

1 Claim. (Cl. 78—21)

The present invention relates to swaging machines of the general type described in U. S. Patent 1,339,054, granted to Brandt and Langelier. The invention in that patent is for an improvement adapting such machines to swaging done to close the open end of an incomplete return bend or so-called "breeches piece." These breeches pieces are fabricated directly on the two pipes which they connect and out of the pipe material itself. With the form of swaging machine disclosed in the patent, certain inconveniences arise which it is the purpose of the present invention to remove.

In describing the present invention reference will be made to the accompanying drawings. In these drawings Fig. 1 is a vertical, axial section of a swaging machine embodying my invention; Fig. 2 is an end elevation looking from the right of Fig. 1; Fig. 3 is an end view from the same direction of a shaft forming part of the swaging machine; and Fig. 4 is a section on line 4—4 of Fig. 1.

Swaging machines of this type have two diametrically opposite hammers or dies reciprocating in unison radially against and away from the work. In the swaging machine described in the patent referred to above, the hammers or die blocks are located well within the body of the machine. As long as the operator has to deal with only two pipes connected by a single return bend, the difficulty with which the present invention deals does not arise. Frequently, however, a series of pipes are to be united by return bends located alternately at opposite ends, connecting the whole series into a single unit presenting a serpentine path to the fluid flowing through it. Fabrication of such a unit presents the difficulty that after the first two pipes are connected the pipes already connected are in the way and render it difficult or impossible to insert the return bend to be operated on into the machine without springing the fabricated portion to such an extent as to exceed the elastic limit of the material. This is particularly true if the constituent pipes are short. In such case the angle by which two adjacent pipes have to be sprung apart is relatively large. It is the purpose of the present invention to obviate or minimize this difficulty.

In the drawings, the two hammers or dies which operate on the work are shown at 1. The surfaces 2 coming in contact with the work are suitably shaped as will be understood by those versed in the art. The blocks are secured in any desired way to the horizontal arms 4 of angular levers 3. In the form illustrated this is done by dovetailing each of the dies 1 into the end of its arm 4, as at 6, and locking them in position by means of keys 5. The angular levers 3 are each pivotally mounted in two lugs 7—7 by means of pins 9—9. These lugs are integrally or otherwise made part of the hollow shaft 11 which is rotated in bearings 15—15 by means of the pulley wheel 13. The levers are therefore rotated together with the shaft.

Mounted in the arm 17 of each of the levers is a roller 19. These two rollers 19 come into contact successively with cams 21 of the cam ring 23 as the shaft 11 is rotated. The cam ring 23 is bolted or otherwise secured rigidly in place on the frame 25 and is preferably vertical with the cams also vertical, although the cams might obviously be arranged at some other angle or parallel to arms 4. When the rollers 19 come into contact with the cams 21, they are thrown outward toward the right as viewed in Fig. 1 thereby causing the hammer blocks 1 to come together or at least approach each other. If the work is in place as illustrated in Fig. 1 where 27 represents an incomplete return bend being operated on, the hammer blocks will be caused to impact against this work. After striking it they will rebound. In addition, centrifugal force will after impact against the work cause the blocks and lever arms 4 to move in a direction away from the work and the rollers 19 in a direction toward the cam ring 23. There will therefore result a rapid vibratory motion of the levers and hammer blocks well adapted to effect the desired swaging action.

The cams on ring 23 are diametrically opposite each other so that the dies vibrate in unison toward and away from the work. The number, height, and shape of the cams will depend on the rate at which the shaft is to revolve.

The desirable feature of this present arrangement as compared with that of the patent mentioned above is that neighboring pipes such as 27 and 29, whose other ends are already connected by a return bend, do not need to be sprung apart very far to enable the operator to insert into the die the return bend being worked on. The arms 4 of the levers are shaped so as to minimize the angle by which the pipes have to be sprung apart.

In order to prevent the pipe such as 29, which is sprung out of the way, from being struck by the revolving levers 3, a guard 31 is provided.

It will be obvious that some changes may be made in the arrangement disclosed without sacrificing the spirit of the invention and such va-

riations are to be considered as being within the scope of the following claim.

What I claim is:

In a swaging machine, a stationary frame, a shaft mounted for rotation in the frame, two levers mounted on diametrically opposite pivot pins carried by said shaft and at right angles to its axis, said levers having one arm substantially at right angles to the axis of the shaft and the other arm substantially parallel to said axis, a roller on the end of the first arm of each lever, a cam ring mounted on the frame coaxially with the shaft and having a plurality of pairs of diametrically opposite cams arranged for engagement by said rollers, die blocks at the ends of the second arms of said lever, the second arms being of small dimension in a direction at right angles to said axis and extending a considerable distance from the pivots, whereby work can be inserted between the die blocks for operation without interference with any part of the machine by parts fixed to the work and lying closely adjacent laterally to the work.

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