

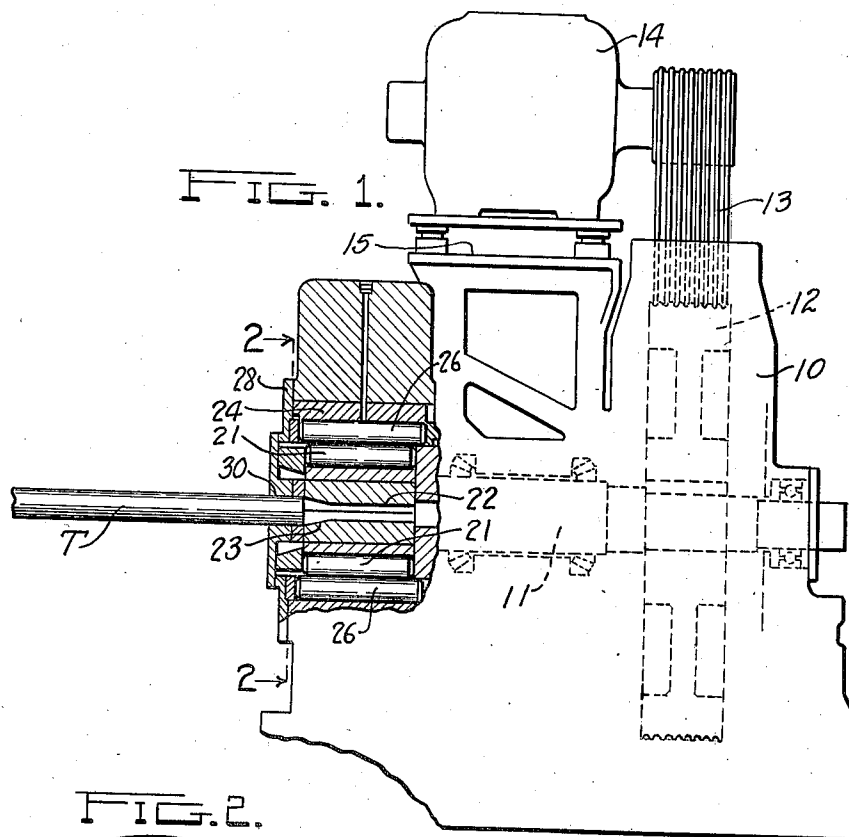
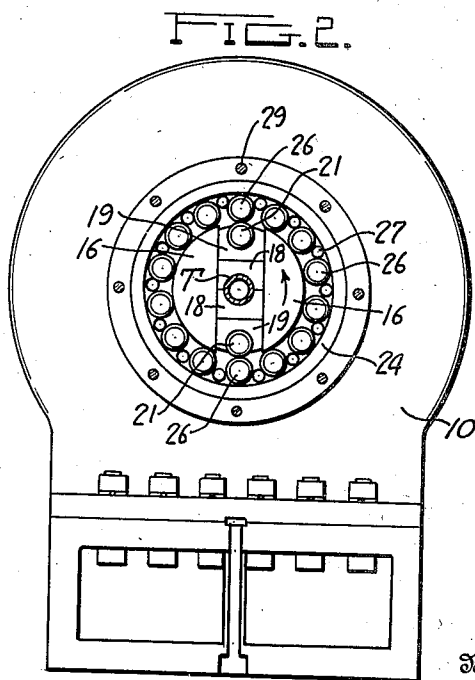
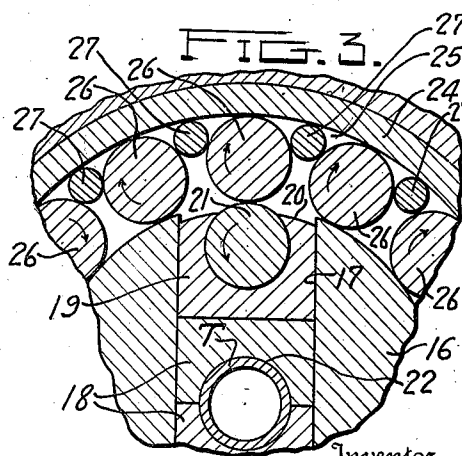
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SWAGING MACHINE

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## SWAGING MACHINE

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5 Claims. (Cl. 78—21)

This invention relates to swaging machines for use in reducing the diameter of tubes, rods and the like.

Heretofore, swaging machines for reducing tubes or solid rods have been equipped with an annular series of striker rolls against which hammer blocks cooperating with the die blocks in a rotary spindle, cooperate so that recurrently the hammer blocks strike against the striker rolls to effect the desired swaging operation. To obtain most satisfactory results, it is desirable that the striker rolls be spaced a slight distance from each other and for that purpose, different devices have been employed. The striker rolls have been mounted in cages which hold them in predetermined spaced relation but this arrangement is objectionable because cuttings or other particles find their way between the peripheral surface of the striker rolls and the cage and prevent the turning movement of the rolls so that in a short time the rolls become deformed and are rendered useless. It has also been proposed to dispose spacer rolls between the striker rolls, the spacer rolls being disposed in cages so that they are held against translatable movement but the same difficulty is inherent in that arrangement in that the spacer rolls are soon held against turning movement and as a consequence the parts are soon rendered useless, necessitating replacement of the spacer rolls. This is not only time-consuming but a somewhat difficult operation.

An object of this invention is to overcome the above difficulties by spacing the striker rolls from each other in such manner that creeping of the annular series of striker rolls is afforded although movement thereof concomitantly with the rotary spindle head is prevented.

Another object is to produce a swaging machine in which an efficient braking means is provided to restrain the annular series of striker rolls from translatable movement but at the same time permitting slight translatable movement as well as relatively unrestricted axial turning movement thereof.

A further object is to produce a new and improved swaging machine having the novel features of construction, arrangement and operation hereinafter described.

For purposes of illustration but not of limitation, an embodiment of the invention is shown in the accompanying drawing in which

Figure 1 is a side elevation partly in section of a swaging machine;

Figure 2 is an end elevation of the machine sub-

stantially on the line 2—2 of Figure 1 with the face plate removed; and

Figure 3 is an enlarged fragmentary sectional view showing striker rolls, spacer rolls, hammer and die blocks and associated parts.

The illustrated embodiment of the invention comprises a main frame 10 in the intermediate portion of which is mounted a horizontally disposed spindle 11 suitably supported on anti-friction bearings. Fixed to one end portion of the spindle 11 is a sheave 12 operatively connected by a series of belts 13 to a sheave driven by an electric motor 14 which is supported on a platform 15 on the upper portion of the main frame 10.

At the opposite end of the spindle 11 is an enlarged annular head 16 which is formed with a transverse slot 17 to receive a pair of die blocks 18 on the outer sides of which are respectively hammer blocks 19. Each hammer block 19 has its outer end wall 20 curved and is formed with a recess to receive a hammer roll 21, a portion of the peripheral surface of which projects outwardly of the curved end wall 20. The hammer rolls are mounted in their respective hammer blocks in such a manner that they are able to turn in order to present different surfaces to be struck by the striker rolls as will hereinafter appear. As shown, the die blocks 18 have complementary semicircular grooves 22, the outer ends of which flare or taper outwardly as indicated at 23. A tube T is shown introduced between the die blocks 18 and is fed into the machine from the outer end and thence passed axially through the bore of the spindle 11 as will be readily understood by those skilled in this art.

Spaced radially from the peripheral surface of the spindle head 16 is a hardened inner or liner ring 24 suitably secured to the main frame 10. Disposed in the cavity 25 between the liner ring 24 and the spindle head 16 is an annular series of striker rolls 26, in this instance of approximately the same diameter as that of the hammer rolls 21, although somewhat longer than the hammer rolls so that the end portions thereof extend beyond the ends of the hammer rolls as indicated on Figure 1.

In accordance with the present invention the striker rolls 26 are spaced from each other a slight distance by means of smaller rolls 27 which are substantially co-extensive with the adjacent striker rolls and in contact therewith and also in contact with the liner ring 24. As indicated by the arrows on Figure 3, the spindle head 16 is driven in a counterclockwise direction and during the rotation thereof the hammer rolls 21 suc-

cessively impinge against the striker rolls 26. The impingement of the hammer and striker rolls causes the hammer rolls to turn slightly in one direction and the striker rolls to rotate slightly in the opposite direction as indicated by the arrows. Accordingly the adjacent spacer rolls 27 are caused to turn slightly in a direction opposite to the direction of turning movement of the striker rolls. Thus the several rolls are caused to turn slightly upon their respective axes in order to bring different surfaces recurrently into operation and thus militate against wear and deformation.

The spacer rolls 27 not only serve effectively to space the striker rolls from each other but also effect a braking action due to their wedging relation with the striker rolls to prevent racing of the annular series of striker rolls along the spindle head 15. It is desirable that the striker rolls creep or have a slight amount of translatory movement around the spindle head and this is made possible by the use of the above described spacer rolls, so that not only are the spacer and striker rolls free to turn on their own axes but also the entire arrangement of rolls gradually moves about the spindle head.

Closing the opening adjacent the spindle head 16 is an end plate 28 which is secured in place by a series of bolts 29 and has an opening 30 aligned with the opening through the die blocks 18 for the passage of the tube T. It will be understood that solid rods instead of tubes are handled by a machine of this character.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. In a swaging machine having a rotary spindle provided with transversely movable die blocks and hammer blocks and an annular series of striker rolls disposed about the spindle and

against which the hammer blocks are adapted recurrently to engage, and means for spacing said striker rolls from each other, said means comprising rolls relatively smaller than the striker rolls and mounted for translatory movement with the striker rolls.

2. In a swaging machine as claimed in claim 1, comprising a continuous unbroken annular surface with which the outer side of said striker rolls engage and said spacer rolls engaging said surface and also the adjacent pair of striker rolls.

3. A swaging machine as claimed in claim 1, comprising a hammer roll mounted for turning movements in each hammer block and projecting from the outer end thereof for contact with said striker rolls respectively.

4. In a swaging machine, the combination of a rotary spindle, transversely movable die blocks carried by said spindle, means for recurrently forcing said die blocks towards each other, said means including an annular series of striker rolls, means for mounting said rolls to enable the series to have translatory movement about the spindle, and spacer rolls disposed respectively between adjacent striker rolls and arranged to have translatory motion therewith.

5. In a swaging machine, the combination of a rotary spindle head having a transverse slot therein, a pair of die blocks in said slot movable toward and away from each other, a hammer block on the outer side of each die block having a part projecting outwardly from the periphery of said spindle, means providing an annular cavity with a continuous unbroken outer wall surrounding said spindle head, an annular series of striker rolls fitting said cavity and having translatory movement relative to said head, and a relatively small spacer roll between each pair of striker rolls and movable along with said striker rolls.

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