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J. B. TIEDEMANN

2,301,094

STOCK FEEDING MECHANISM FOR SWAGING MACHINES

Original Filed July 26, 1939

2 Sheets-Sheet 1

FIG. 1.

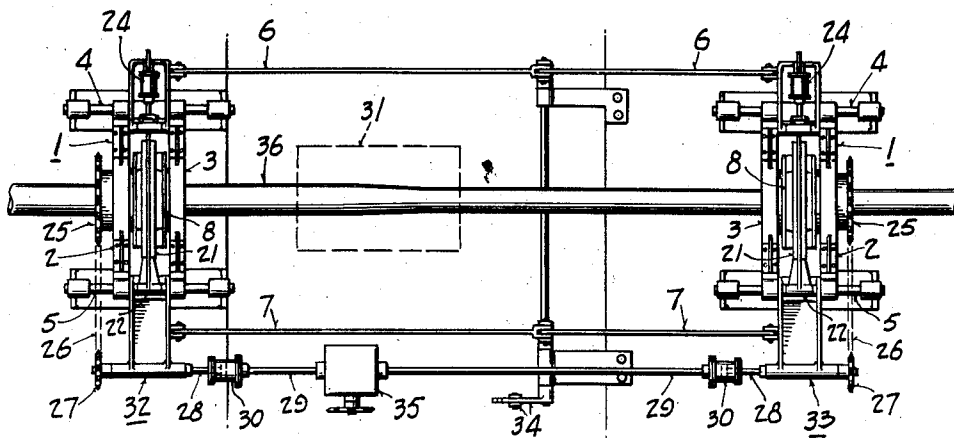
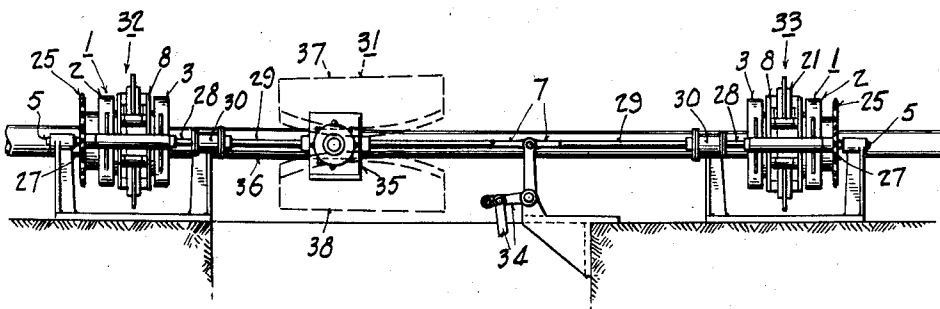


FIG. 2.



Julius B. Tiedemann
INVENTOR.

BY *Clavin A. Andrus*
ATTORNEY.

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FIG. 3.

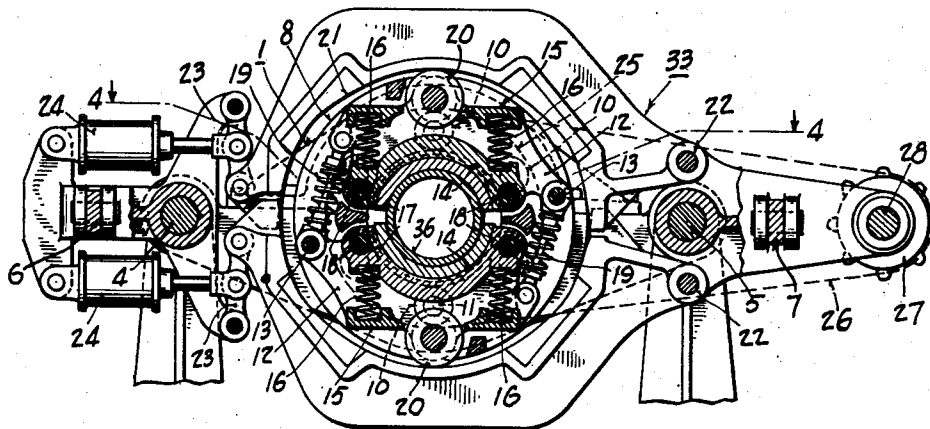
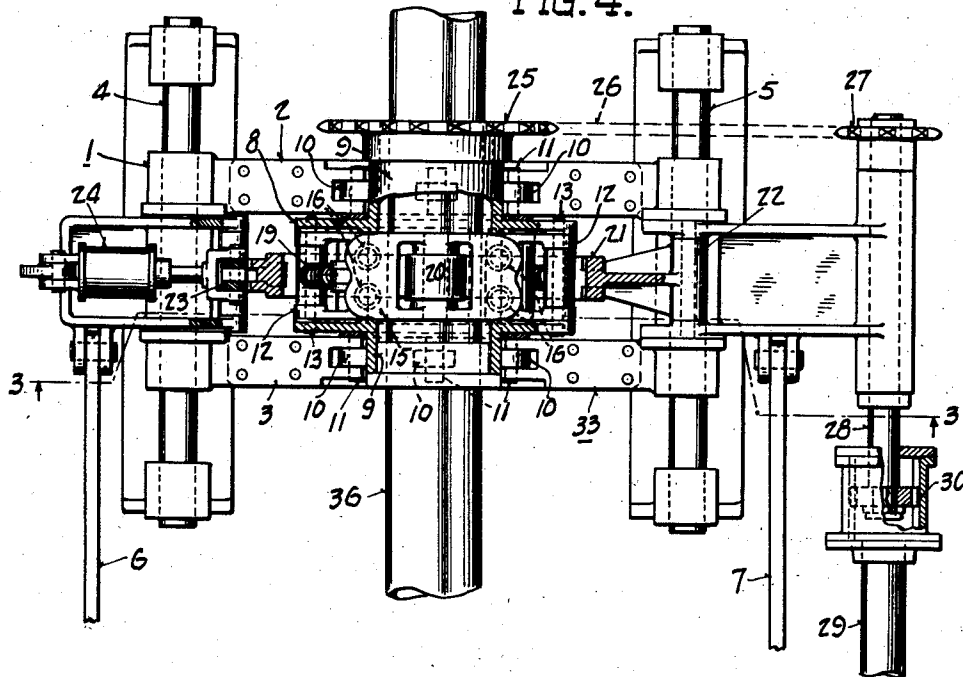


FIG. 4.



Julius B. Tiedemann
INVENTOR.

BY *Thom C. Andrus*
ATTORNEY.

UNITED STATES PATENT OFFICE

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STOCK FEEDING MECHANISM FOR SWAGING MACHINES

Julius B. Tiedemann, Milwaukee, Wis., assignor
to A. O. Smith Corporation, Milwaukee, Wis.,
a corporation of New York

Continuation of application Serial No. 286,627,
July 26, 1939. This application June 22, 1940,
Serial No. 341,869

9 Claims. (Cl. 80—14)

This invention relates to stock feeding mechanism for swaging machines, and more particularly for intermittently feeding and rotating tubular stock in synchronism with intermittently operating die elements of machines similar to that set forth and claimed in my co-pending application Serial No. 276,046, filed May 27, 1939, for Pipe swaging machine, now Patent No. 2,247,863. This application constitutes a continuation of my co-pending application, Serial No. 286,627, filed July 26, 1939, for Stock feeding mechanism for swaging machines, now Patent No. 2,247,864.

The principal object of the invention is to provide a simple and efficient feeding mechanism which will have low maintenance cost and be adjustable in its movement.

Another object is to provide means for readily releasing the stock so that it may be stripped from its mandrel.

Other objects will appear in connection with the description of an embodiment of the invention illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a top plan view of the feeding device, in schematic relation to the swaging machine;

Fig. 2 is a side elevation showing the drive for the feeding devices and means for synchronizing the same with the swaging machine;

Fig. 3 is a transverse section of the device taken on line 3—3 of Figs. 1 and 4; and

Fig. 4 is a top plan view of the device partly in section on line 4—4 of Fig. 3.

In accordance with the invention in its principal aspect the feeding device embodies a plurality of jaw elements pivotally mounted in a constantly rotating frame and actuated by a cam track to effect gripping and rotating of the pipe stock. The longitudinal feeding of the stock is preferably obtained by reciprocating the device bodily, thereby effecting a forward feed of the stock simultaneously with the rotation thereof. However, where such simultaneous action is not desired it is possible to utilize some other means for feeding the pipe forward at a time when it is not being rotated, in which case the rotating device could be mounted in a stationary frame. In the device the operation of the rotating jaws may be prevented by a quick removal of the cam track so that the jaws remain open and the stock may be readily inserted or removed.

Referring to the drawings, the frame 1 of the feeding mechanism comprises two spaced cross-

heads 2 and 3 secured together at their ends and mounted for limited reciprocation on stationary parallel rods 4 and 5 passing through suitable bearings in the respective ends of the cross heads. Drive rods or links 6 and 7 pivoted to the opposite ends of the cross heads serve to reciprocate the same on the supporting rods 4 and 5.

The frame 1 of the feeding mechanism carries a constantly rotating spider 8 having concentric tubular ends 9 at either end which are supported by rollers 10 mounted on pins 11 disposed in the non-rotating cross heads 2 and 3. Between the two tubular ends 9 is a space for receiving the clamping mechanism for gripping the pipe as it is passed through the mechanism.

The clamping mechanism comprises two or more clamping jaws 12 disposed to provide a tubular clamp and pivotally mounted on the pins 13 joining the two ends 9 of the spider on opposite sides of its axis.

The jaws 12 have their semi-circular recessed jaw faces 14 cushioned with respect to the bases 15 of the jaws to allow certain tolerances as to pipe sides and position. The cushioning of each jaw is accomplished by means of four compression springs 16 which are disposed to urge the jaw face 14 toward the pipe and away from the base 15 of the jaw. The movement of the faces 14 relative to the bases 15 is limited by the clearance 17 of pins 18 secured to the bases and passing through holes in the faces.

The jaws are constantly urged apart by means of compression springs 19 which are held by extensible links connecting the pivot pins 13 with the free end of the respective opposite jaw member. The operation of the jaws to clamp a pipe is obtained by means of a roller 20 mounted on each jaw base and riding against a stationary cam track 21. The cam track 21 is a non-circular so that twice during each complete revolution of the spider 8 and its jaws 12, the latter are pressed inwardly together and then separated. The shape of the cam track and the rate of revolution determines the time and frequency of clamping of the pipe.

When it is desired to release the pipe as in introducing it to the machine and subsequently removing it from the machine, the cam track 21 is spread so as not to contact with rollers 20. This is accomplished by forming the cam track 21 of two complementary members, each controlling the operation of the rollers 20 over one-half of the revolution of the feeder, and each pivoted to the frame 1 at one end as at 22.

The free ends of the cam track members are brought together and separated at will by means of the toggle levers 23 operated by air cylinders 24 mounted on the frame 1.

The rotation of the spider 8 is accomplished by means of the sprocket 25 mounted on one of the tubular ends 9 and driven by a chain 26 from a second sprocket 27. The sprocket 27 is mounted on a rotating shaft 28 in a bearing at one end of the frame 1. The shaft 28 is splined to a drive shaft 29 as at 30 to allow for the desired reciprocation of the frame 1 for feeding the pipe.

In feeding pipe to a swaging machine 31, such as shown in Figs. 1 and 2 two feeding mechanisms 32 and 33 are employed, one in front of the machine and one at the rear thereof. The mechanisms 32 and 33 are driven for simultaneous reciprocation in synchronism with the movement of the swaging dies, by means of the links and levers 34 driven from the drive for the machine, and which reciprocates the drive rods or links 6 and 7 connected to the frames of both mechanisms.

The rotation of the mechanisms is effected by the common drive shaft 29 driven by suitable gearing 35 from the swaging machine. The speed of rotation may be varied relative to the speed of the swaging machine by changing the ratios of the drive. Likewise the distance of reciprocation or feed obtained with each feed stroke may be readily adjusted by adjustment means provided in the lever mechanism 34.

In operation, during the introduction of a pipe section 36 into the machine, the air cylinders 24 of the feed mechanism 32 are operated to separate the cam track members and release the jaws 12 until the end of the pipe blank approaches the swaging dies. Then the air cylinders 24 are operated to bring the cam track members together thereby causing the jaws 12 to grip the pipe and give it a quarter turn while the feed rods 6 and 7 move the entire frame and clamping mechanism to the right bringing the end of the pipe to a position between the open swaging dies 37 and 38. As the swaging dies close down on the pipe the cam track 21 effects a release of the jaws 12 and the pipe, not being gripped, ceases to move forward and also ceases to rotate. While the swaging dies engage the pipe the feeding mechanism returns to the left preparatory to again gripping the pipe to rotate it and feed it forward as soon as the swaging dies release it.

The pipe thus travels intermittently through the machine. As its forward end enters the feeding mechanism 33, the latter operates simultaneously with the mechanism 32 to effect continued feeding of the pipe. When the rear end of the pipe section leaves the feeding mechanism 32, the mechanism 33 effects the entire feeding of the pipe, and as the rear end of the pipe leaves the swaging dies, the mechanism 33 is made inoperative by operation of its air cylinders 24 and separation of its cam track members and the jaws 12 so that the pipe may be rapidly removed from the machine.

The extent of turning of the pipe during each feeding movement will depend largely upon shape of the cam track 21 and the speed of rotation. The pipe may continue to be rotated without forward feeding movement, but normally the forward feeding movement will take place only when the pipe is rotating. Where it is desired to feed the pipe forward at a time when it is not

being rotated, separate gripping and feeding mechanism should be provided, leaving the mechanism here shown to merely rotate the pipe at a time when it is not being fed forward.

Various embodiments of the invention may be provided within the scope and spirit of the invention as set forth in the accompanying claims. The invention is claimed as follows:

1. A device of the class described comprising constantly rotating mechanism having an axially extending opening therethrough to receive stock to be fed, means for giving said mechanism a limited axial reciprocation, means on said rotating mechanism for intermittently gripping the stock to effect its rotation and forward feed, and means for making said gripping means inoperative to provide for rapid insertion and removal of the stock from the device.

2. A device of the class described comprising constantly rotating mechanism having an axially extending opening therethrough to receive stock to be fed, means on said rotating mechanism for intermittently gripping the stock to effect its rotation and forward feed, and means for making said gripping means inoperative to provide for rapid insertion and removal of the stock from the device.

3. A device for feeding blanks to a forging or swaging machine, comprising a spider constantly rotating during successive forging and feeding operations and having an axially extending opening therethrough to receive stock to be fed, a plurality of clamping shoes carried by said spider for gripping the stock and movable radially toward and away from the stock, and means for intermittently pressing said clamping shoes inwardly to engage the stock.

4. A device for feeding blanks to a forging or swaging machine, comprising a spider constantly rotating during successive forging and feeding operations and having an axially extending opening therethrough to receive stock to be fed, a plurality of clamping shoes carried by said spider for gripping the stock and movable radially toward and away from the stock, and stationary means disposed to engage said clamping shoes to press them into engagement with the stock during a predetermined portion of the rotation of the spider.

5. A device for feeding blanks to a forging or swaging machine, comprising a spider constantly rotating during successive forging and feeding operations and having an axially extending opening therethrough to receive stock to be fed, a plurality of clamping shoes carried by said spider for gripping the stock and movable radially toward and away from the stock, means disposed to engage said clamping shoes to press them into engagement with the stock during a predetermined portion of the rotation of the spider, and means for removing said last named means to prevent its acting upon said clamping shoes.

6. A device for feeding blanks to a forging or swaging machine, comprising a spider constantly rotating during successive forging and feeding operations and having an axially extending opening therethrough to receive the stock to be fed, a plurality of clamping shoes pivotally mounted on said spider and having springs normally pressing the same outwardly away from engagement with the stock, and cam means for pressing said clamping shoes against said springs to effect a clamping of the stock during a predetermined period of revolution of the spider.

7. A device of the class described comprising a

constantly rotating spider having an axially extending opening therethrough to receive the stock to be fed, a plurality of clamping shoes pivotally mounted on said spider and having springs normally pressing the same outwardly away from engagement with the stock, cam means for pressing said clamping shoes against said springs to effect a clamping of the stock during a predetermined period of revolution of the spider, and means for removing said cam means from the effective path of its operation to prevent its closing said clamping shoes.

8. A device of the class described comprising a constantly rotating spider having an axially extending opening therethrough to receive the stock to be fed, a plurality of clamping shoes pivotally mounted on said spider and having springs normally pressing the same outwardly away from engagement with the stock, cam means for pressing said clamping shoes against said springs to effect a clamping of the stock, said cam means

comprising a split ring having an internal cam surface for engaging cam followers on the clamping shoes, and means for separating the two halves of the ring to make the cam ineffective at will.

9. A device of the class described comprising a constantly rotating spider having an axially extending opening therethrough to receive the stock to be fed, a plurality of clamping shoes pivotally mounted on said spider and having springs normally pressing the same outwardly away from engagement with the stock, cam means for pressing said clamping shoes against said springs to effect a clamping of the stock, said cam means comprising a split ring having an internal cam surface for engaging cam followers on the clamping shoes, and being pivoted together at one side, and means at the other side for closing and separating the two halves of the ring to make the cam effective at will.

JULIUS B. TIEDEMANN.