Sept. 10, 1929. F. H. MOYER 1,727,894

BAR WEB BENDING MACHINE

Filed Jan. 24, 1927 3 Sheets-Sheet 1

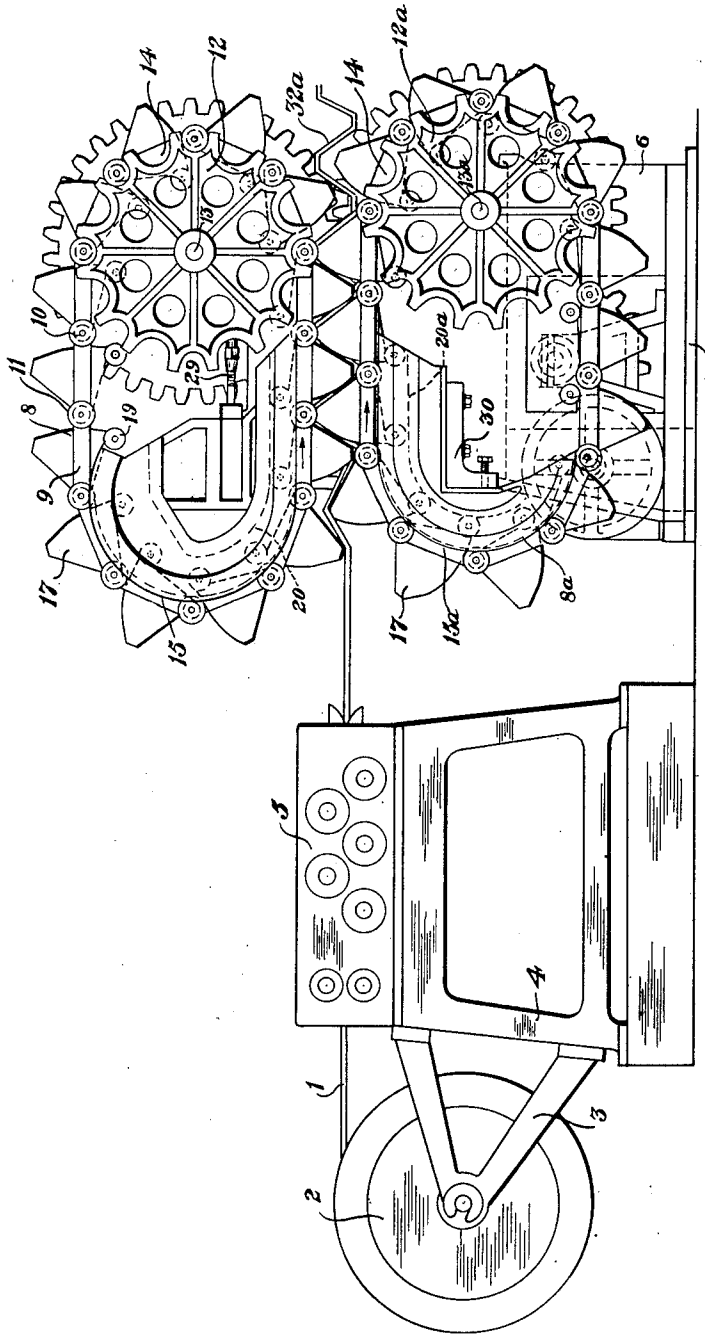


Fig. 1

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BAR WEB BENDING MACHINE

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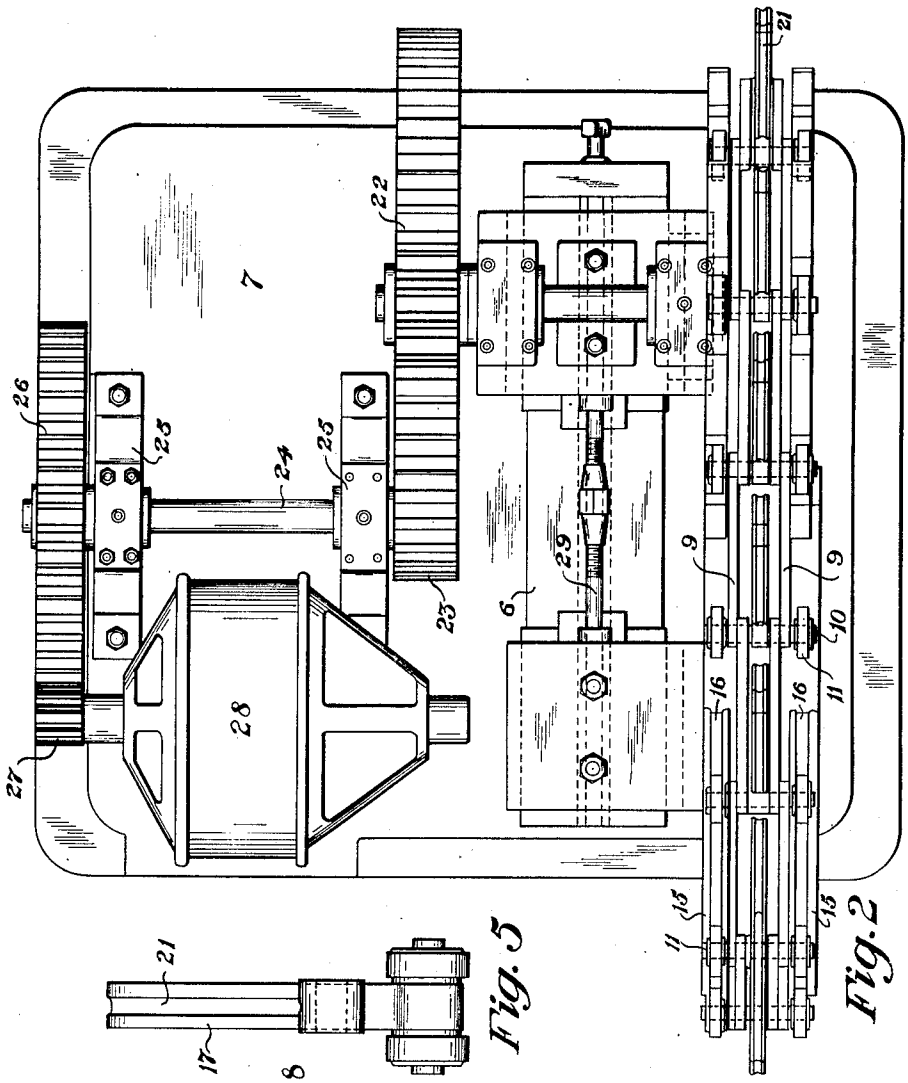


Fig. 2

Fig. 5

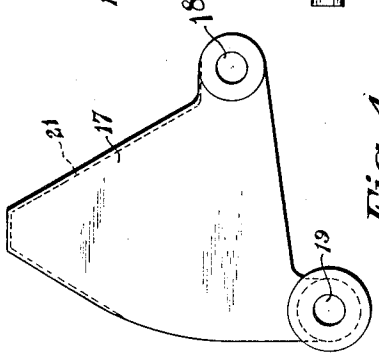


Fig. 4

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BAR WEB BENDING MACHINE

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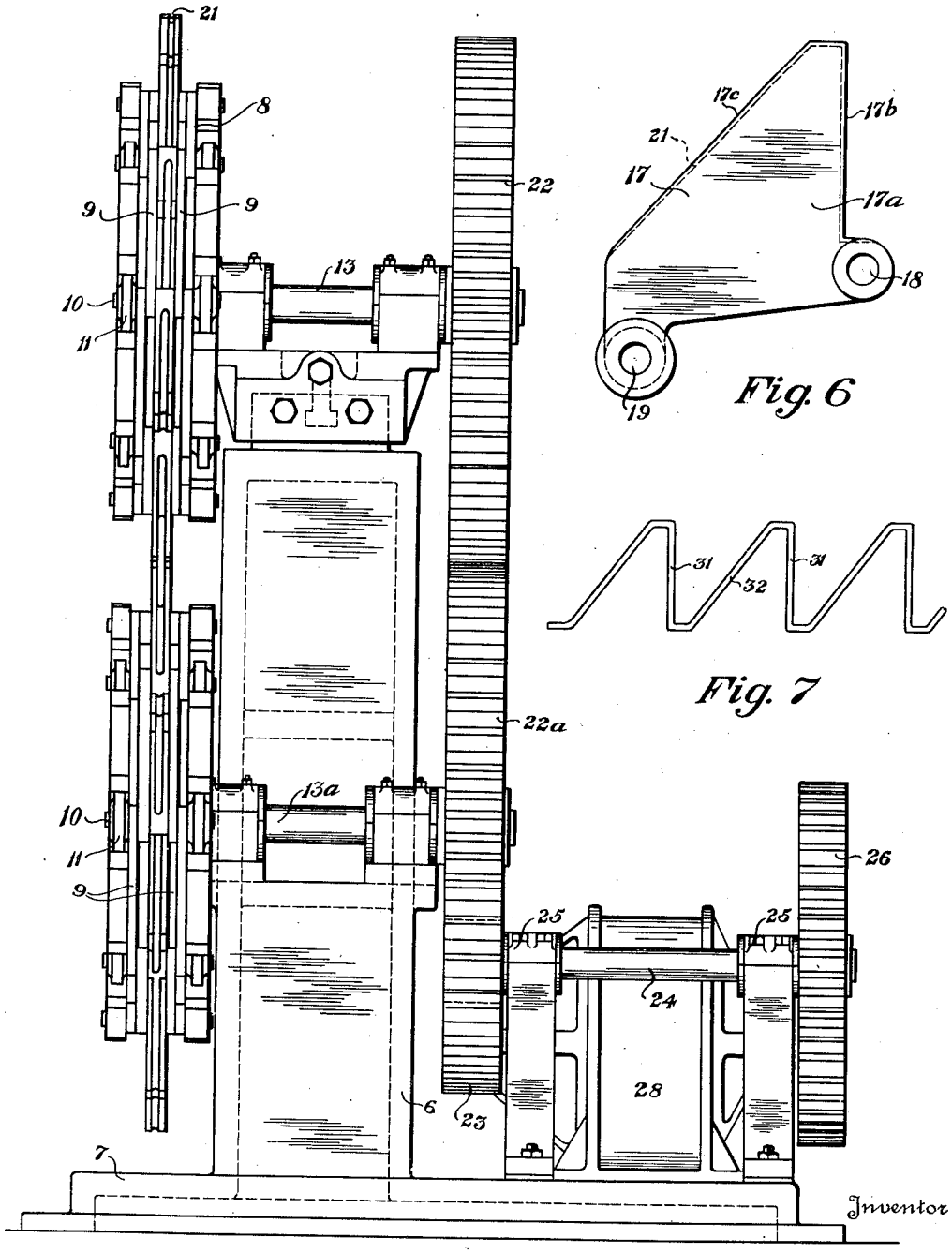


Fig. 3

Fig. 6

Fig. 7

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UNITED STATES PATENT OFFICE.

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BAR-WEB-BENDING MACHINE.

Application filed January 24, 1927. Serial No. 163,072.

The invention relates to bending machines and more particularly to a machine for bending bars to be used as the web members of bar joists, trussed welded beams and other structural units.

These bar web members are usually bent into zig-zag, saw tooth or other regular form to meet the requirements of the type or design of structural unit in which the bar web is to be used.

The present method of forming such web members is to manually form them upon a bending table so arranged that one bend is made at a time by placing the bar to be formed between the jaws of a bending device provided with a swing arm which forces the bar around a fixed point, bending it to the predetermined shape and then reversing the bent portion of the bar and moving it ahead, each succeeding bend being made in the same manner, the operations being continued throughout the length of the bar as required.

This is a very slow, cumbersome and expensive method of bending the bar web members, both from a labor as well as a tonnage standpoint.

Two or three operators are required for each of these machines and as the output of each machine is small, several machines are usually required.

The object of the present improvement is to provide a bending machine through which the bar stock may be continuously passed, the formed bar web being delivered from the machine at a uniform and predetermined rate of speed.

The bar stock may be delivered to the machine in coils of several feet in length, passing first through a straightening machine before it enters the bending machine, the formed bar web being cut to the required length after forming. When the end of a coil has been reached, the free end of the next coil may be welded thereto and thus a continuous bar may be fed through the machine.

In this manner the waste of stock will be reduced to a minimum and a very much increased production may be maintained with a minimum number of operators.

The above and other objects may be attained by providing a machine having a pair of endless chains carrying cooperating die members between which the bar is delivered, the chains being driven at a uniform rate of speed whereby the bar is formed and passed through the machine in a single continuous operation.

An embodiment of the invention is illustrated in the accompanying drawings, in which

Figure 1 is a side elevation of the improved bending machine showing a coil of bar stock in the operation of passing through the straightening machine and through the bending machine;

Fig. 2 is a top plan view of the bending machine drawn upon a larger scale;

Fig 3, an end elevation of the machine;

Fig. 4, a detached side elevation of one of the bending dies;

Fig. 5, an edge elevation of the same;

Fig. 6, a detached side elevation of another form of die, and

Fig. 7, a fragmentary elevation of a portion of a bar web formed with dies such as shown in Fig. 6.

Similar numerals refer to similar parts throughout the drawings.

The bar stock 1, to be formed into the bar web, may be in a coil mounted upon a reel 2 which is journaled upon a bracket 3 which may be supported upon one side of the frame 4 of the straightening machine 5.

The bending machine to which the invention pertains may be supported upon the frame 6 mounted upon a base 7. A pair of endless chains 8 and 8^a are carried upon one side of the frame 6 and mounted one above the other and adapted to be driven in the direction of the arrows shown on Fig. 1.

As illustrated in this figure, the lower chain may be mounted slightly forward of the upper chain. Each of the chains is in the form of a roller chain formed of spaced pairs of links 9 connected by the pins 10,

rollers 11 being mounted upon the ends of each pin.

At the forward end of the machine each chain passes over a sprocket wheel comprising a pair of spaced disks 12 and 12ª spaced apart sufficiently to permit the chain to pass therebetween and fixed upon shafts 13 and 13ª respectively.

Each of these disks is provided in its periphery with notches 14 to receive the rollers 11 of the chains.

At the rear end of the machine the chains 8 and 8ª pass over curved guides 15 and 15ª respectively, these guides having grooves 16 in their peripheries to accommodate the rollers 11.

The dies 17, of a shape to produce the desired conformation of web, are pivoted and hingedly at 18 upon the pins 10 of the chain, being located between the links of the chain.

It will be seen that it is necessary that the dies be pivoted at one end in order that they will not interfere with the formed or bent portion of the web as it leaves the machine after forming.

On the other hand it will be evident that since the dies are thus pivotally mounted, some means must be provided for holding the dies in proper position, in contact with the bar for the forming operation. For this purpose a pair of rollers 19 is mounted upon each die at the opposite end from the pivotal point and a path 20 and 20ª is formed in each guide 15 and 15ª respectively for holding the dies in proper position throughout the bending or forming operation.

Each of the dies 17 is provided with the groove 21 in its edge to receive the bar to be bent. It should be understood that round, square, flat or other suitable cross section of bar may be used for forming the web.

Gears 22 and 22ª are mounted upon the shafts 13 and 13ª respectively, said gears meshing with each other while a pinion 23 meshes with the lower gear 22ª.

This pinion is mounted upon a shaft 24 journaled in suitable bearings 25, carried upon the base 7 and a gear 26 may be fixed upon the outer end of this shaft and meshed with a pinion 27 upon the shaft of the motor 28 which may also be supported upon the base 7.

Of course, it will be understood that any other suitable means may be provided for driving the shafts 13 and 13ª in unison.

Means, as indicated at 29 and 30, may be provided for longitudinal and vertical adjustment in order that the dies may have the proper register as may be required in the formation of the web member and also to compensate for wear upon the guides.

It will be understood that the shape of the dies may be changed to produce different conformations of web members, as for instance the die shown at 17ª in Fig. 6 may be provided with one vertical edge 17ᵇ and one inclined edge 17ᶜ in order to form the web member shown in Fig. 7 having the vertical portions 31 and inclined portions 32, whereas the web formed by the dies shown in Fig. 1 is made up of the reversely inclined portions 32ª.

Although the edges of the dies are shown grooved in order to receive round bars and the like and are shown spaced apart during the forming operation, it should be understood that these grooves may be dispensed with if desired, or the dies may be arranged to contact with each other as required.

Although the machine is illustrated and described as adapted to receive the bar stock from a coil of great length, it will be seen that straight bars of any desired length may be passed through the machine if desired.

It should also be understood that while the forming mechanism is shown upon the outside of the main frame of the mechanism in order that the forming operation may be observed as the bar passes through the machine, this mechanism may be placed between housings and supported upon both sides if desired without in any way changing the mechanism or the operation thereof.

I claim:

1. A bar bending machine including a pair of endless chains, cooperating forming dies pivoted at one end upon the chains, means for uniformly driving the chains to feed a bar through the machine and bend the bar into a predetermined, continuous contour, guides for holding each die in a predetermined path during the forming operation and rollers upon the free ends of the dies for engagement with said guides.

2. A bar bending machine including a pair of endless chains, each chain comprising spaced parallel links connected by pins, cooperating forming dies hingedly mounted one die on each pin upon the pins, between said links, and means for uniformly driving the chains to feed a bar through the machine and bend the bar into a predetermined continuous contour.

3. A bar bending machine including a pair of endless chains, each chain comprising spaced parallel links connected by pins, cooperating forming dies hingedly mounted one die on each pin upon the pins, between said links, means for uniformly driving the chains to feed a bar through the machine and bend the bar into a predetermined continuous contour, and means for holding each die in a predetermined position during the forming operation.

4. A bar bending machine including a pair of endless chains, each chain comprising spaced parallel links connected by pins, cooperating forming dies hingedly mounted one die on each pin upon the pins, between

said links, means for uniformly driving the chains to feed a bar through the machine and bend the bar into a predetermined continuous contour, and guides for holding each die in a predetermined path during the forming operation.

5. A bar bending machine including a pair of endless chains, each chain comprising spaced parallel links connected by pins, cooperating forming dies pivotally mounted upon the pins, between said links, means for uniformly driving the chains to feed a bar through the machine and bend the bar into a predetermined continuous contour, guides for holding each die in a predetermined path during the forming operation, and rollers upon the dies for engagement with said guides.

6. A bar bending machine including a pair of endless chains, each chain comprising spaced parallel links connected by pins, cooperating forming dies hingedly mounted one die on each pin upon the pins, between said links, means for uniformly driving the chains to feed a bar through the machine and bend the bar into a predetermined, continuous contour, and sprockets at one end of the machine for supporting the chains, each sprocket comprising a pair of spaced disks between which the dies are arranged to pass.

In testimony that I claim the above, I have hereunto subscribed my name.

FREDELLIA H. MOYER.