Nov. 16, 1954 J. C. LARSEN 2,694,419

WIRE WORKING MACHINE

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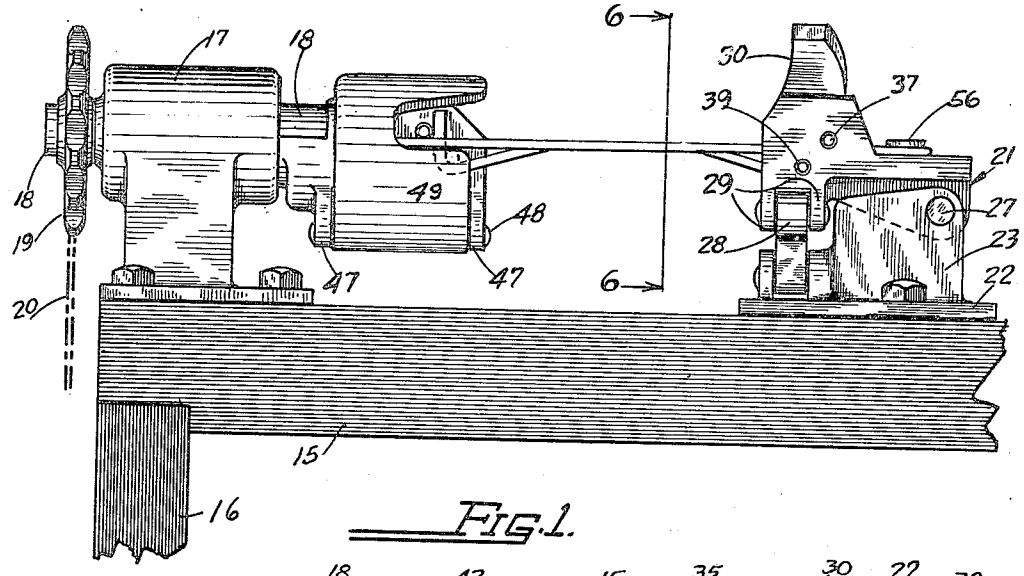


FIG. 1.

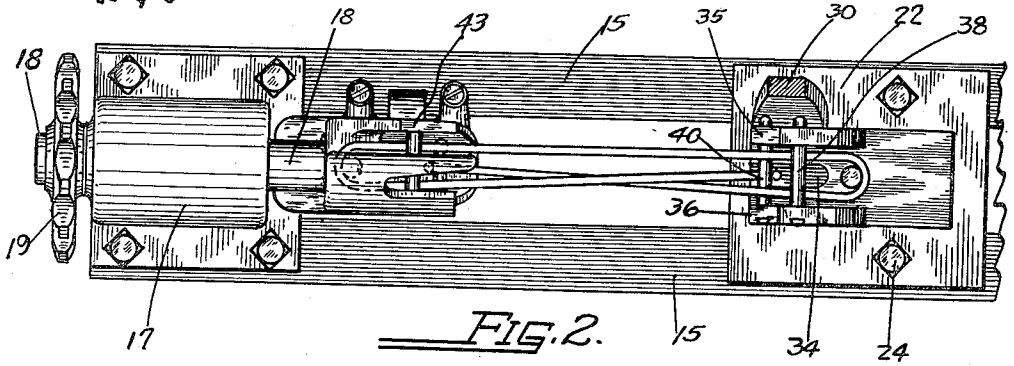


FIG. 2.

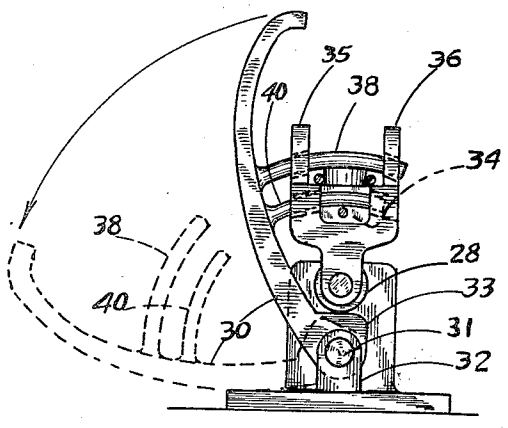


FIG. 6.

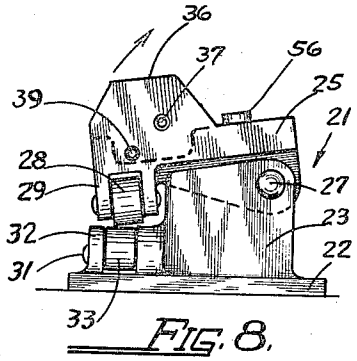


FIG. 8.

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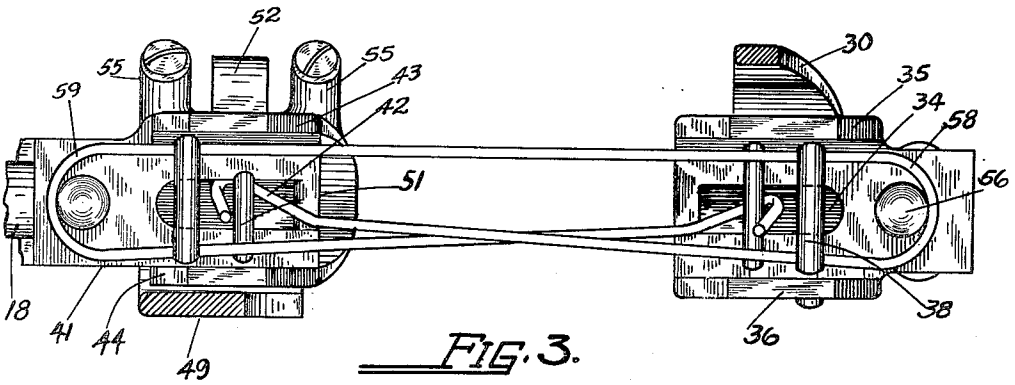


FIG. 3.

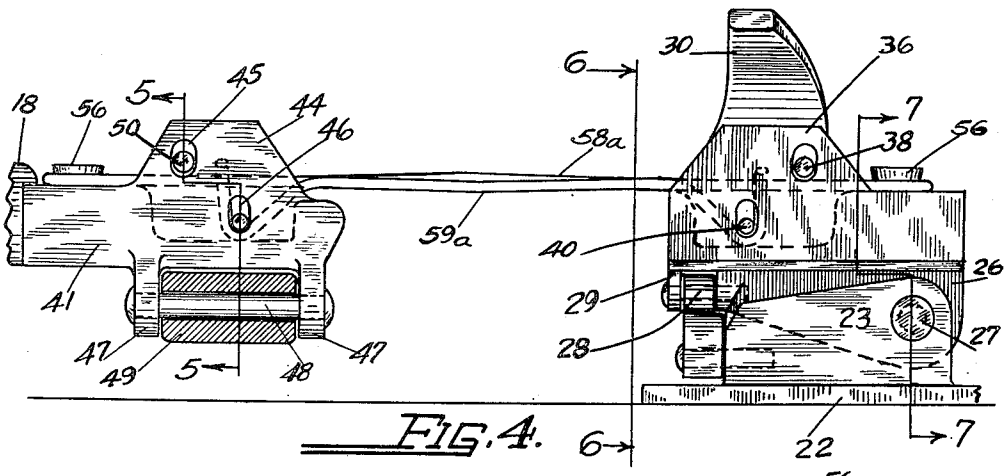


FIG. 4.

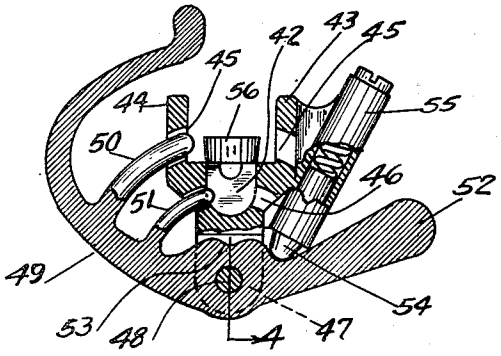


FIG. 5.

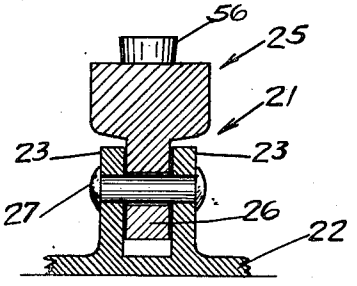


FIG. 7.

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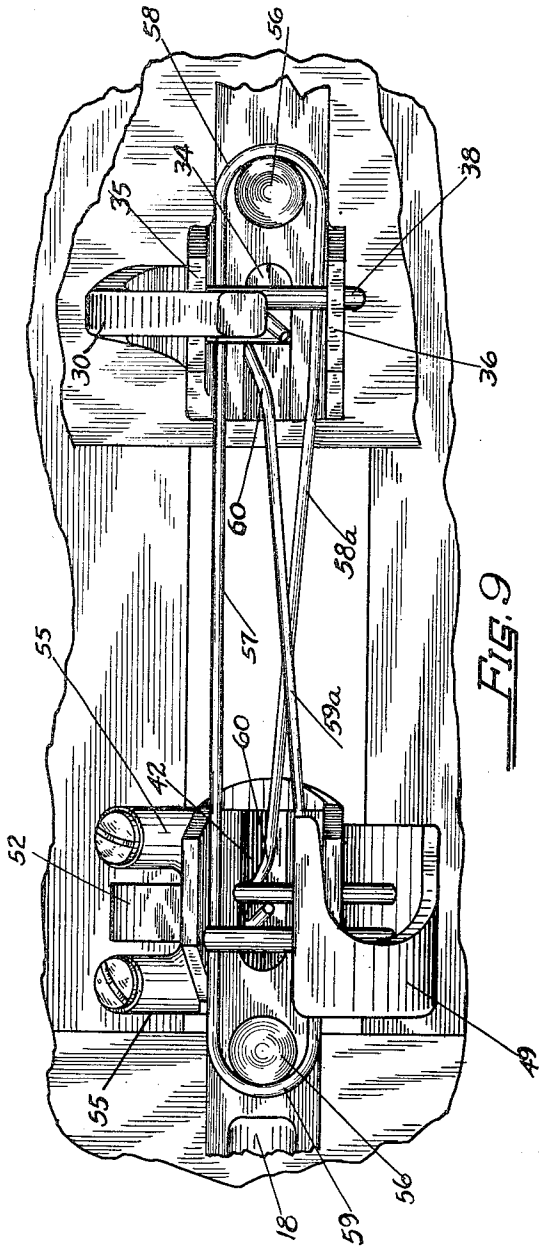


Fig. 9

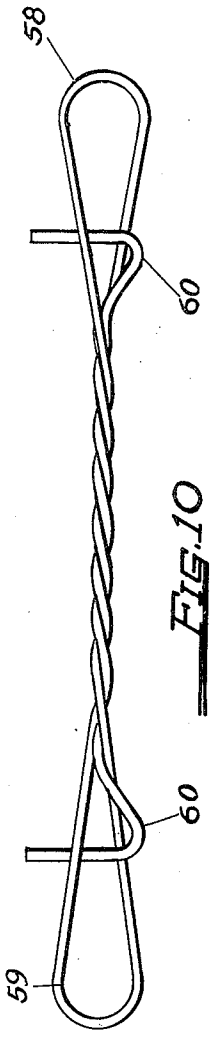


Fig. 10

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2,694,419

WIREWORKING MACHINE

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Application June 2, 1952, Serial No. 291,204

9 Claims. (Cl. 140—149)

This invention relates to improvements in wire working machines and has reference more particularly to a machine for performing the final steps in the manufacture of concrete form ties of the general type illustrated and described in U. S. Patent 1,692,166 and more specifically to the tie shown in Figures 3 and 6 of said patent.

Ties to the manufacture of which this invention relates, are of exceptional merit but have been difficult to manufacture for want of suitable machinery.

In application Serial Number 279,073 filed March 28, 1952 a method of making ties of the type for which this machine is employed, has been described, illustrated and claimed. The last step in the method is the step of twisting which is performed by the machine that forms the subject of this application.

It is the object of this invention to produce a machine for the purpose above indicated, that shall be of simple and substantial construction and which shall be adapted for mass production.

In order to describe the invention so that it can be readily understood reference will be had to the accompanying drawing in which it has been illustrated and in which

Figure 1 is a side elevation of a portion of the machine, showing the parts to which this invention relates;

Figure 2 is a top plan view of the machine shown in Figure 1;

Figure 3 is a top plan view, looking downwardly in Figure 4, and shows the parts of the machine to which this invention relates to an enlarged scale, certain parts being shown in section to better disclose the construction;

Figure 4 is a side elevation, looking upwardly in Figure 3, one part being shown in section taken on line 4, Figure 5;

Figure 5 is a section taken on line 5—5, Figure 4;

Figure 6 is an end elevation looking through plane 6—6, Figures 1 and 4;

Figure 7 is a section taken on line 7—7, Figure 4;

Figure 8 is a fragmentary side elevation showing one of the parts that is shown in Figure 1, in another position;

Figure 9 is a view somewhat similar to that shown in Figure 2 but to an enlarged scale to more clearly disclose the structure and the relation of the parts, and

Figure 10 is a side elevational view of the completed form tie.

Referring now to the drawing reference numerals **15** designate the side frame members of the machine and **16** the supporting legs while **17** designates a bearing in which shaft **18** is journaled. Shaft **18** carries sprocket wheel **19** which is turned by power transmitted by sprocket chain **20**. Bearing **17** and shaft **18** resemble the headstock of a lathe and may be so designated in subsequent portions of this description. Mounted for longitudinal adjustment along the bed formed by frame member **15** is a tailstock **21** having a base **22** and two upwardly projecting spaced plates **23**. The tailstock is attached to the bed by bolts **24**. An anchor block **25** which will be referred to hereafter as the tail anchor block, forms part of the tailstock and has a downwardly extending tongue **26** that is positioned between plates **23** to which it is rockably connected by pivot **27**. A roller **28** is mounted for free rotation between the spaced lugs **29** that project downwardly from the inner end of the anchor block.

A lever **30** has its lower end attached to the base by a pivot **31** which extends through the upwardly extending lug **32**. The pivoted end of lever **30** has a cam surface **33** on which roller **28** rests in the manner shown

in Figures 6 and 8. When lever **30** is in the full line position (Fig. 6) the anchor block is in the position shown in Figures 1 and 4 but when the lever is moved to the broken line position (Fig. 6) the anchor block tilts to the position shown in Figure 8.

The tail anchor block is forged or cast as a unitary part whose otherwise substantially flat upper surface has a recess **34**. Extending upwardly from the anchor block on the sides of recess **34**, are walls **35** and **36**. Walls **35** and **36** have holes **37** through which the curved finger **38** extends when lever **30** is in the full line position shown in Figure 6.

The anchor block has other holes **39** in the opposite recess walls and the curved finger **40** extends through these holes when lever **30** is in full line position, all as shown in Figure 6.

Referring now to the headstock assembly and in particular to Figures 1 to 5, it will be seen that there is attached to the inner end of shaft **18**, as by welding, an anchor block **41** that for convenience will be referred to as the head anchor block. Block **41** resembles the tail anchor block **25** in a geenral way and has its upper surface, which lies in a plane that contains the axis of shaft **18**, provided with a recess **42**. Walls **43** and **44** project upwardly from opposite sides of the recess. Walls **43** and **44** have opposed holes **45** and the side walls of the recess have opposed openings **46**. Extending outwardly from the under side (Figs. 1, 4 and 5) are spaced lugs **47** that have aligned perforations for the reception of pivot pin **48**.

A latch lever **49**, of a shape substantially as shown in Figure 5, is rockably pivoted on pin **48** and has two arcuate fingers **50** and **51** that are curved about the center of pin **48**. Finger **50** is positioned to extend through holes **45** and finger **51** is positioned to engage in holes **46**.

The part **52** of lever **49** is a counterweight whose function will appear as the description proceeds. Attention is called to the cam surface **53** and to the spring pressed plunger **54** that project from the cylindrical housings **55** and which serve to yieldably hold lever **49** in the inoperative position shown in Figure 5 and also in the operative position shown in Figure 9 in which latter position the lever is when the parts rotate. During rotation the centrifugal force exerted by the counterweight **52** serves to hold lever **49** in operative position and cooperates with plunger **54** to this end. Tail anchor block **25** and head anchor block **41** are each provided with short posts **56** that serve as anchors for the preformed tie unit which is to be twisted from the shape shown in Figures 3 and 9 to the finished shape shown in Figure 10.

Briefly described the preformed tie unit consists of a single length of wire bent in such a way that it has a straight portion **57** which is reversely bent forming bights **58** and **59**. From the bights the wire extends in straight portions **58***a* and **59***a* which cross as shown in Figures 3 and 9 and which terminate in hooks **60**.

The preformed tie unit is positioned on the anchor blocks with the bights encircling the anchor posts and the hooks positioned in recesses **34** and **42**. Before applying the tie unit to the anchor blocks lever **30** is moved to the dotted line position shown in Figure 6 whereupon tail anchor block **25** assumes the position shown in Figure 8 thus shortening the distance between posts **56**. In a like manner lever **49** is moved to the position shown in Figure 5. After the tie unit has been positioned with the posts **56** in the bight lever **30** is moved to the full line position shown in Figure 6 whereupon the tail anchor block moves to the position shown in Figures 1 and 4. Finger **38** now extends over the wire tie and prevents it from slipping from the anchor post **56** and finger **40** projects through the hook all as shown most clearly in Figures 3 and 4.

Lever **49** is now moved in a clockwise direction from the position shown in Figure 5 to that shown in Figures 1 and 3 whereupon finger **50** extends over the tie unit and finger **51** extends through the hook. Plunger **54** now engages cam notch **53** and the counterweight is moved farther outwardly, all as will be obvious from an inspection of Figure 5.

The head anchor block is now rotated through a predetermined number of complete turns and through an additional fraction of a turn, the latter being necessary to compensate for the reverse rotation of the tie when the twisting torque is removed. In the finished tie the bights of the tie must lie in the same plane or approximately so.

The machine is provided with a driving mechanism comprising a clutch that will automatically release after the head anchor block has rotated the predetermined number of degrees; this has not been illustrated as it involves an independent invention, which cannot be claimed herein.

Attention is directed to Figures 4, 6 and 8 which show how the movement of lever **30** rocks the tail anchor block about pivot **27** to facilitate the application of the preformed tie unit and the removal of the twisted unit therefrom.

It will be observed that both the head and the tail anchor blocks are similar to each other. Each block has a depression for the reception of the hook, a post for engagement in the bight and means for holding the unit in position during the twisting operation.

It is evident that the exact construction shown and described can be varied without departing from the spirit of the invention and such changes may be made as fall within the scope of the appended claims.

Having described the invention what is claimed as new is:

1. A machine for twisting preformed concrete form ties of the type made from a single piece of wire having its ends bent into hooks, and folded about points that divide the wire into three substantially equal parts with bights at their points of juncture, the bights lying in the same plane, the hooks being positioned in the bights; said machine comprising, a base, a head anchor block supported on the base for rotation, a tail anchor block supported on the base in spaced relation to the head anchor block, both anchor blocks having each a flat surface whose plane is parallel to the axis of rotation of the head anchor block and closely adjacent thereto, the flat surfaces of each anchor block having a cavity near the end facing each other for the reception of the hooked ends of the tie, each anchor block having an anchor post projecting upwardly from its flat surface, the posts being so positioned that both cavities are positioned between them, the posts serving to receive the bights at the ends of the tie unit to be twisted, means associated with each anchor block for holding the corresponding end of the tie unit during the twisting operation, said means comprising a lever pivotally connected with each anchor block, each lever having two arcuate fingers one of which extends across the cavity and engages in the hook and the other extending across the bight when the levers are in operative position, and means for rotating the head anchor block.

2. A wire form tie twisting machine in accordance with claim 1 in which the tail anchor block is mounted to rock about a pivot whose axis is substantially perpendicular to the axis about which the head anchor block turns and which is positioned on the far side of the anchor post and below the plane of the upper surface of the block, whereby the distance between the two anchor posts may be changed by rocking the anchor block about the axis of said pivot, to facilitate the application of the wire tie unit to and for removing it from the anchor posts, and means comprising a lever having a cam surface for rocking the block.

3. A wire form tie twisting machine in accordance with claim 2 in which the lever associated with the tail anchor block is mounted for rocking movement about a pivot positioned below the free end of said anchor block, said lever having a cam surface in operative engagement with the under surface of said anchor block forming means for rocking said anchor block about its pivot to raise its free end as the fingers are moved into tie engaging position.

4. A device in accordance with claim 3 in which spring pressed latching means is provided on the head anchor block in operative position relative to the lever for exerting a force thereon tending to hold it in either of the operative or the inoperative position.

5. A machine for use in twisting a preformed wire unit made from a single piece of wire bent at points about one third of its length from the ends so as to have three substantially parallel sections joined by bights, the ends being formed into hooks, comprising a base, a non-rotatable tail anchor block attached to the base, a rotatable head anchor block attached to the base in axial alignment with and spaced from the tail anchor block, each of said anchor blocks having a substantially planar surface positioned parallel to and closely adjacent the axis of rotation of the head anchor block, each anchor block having its flat surface provided with a cavity adapted to receive a hooked end of a concrete form tie, each anchor block having an anchor post positioned beyond the cavity, adapted to be inserted into a bight of a concrete form tie to be twisted, means operatively attached to each anchor block for relative pivotal movement from an inoperative position to an operative position, in which a portion thereof extends across the cavity and another portion extends across the planar surface at a point between the cavity and the anchor post, for holding an end of a concrete form tie in position during the tie twisting operation.

6. A machine for twisting the central portions of partially preformed concrete form ties of the type made from a single piece of wire having its ends formed into hooks, and folded about points that divide the wire into three substantially equal parts with bights at their points of juncture, the bights lying in the same plane the hooks being positioned in the bights, comprising, a base, a tail anchor block attached to the base, a head anchor block attached to the base and spaced from the tail anchor block, the head anchor block being mounted for rotation, each of the anchor blocks comprising a body having a substantially planar surface parallel with and adjacent to the axis of rotation of the head anchor block, said bodies having their planar sides provided with cavities for the reception of the hooks on the ends of the partially preformed ties, each of said bodies having an anchor post positioned beyond the cavity for insertion into the bights of the partially preformed ties and operatively associated with each of said bodies, means for holding the tie in position on said bodies while the head anchor block rotates, consisting of a lever pivotally attached to the body with which it cooperates and which is provided with two arcuate fingers positioned at different radial distances from the axis of pivotation, the fingers having the shorter radius being positioned to pass across the hook receiving cavity at a point below the planar surface, the other finger being positioned to pass across the planar surface between the anchor post and the cavity.

7. A device in accordance with claim 6 in which the lever has a cam surface and means comprising a cam surface on the lever and a cam follower urged against the cam surface by a yielding pressure for holding the lever in either operative or inoperative position.

8. A device in accordance with claim 7 in which the lever is provided with a counterweight to balance the torque producing centrifugal force during rotation of the head anchor block.

9. A machine for use in twisting a preformed wire unit made from a single piece of wire bent at points about one third of its length from the ends so as to have three substantially parallel sections joined by curved bights, the ends being formed into hooks, comprising a base, a non-rotatable tail anchor block attached to the base, a rotatable head anchor block attached to the base in axial alignment with and spaced from the tail anchor block, each of said anchor blocks having a substantially planar surface positioned parallel to and closely adjacent the axis of rotation of the head anchor block, each anchor block having its flat surface provided with a cavity adapted to receive a hooked end of a concrete form tie, each anchor block having an anchor post positioned beyond the cavity, adapted to be inserted into a bight of a concrete form tie to be twisted, means operatively attached to each anchor block for relative pivotal movement from an inoperative position to an operative position, in which a portion thereof extends across the cavity and another portion extends across the planar surface at a point between the cavity and the anchor post, for holding an end of a concrete form tie in position during the tie twisting operation, and means operatively connected with the base and the tail anchor block to change the distance between the anchor posts.

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