F. R. HOLDRED.

WIRE WORKING MACHINE.

APPLICATION FILED SEPT. 10, 1914.

1,155,729.

Patented Oct. 5, 1915.

2 SHEETS—SHEET 1.

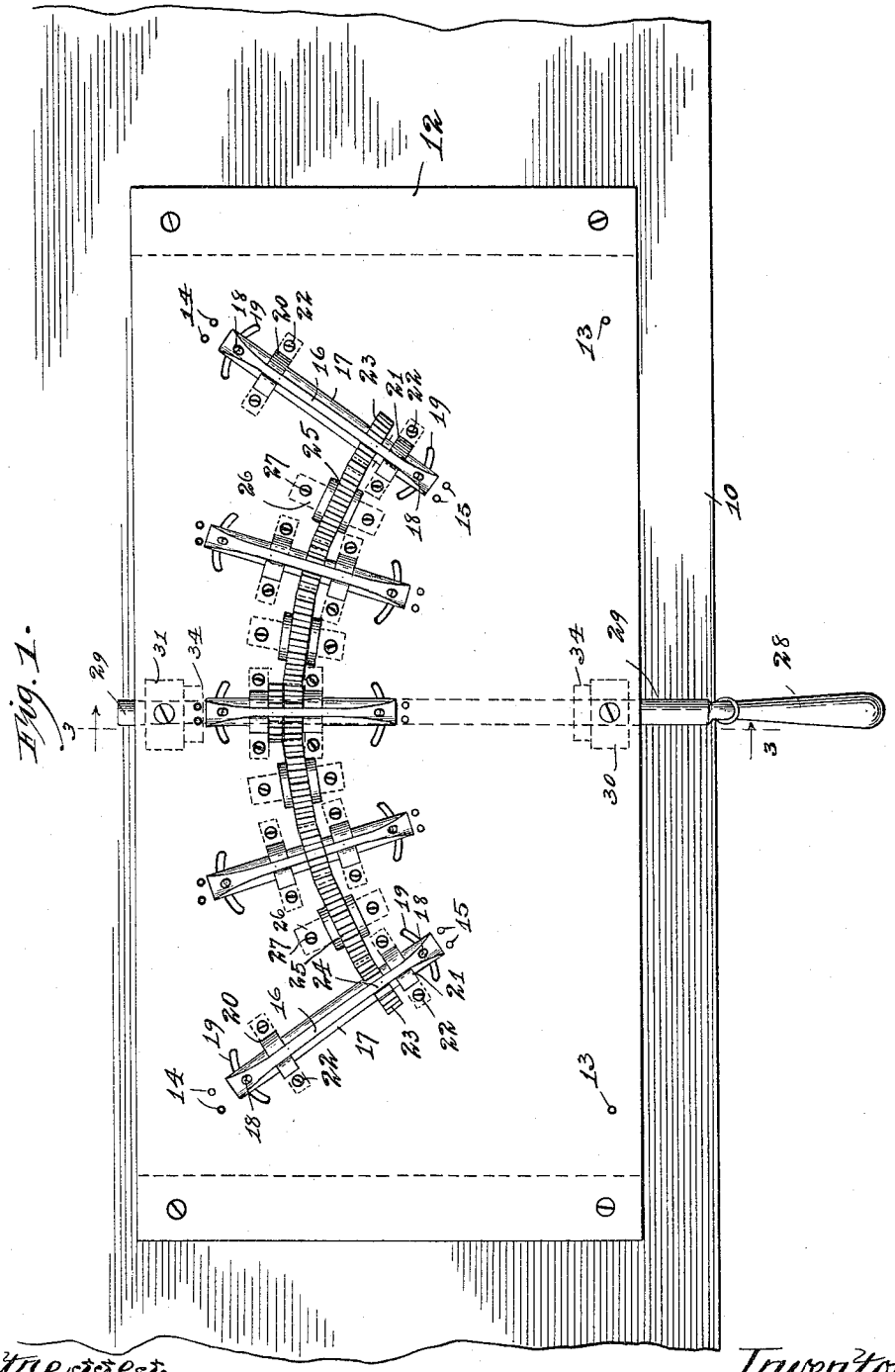

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

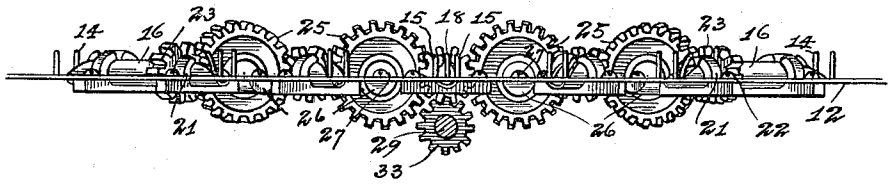
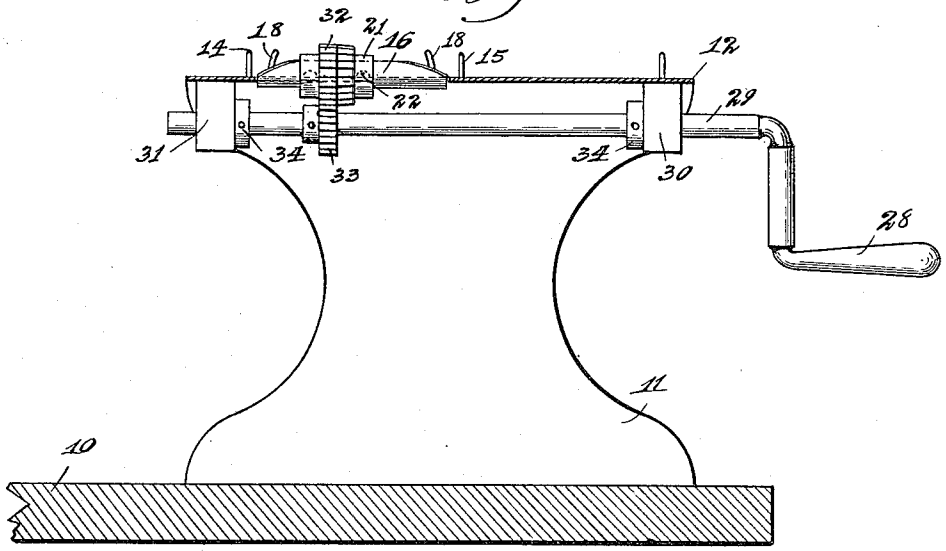


Fig. 3.



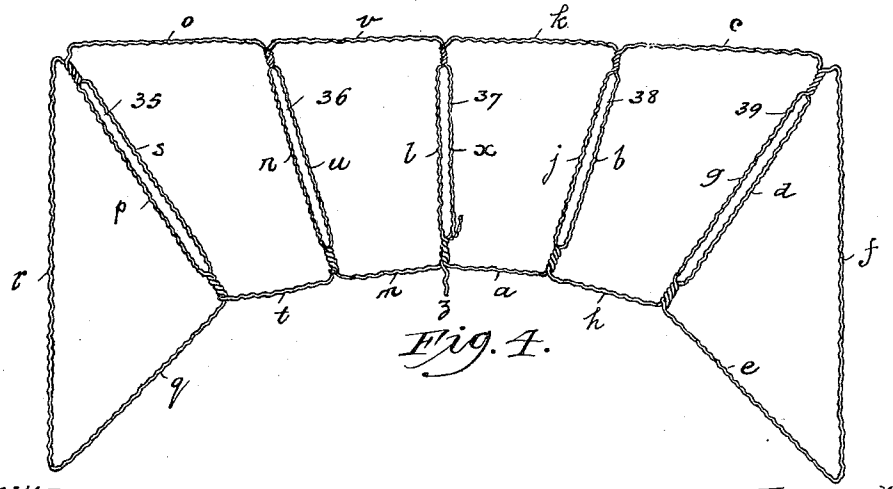


Fig. 4.

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UNITED STATES PATENT OFFICE.

FRANK R. HOLDRED, OF THREE OAKS, MICHIGAN, ASSIGNOR TO THE WARREN FEATHERBONE CO., OF THREE OAKS, MICHIGAN, A CORPORATION OF MICHIGAN.

WIRE-WORKING MACHINE.

1,155,729. Specification of Letters Patent. Patented Oct. 5, 1915.

Application filed September 10, 1914. Serial No. 861,034.

To all whom it may concern:

Be it known that I, FRANK R. HOLDRED, a citizen of the United States, residing at Three Oaks, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in Wire-Working Machines, of which the following is a specification.

My invention relates to improvements in wire-working machines and refers more particularly to a type of machine which, although adaptable for various uses, is particularly fitted for constructing ladies' collar stiffeners which are known in the trade as "flares".

Among the salient objects of the invention are, to provide a machine for facilitating the rapid and accurate shaping and forming of a wire structure of the general type referred to; to provide in a machine of the class referred to a construction which will enable the wire ties to be formed and twisted with a high degree of speed and accuracy by relatively unskilled help; to provide a machine which shall be readily adaptable to various forms of wire structures of the general type referred to; to provide a machine of the class described in which the twisting of all of the ties in the structure may be simultaneously effected by a single twisting operation; to provide a machine of the class described which will admit of the structure being formed from a single continuous length of wire; to provide a machine which shall be simple and economical in construction; and, in general, to provide a machine of the class referred to.

My machine in its construction and operation may be more readily understood when considered in connection with the accompanying drawings, in which—

Figure 1 is a plan view of one embodiment of my invention; Fig. 2 is an elevation of Fig. 1 shown partially in section; Fig. 3 is a section of Fig. 1 taken on the line 3—3; and Fig. 4 is a plan view of the wire structure or flare which the machine is designed to operate upon.

As an illustration of the application of my invention, in the drawings I have shown a machine designed to form and twist a structure indicated in plan in Fig. 4 of the drawings, this representing what is known in the trade as a "Gladstone flare". This article is constructed in the following manner by the aid of my improved machine, which will now be described.

Upon a suitable bench or platform 10 I erect a pair of wooden standards 11 to the top of which is screwed a flat base plate 12. In the top of this plate there are driven, or otherwise securely fixed, a plurality of upstanding steel pins which include two corner pins 13 and a plurality of pairs of outer pins 14, slightly spaced apart, and corresponding pairs of inner pins 15. Between each pair of pins 14 and 15 I mount a rotatable longitudinal twist member 16 axially in line with the centers of said pairs of pins. Each of these twisted members 16 consists of a hollow tube 17 of suitable length, one side of which is slotted out continuously from end to end, the slot being relatively narrow as to its intermediate portion and flaring out considerably toward the ends of the tube. A short distance from each end of the tube I secure a twist pin 18, curved slightly toward the other end of the tube, and extending from the unslotted side of the tube inwardly through the axis thereof and some distance beyond, as indicated in Fig. 3. The axis of each of these twist tubes 17 is located slightly above the top surface of the plate 12, which is slotted out on either side of the tube and at each end to admit the pins 18 as they rotate, these slots being shown at 19 in Fig. 1. Each of the tubes 17 is adapted to rotate freely in a pair of small bracket bearings 20 and 21 which project through slots in the plate 12 and are attached by screws 22 to the under side thereof. Each of the bearings 20 and 21 is slotted out on its upper side to afford communication with the slot in its associated twister tube 17, the slot, however, not being wide enough to interfere with its function as a bearing for the tube 17. Rigidly on each tube 17 and co-axially therewith, a short distance from the bearing 21, I mount a gear 23 which is also slotted radially at 24 to afford communication with the slot in the tube 17. The plate 12 is cut out to accommodate each of the tubes 17 and its associated gear 23 which, in conjunction with its slot, preferably acts as a collar to limit the axial movement of the tube in its bearings. Each of the twister members 16 is of the proper length and located in a suitable position on the plate to correspond with the length and

location of the corresponding tie wire connection of the completed structure.

In order to enable all of the tubes or twist members to be actuated simultaneously, I connect them by means of intermediate gears 25. I preferably locate each of these gears 25 with its axis in the same plane as the axes of the twist members; and to this end I mount each of the said gears 25 to rotate freely upon a stationary pin or shaft 26. This shaft or pin 26 has its ends slightly flattened or milled off so that they may be screwed securely to the under side of the plate 12 by means of screws 27. The plate 12 is slotted out to admit the intermediate circular portion of the pin 26, this slot being of suitable shape and size to admit the gear 25 and its hub. The slotting out of the plate 12 for the gears 23 and 26 practically results in a continuous slot extending between the two outer twist members. Obviously, if the axes of the twist members 16 are parallel, the gears 23 driving them and the intermediate gears 26 may be ordinary spur gears; but if the axis are inclined, as shown in the embodiment illustrated, the gears must be suitably beveled in order to mesh properly.

The twister members 16 are all operated at the same time by means of a crank handle 28 on the end of a shaft 29 adapted to rotate in a pair of bearings 30 and 31 mounted on the under side of the plate 12, with the axis of the shaft preferably parallel with the axis of one of the twister members in the set. Since, in the case I have illustrated, the gear 23 mounted on said twister member is of the bevel type, and since the axis of the shaft 29 and the said twister member are parallel, I provide on the said twister member tube 16 a driving gear 32 of the spur type, which is adapted to mesh with a spur gear 33 secured on the shaft 29. Axial movement of the shaft 29 in its bearings 30 and 31 is prevented by means of a pair of suitable collars 34 pinned to the said shaft and coöperating with the inner adjacent faces of the bearings 30 and 31. It should be noted that the gear 32 is slotted to communicate with the slot in the tube 16 in a manner similar to the slotting of the gears 23; and all of these gears 33, 32 and the different gears 23 are provided with the same number of teeth so that when the crank handle is in a certain position (in this case at its lowest point), the twister members 16 are all presented with their slots opening upwardly and thus in communication with the slots in the journal bearings 20 and 21.

In order to form the wire structure shown, the operator sets the handle in the position shown, with the slots open throughout their length and facing upwardly, and takes a continuous length of suitable wire, the end of which she inserts in the end of the slot in one of the twister tubes (in this case preferably the inner end of the middle twister member tube). She then loops the wire around the pins, following the course indicated in Fig. 4 by the letters *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *j*, *k*, *l*, *m*, *n*, *o*, *p*, *q*, *r*, *s*, *t*, *u*, *v*, *x*, finally cutting off the wire at the point *z*. When laying the wire in the slots of the tubes, care is taken to see that while the two wires constituting the ties 35, 36, 37, 38 and 39 lie between the pairs of pins 14 and 15, they are placed at either side of the pins 18 so as to prevent a relative movement of the intermediate portions of the wires with reference to each other and to the tube while the latter is rotating. Having looped the wire around the pins and within the tubes in the above described manner, the operator completes the formation of the structure by giving a sufficient number of turns to the crank handle 28 to make a strong twisted connection of each of the two strands of wire constituting the ties. The completed structure may then be readily removed from the machine after first locating the crank handle 28 in its lowest position so as to permit the ties to be lifted out of the slots.

Upon inspection of Fig. 4, it will be noticed that the wire constituting the structure is formed with a succession of crimps or corrugations. This crimping operation, however, has no connection with my improved machine but is performed by other mechanism before the wire reaches my machine. The crimps referred to are provided for the purpose of enabling the flare to be stretched or distorted into any desired shape upon its application to the collar; they also prevent the threads from slipping when the flare is sewed to the collar. These crimps, however, are simply an incidental feature in the manufacture of these flares and form no part of my invention.

It is obvious that my machine is capable of many modifications without departing from the spirit of the invention, and therefore I do not wish to limit myself to the details of construction shown, except as specified in the appended claims.

I claim—

1. In a wire-working machine, the combination of a twister member provided with a side opening at either end thereof extending substantially to the axis of said twister member for the admission, sidewise and toward the center thereof, of a pair of wires, means spaced apart along the axis of said twister member for causing the intermediate portions of said wires to rotate bodily with said twister member, and means for rotating said twister member.

2. In a wire-working machine, the combination of a twister member provided with a side opening at either end thereof extending substantially to the axis of said twister

member for the admission in a radial direction of a pair of wires sidewise substantially to the center of said twister member, engaging means at either end of said twister member for preventing movement of the intermediate portions of said wires relative to said twister member, and means for rotating said twister member.

3. In a wire-working machine, the combination of a twister member provided with a side opening at either end thereof extending substantially to the axis of said twister member for the admission in a radial direction of a pair of wires sidewise substantially to the center of said twister member, engaging means at either end of said twister member for preventing movement of the intermediate portions of said wires relative to said twister member, means for rotating said twister member, and a journal bearing for said twister member intermediate the ends thereof.

4. In a wire-working machine, the combination of a twister tube having a slot extending from end to end in one side thereof to permit the insertion sidewise of a pair of wires to be twisted together at their ends, means for rotating said tube, and means associated with each end of said tube adapted to prevent relative movement of the intermediate portions of said wires with reference to said tube during said rotary movement.

5. In a wire-working machine, the combination of a twister tube having a slot extending from end to end in one side thereof to permit the insertion sidewise of a pair of wires to be twisted together at their ends, means for rotating said tube, a separating member mounted in each end of said tube, and a journal mounting for said tube.

6. In a wire-working machine, the combination of a plurality of twisting mechanisms each comprising a twister member provided with a side opening at either end thereof extending substantially to the axis of said twister member for the admission of a pair of wires sidewise substantially to the center of said twister member, means spaced apart along the axis of said twister member for preventing movement of the intermediate portions of said wires relative to said twister member, and gearing connecting all of said twister members and adapted to drive the same at the same angular velocity.

7. In a wire-working machine, the combination of a twister tube having a slot extending from end to end thereof to permit the sidewise insertion of a pair of wires to be twisted together at their ends, a separating member mounted in each end of said tube, a journal mounting for said tube slotted to admit said wires, and a gear mounted on said tube and provided with a slot communicating with the slot in said tube.

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