This invention relates to a forming tool for wire anchors and, more particularly, to a tool useful in twisting strands of wire to form anchors.

In engine servicing operations, with particular reference to aircraft or trucks and tank engines, it is often customary to twist wires that are passed through holes in nut and stud bolts to anchor the wires together. The problem becomes particularly complex when such wires are to run through a series of bolts and nuts, in which case twisting must be between the members being anchored. Previously such an operation has been performed by inserting between the wire strands a small pin or nail and manually twisting the strands by causing the pin or nail to rotate. Certain tools have been provided but their use is limited by the space available in which to operate them.

In having in mind the defects of the prior art, it is an object of my invention to provide a tool for forming twisted wire anchors in extremely limited space.

Another object of my invention is the provision, in a tool of the type described, of gripping means which can be easily connected to but cannot become dislodged or disconnected from the wire during a twisting operation.

A still further and more specific object of my invention is to provide, in a tool of the type described, a pair of relatively moveable wire engaging jaws that cannot be opened during the wire twisting operation.

The foregoing objects and others ancillary thereto I prefer to accomplish as follows:

According to a preferred embodiment of my invention, I provide a hollow shank or stem having mounted therein an extended train of gears. At one end of the shank is a handle and adjacent thereto a gear wheel which may be manually rotated to produce rotation throughout the gear train. The last gear in the train, opposite that to which the crank is connected, is radially slotted and is mounted upon a radially slotted pin so that a pair of wires may be straddled in preparation for their twisting. The housing is also slotted so that the tool may be engaged over such a pair of wires. A centering detent cooperates with the slotted pin for aligning the pin and the housing slot when the tool is to be disengaged from wires previously twisted.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Figure 1 is an upright elevational view of my wire forming tool with portions broken away and others shown in section for convenience of illustration;

Figure 2 is a longitudinal sectional view taken on line 2—2 of Figure 1;

Figures 3 and 4 are enlarged sectional views of lockable wire engaging and twisting means employed in my tool;

Figures 5 and 6 are schematic views showing, respectively, the manner in which a pair of wires to be twisted is engaged, and the manner of twisting them by the use of my tool; and

Figure 7 is a fragmentary sectional view taken on line 7—7 of Figure 1.

A wire forming tool of the type described, to overcome the defects hereinbefore mentioned, must have at least two totally distinct characteristics; it must be capable of rapid engagement to and disengagement from a pair of wires for the performance of a wire twisting operation; and it must also provide a positive lock whereby the tool is retained relative to the wires being twisted during the twisting operation. Accordingly, a preferred embodiment of my invention, referring to Figures 1 and 2 of the drawing, is constituted by the hollow shank here shown to comprise the two stamped metal channels 10 and 11, which when joined, form a generally rectangular hollow member. Mounted upon a series of spaced apart pins 12 is a train of solid gears 14, 15, 16, 17, 18, 19, 20 and 21 and radially slotted gear 22. The teeth of pairs of gears in the train are in intermesh. It will be seen that when the gear 14 secured to the crank pin 13 is rotated, this rotary motion will be transmitted throughout the gear train to the gear 22 remote therefrom. Rotation of pin 13 and gear 14 is obtained by means of the arm 24 having crank handle 25. Gear 22 is mounted for rotation upon the pin 27 which has a radial slot 28 longitudinally throughout its length.

The gear 22 is radially slotted at 30 as is also the housing 10 which has slot 32 entering from the end.

On its exterior face pin 27 has groove 34 in which the dog or pin 35, carried by gear 22, op-
erates to permit limited relative movement be-

 tween the pin 27 and gear 22.

Referring specifically to Figures 5 and 6, it will

be seen that, upon the engine block B, a pair

of nuts N, N are threadedly engaged on the studs

S, S. The nuts and studs are pierced and a pair

of wires W, W are passed through the piercings

and extend between such a pair of nuts in rela-

tively parallel relationship to each other.

To twist the wires, from the showing of Figure

5 to that of Figure 6, the wires are first straddled

by being inserted into the opening 32 of the hous-

ing, the opening 33 of gear 22, and the open-

ing 28 of the pin 27 until they are placed approxi-

mately at the axis of pin 27. Manual rotation

of gear 24 through the instrumentality of crank

arm 24 produces an initial rotation of gear 22

relative pin 27. This function is delineated in

Figure 4 which may be compared with Figure 3.

It will be seen that as the two wires W are thus

locked in the slot 28 of pin 27 which is picked

up and begins to rotate when pin 35 arrives at

the end of the groove 24. This lost motion ac-

tion is of a limited nature but is sufficient to close

the gap of slot 28 to insure the retention, during

rotation, of the wires W. Continued rotation of

the gears through the operation of the crank is

carried on until a proper amount of twisting is

obtained.

Referring specifically to Figure 7, I illustrate

means employed in centering or aligning the slot

28 in pin 27 with the slot 32 of the casing. The

pin 27 has a flat surface 40 at right angles to the

slot 28 and spring bar 42, anchored at 43 in the

casing 16, extends across the flat surface 40 and

serves as an indicator as well as a retainer. It

will be apparent that as the pin 27 rotates a click-

ing action will obtain due to the rise and fall of

the pin 42 relative the surface 40. When it is

desired to disengage the tool from a pair of wire

strands that have been twisted the operator

stops the tool at one of the clicks, then backs up

on the crank arm 24 until the dog 35 has moved

counter-clockwise in the groove 24 the limit

thereof and slot 30 in gear 22 will be aligned with

the slot 28 of pin 27.

While I have shown and described particular

embodiments of my invention, it will occur to

those skilled in the art that various changes and

modifications may be made without departing

from the invention, and I, therefore, aim in the

 appended claims to cover all such changes and

modifications as fall within the true spirit and

scope of my invention.

Having thus described my invention, I claim:

1. In a wire twisting tool, a frame, a pin

 mounted for rotation in said frame and having

a radial groove longitudinally thereof to receive

wire strands to be twisted, a ring gear mounted on

said pin and having a portion of the periphery

thereof cut away, the opening provided by the
cut away portion of the ring gear being normally
aligned with the groove of said pin, means for
rotating said gear, and a delayed-motion con-
nection between said gear and said pin whereby
upon rotation of the gear the cut away portion in
the periphery thereof is first disaligned relative
the groove in said pin and thereafter the gear
and said pin are rotated together to twist a pair of
wires which may be disposed in the groove of said
pin.

2. A wire twisting tool, comprising: a frame,

a pin having a radial groove longitudinally
therein to receive wire strands to be twisted, said
pin being mounted in said frame for rotation, a
ring gear mounted upon said pin and having

a peripheral slot normally aligned with the
groove of said pin, means permitting limited
movement of said ring gear relative said pin,
means for jointly rotating said gear and said pin
whereby a twisting action is applied to wire
strands inserted in the groove of said pin, and

detent means for releasably restraining rotation of
said pin during rotary movement of the gear
relative said pin.

3. A wire twisting tool, comprising: a frame,

a pin having a radial groove longitudinally there-

in to receive wire strands to be twisted, said pin

being mounted in said frame for rotation, a ring

gear mounted upon said pin and having a peripher-

al slot normally aligned with the groove of said
pin, an elongated groove and pin delayed-mo-

tion connection between said ring gear and said
pin to permit limited movement of said ring gear
relative said pin, and means for jointly rotating
said gear and said pin whereby a twisting action
is applied to wire strands inserted in the groove
of said pin.

4. A wire twisting tool, comprising: a frame,

a pin having a radial groove longitudinally there-

in to receive wire strands to be twisted, said pin

being journaled in said frame, a ring gear

mounted upon said pin and having a peripheral
slot normally aligned with the radial groove in
said pin, an arcuate groove in one of said mem-
bers and lying between said pin and gear, a dog
pin in the other of said members and extending
into said arcuate groove, means for rotating said
gear whereby from the normal position the slot
in the gear is first disaligned with the radial
groove of the journal pin and then the two mem-
bers rotate together.

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