March 22, 1949. R. D. GREEN 2,464,860

WIRE STRAND MACHINE

Filed April 26, 1946 2 Sheets-Sheet 1

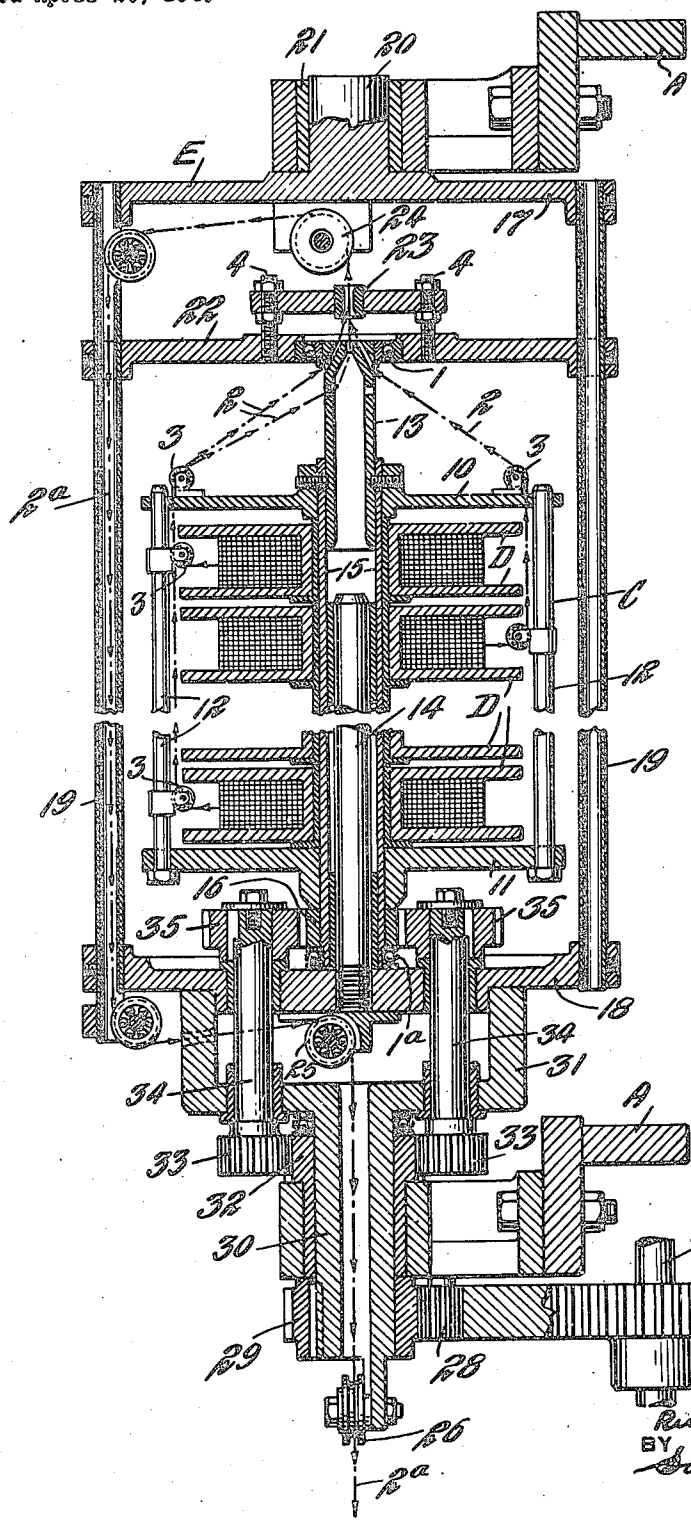


Fig. 1.

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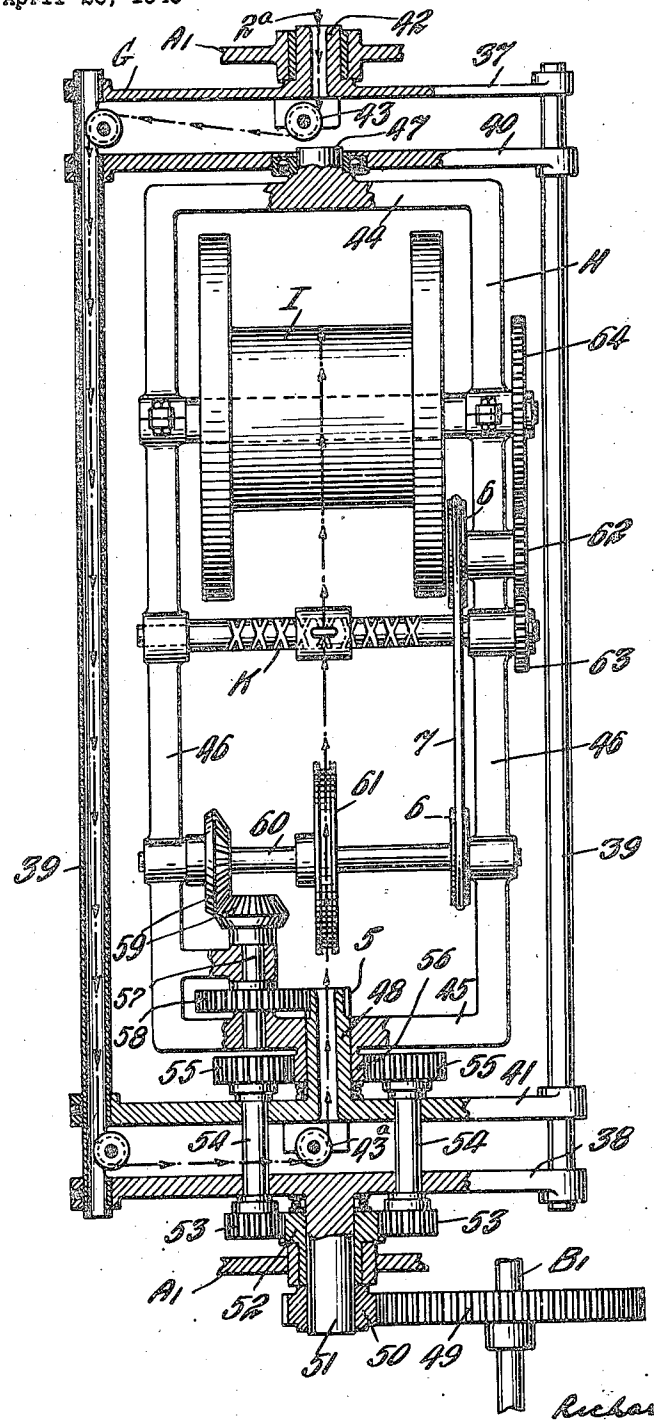


Fig. 1A.

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WIRE STRAND MACHINE

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3 Claims. (Cl. 57—58)

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This invention relates to a wire strand machine of the type in which a number of wires or strands are twisted together, the object of the invention being to provide a simple, efficient and durable machine which shall be capable of operating at very high speed.

A further object is to provide such a strand machine in which a larger number of twists may be made than in previous machines of this type.

A machine embodying all the features of the invention in a preferred form will now be described in connection with the accompanying drawings forming a part of this specification and the features forming the invention then specifically pointed out in the claims.

In the drawings:

Figure 1 is a vertical diagrammatic view in section of the upper part of the machine in which the first twists are made;

Figure 1A is a similar view of the lower part of the machine for additional twists and spooling of the strand.

Referring to the drawings, and now more especially to Figure 1, A is a part of the stationary frame which carries the operating mechanism, B the driving shaft mounted in the frame, C a rotating spool carrier in which are mounted the spools D supplying the wire for the strand, and E is a twisting flyer to which the wires pass from the spool carrier C.

The spool carrier C consists of upper and lower heads 10, 11, connected by tie bars 12 and carries in its upper head 10 the twisting head 13 running in bearing 1 in head 10 and provided with separate passages for the wires 2 to be twisted, preferably, as shown, a central wire and several wires twisted about this central wire to form a strand. It will be understood that any desired number of tie bars 12 may be used to connect the heads 10, 11.

The spool carrier and flyer are broken so as to shorten the view of the machine and only four spools D are shown, but it will be understood that any number of wires and spools desired may be used, a common arrangement being seven wires with six wires twisted about the seventh wire.

The spools D are arranged in line to rotate on and concentrically with the carrier and the wires 2 are led from the spools outward and then upward over the guide rolls 3, shown as mounted on the tie bars 12. The spool carrier E is mounted on the bottom head of the flyer E by bearing 1a and rotates on a central stud 14 carried by the flyer E and extending through a considerable portion of the central sleeve 15 of the carrier, so

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as to form a firm support for high speed operation and the spool carrier carries at its lower end gear 16 through which it is rotated by the flyer by gearing described hereafter.

The flyer E consists of the upper and lower heads 17, 18 connected by ties 19 shown as tubes through one of which the strand 2a is led, the upper head 17 carrying stud 20 mounted to rotate in bearing 21 carried by the frame A. The flyer E carries, also, a cross plate or bar 22 mounted on the ties 19 and on this plate or bar 22 is mounted a strand closing die 23 for the wires passing from the twisting head 13, this die 23 being made adjustable on bolts 4 by which it is mounted in bar 22, so that the die 23 may be adjusted as desired relatively to the twisting head 13 to suit the lay of the wires. The twisting head 13 is removably mounted in the spool carrier so that the empty supply spools may be removed and full spools inserted.

The strand is guided from the die 23 over central sheave 24 and outward to one of the tubes 19, downward through the tube over guide sheaves and then inward at the lower end of the flyer to a central sheave 25 from which the strand passes downward and over a sheave 26 to the part of the machine shown in Figure 1A or to any common or suitable windup mechanism if additional twists are not desired.

The flyer is driven from gear 27 on shaft B through pinion 28 and gear 29 on the lower end of hollow stud 30 projecting downward from a frame 31 carried by the flyer and through which hollow stud 30 the strand passes as above described. The spool carrier C is rotated from the flyer through stationary sun gear 32 carried by stud 30 and engaging planet gears 33 on shafts 34 mounted in the lower head of flyer E and frame 31, the upper ends of these shafts 34 carrying gears 35 engaging gear 16 on the lower end of the spool carrier C.

It will be seen that through this driving gearing the spool carrier C and flyer E are rotated in opposite directions and the gearing is shown as driving the spool carrier at the same speed as the flyer. It will be understood, however, that the gearing may be varied when desired so as to drive the spool carrier at any speed desired relatively to the flyer and that the production speed of the machine may be increased by increasing the speed of one relatively to the other.

With the machine shown in Figure 1, it will be seen that three twists are made per revolution of the flyer E if the wire is delivered from sheave 26 directly to a stationary wind-up roll, two twists

being made between the spool carrier and the flyer by the rotation of the spool carrier with twisting head 13 and the upper sheave 24 in opposite directions and the third twist between the sheave 26 revolving with the flyer and the wind-up roll. If no more than three twists are to be given in making the strand, such machine shown in Figure 1 is complete with non flyer means for receiving the strand.

It is preferable in many cases, however, and one of the specific objects of the invention is, to provide for a larger number of twists and I have shown in Figure 1A an addition to the above machine, which provides for securing a total of six twists. In this construction A—1 are stationary frame parts and B—1 the driving shaft by which the mechanism is driven, which shaft may be an independent shaft, as shown, or a continuation of shaft B of Figure 1.

In this construction, an outer flyer G, to which the strand passes from sheave 26 to Figure 1, encloses and drives a flyer H, which carries a wind-up spool I on which the completed strand is wound, preferably with a usual traverse K. The outer and inner flyers G and H are driven in opposite directions and the outer flyer in the opposite direction to the flyer E of Figure 1.

The flyer G consists of upper and lower heads 37, 38 connected by ties 39 shown as tubes, through one of which the strand runs, and has secured on the ties 39 cross plates or bars 40, 41, providing mounting for the flyer H. The upper head 37 carries hollow stud 42 through which the strand enters and which runs in a bearing in frame A—1. The flyer G also carries central guide sheave 43, and sheaves over which the strand passes outward to the tube tie and over guide sheaves through the tube and inward to central sheave 43*a*, all arranged as the strand guide sheaves of Figure 1, except that the strand passes upward from sheave 43*a*.

The inner flyer H consists of the upper and lower heads 44, 45, connected by frame bars 46 and is mounted for rotation in cross bar 40 of flyer G by stud 47 and by its lower head 45 running on cross bar 41 of flyer C and hollow stud 48 extending upward from the cross bar.

The driving mechanism for the flyers and the parts carried by the inner flyer H are as follows: The gear 49 on shaft B—1 drives the outer flyer G through gear 50 on stud 51 projecting downward from head 38 and the inner flyer H is driven by stationary or sun gear 52 engaging gears 53 on shafts 54 carried by the flyer G, the shafts at their upper ends carrying gears 55 engaging gear 56 carried by lower head 45 of inner flyer H. The gearing is shown as driving flyers G and H in opposite directions at the same speed, but it is understood that this gearing may be changed for different relative speeds of the two flyers, as in the case of the gearing in Figure 1.

Flyer H carries a shaft 57 rotated by a gear 58 engaging pinion 5 formed on the upper end of stud 48, and shaft 57 through bevel gears 59 drives shaft 60 carrying sheave or capstan 61 from which the strand passes to traverse K and wind-up roll I. Shaft 60 is mounted in the side frames 46 of flyer H and through pulleys 6 and belt 7 drives a stub shaft carrying gear 62 driving the traverse K through gear 63 and the wind-up spool I through gear 64.

It will be seen that with the construction shown in Figures 1 and 1A, and the strand lead from

sheave 26 of Figure 1 to sheave 43 of Figure 1A, the strand will be given six twists per revolution, the third and fourth twists being between the sleaves 26, 43, as flyer G rotates in the opposite direction of flyer E, and the fifth and sixth twists between the sheave 43*a* at the lower end of flyer G and sheave or capstan 61, as flyers G and H rotate in opposite directions.

It will be understood that if only four twists are desired, this may readily be arranged by mounting the wind-up drum on the flyer G and omitting the flyer H, so that no twist is given the strand after the third and fourth twists given between sheaves 26, 43. It will be understood, also, that other modifications may be made in the construction shown without departing from the invention as defined by the claims.

I claim:

1. In a strand twisting machine, the combination of a spool carrier, a plurality of wire spools rotating on and concentrically with the carrier, a twisting head on the carrier carrying a plurality of spool wires and arranged to twist the plurality of wires into a twisted strand, a flyer receiving the twisted strand and carrying it around the spool carrier, and driving means for securing the rotation of the spool carrier from the flyer and in relatively opposite direction.

2. In a strand twisting machine, the combination of a spool carrier, a plurality of wire spools rotating on and concentrically with the carrier, a twisting head on the carrier carrying a plurality of spool wires and arranged to twist the plurality of spool wires into a twisted strand, a die receiving the twisted wires from the spools and adjustable toward and from the twisting head, a flyer for receiving the twisted strand from the die and carrying the strand around the spool carrier, and driving means for securing the rotation of the spool carrier from the flyer and in relatively opposite directions.

3. In a strand twisting machine, the combination of a spool carrier, a plurality of wire spools rotating on and concentrically with the carrier, a twisting head on the carrier removably mounted for change of heads and carrying a plurality of spool wires and arranged to twist the plurality of wires into a twisted strand, a die on the carrier receiving the twisted wires from the spools and adjustable toward and from the twisting head, a flyer receiving the strand from the die and carrying the strand around the spool carrier, and driving means for rotating the spool carrier from the flyer and in relatively opposite directions.

RICHARD DUANE GREEN.

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