April 23, 1963 H. H. DUFF 3,086,721

TRANSFER DEVICE FOR CONTINUOUS SPOOLERS

Filed March 14, 1961

FIG. 1

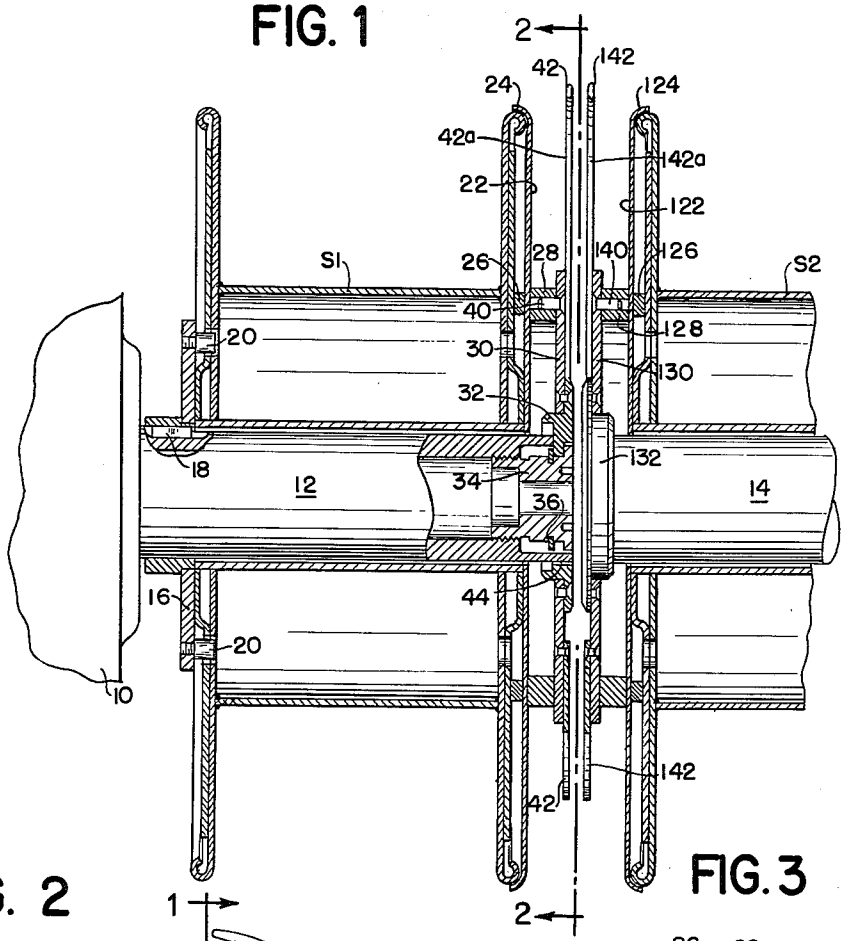


FIG. 2

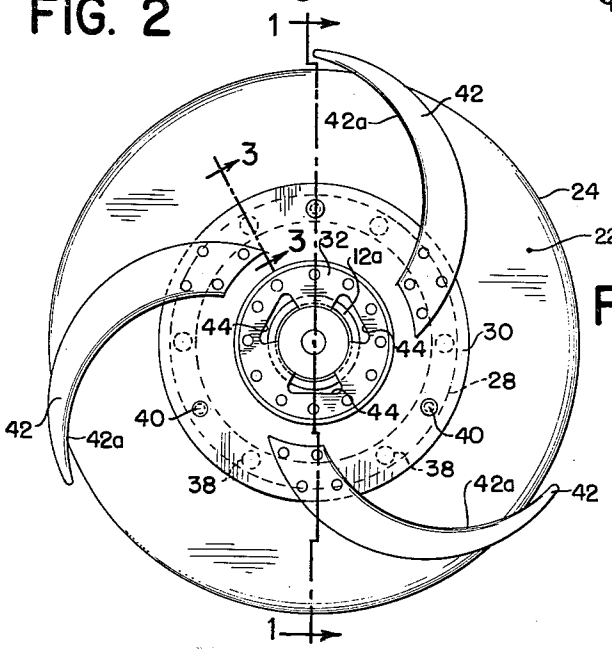


FIG. 3

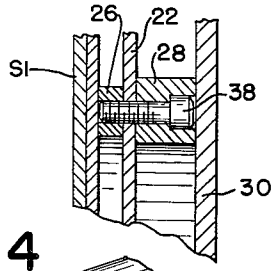
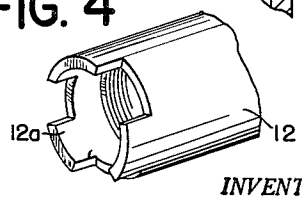


FIG. 4



INVENTOR.
HAROLD H. DUFF

BY Darby & Darby

ATTORNEYS

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TRANSFER DEVICE FOR CONTINUOUS SPOOLERS

Harold H. Duff, Fords, N.J., assignor to Syncro Machine Company, Perth Amboy, N.J., a corporation of New Jersey

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This invention relates to improvements in transfer devices for continuous spoolers in which, as is understood in the art, a pair of associated power driven spools are arranged with suitably acting distributing mechanism, whereby when one spool is filled with wire the wire is directed onto the empty spool without stopping the machine.

One of the objects of this invention is to provide an improvement in construction whereby the wire during transfer from one spool to the other is manipulated so as not to subject it to sufficient stress to cause the transfer end to suffer sufficient reduction in diameter as to not meet diameter specifications.

Another object of the invention is to provide an improvement in this mechanism whereby the initial end of the wire going onto each spool can be made longer than has heretofore been possible.

Still another object of the invention is to arrange the mechanism so that the long initial end can easily be released from the mechanism.

Other and more detailed objects of the invention will be apparent from the following description of the embodiment thereof set out in the attached drawings for purposes of exemplification.

In the drawings,

FIGURE 1 is a vertical, central view on the line 1—1 of FIG. 2, showing the details of construction comprising the assembly of the invention;

FIGURE 2 is a righthand elevational view of the left-hand spool viewed from the plane 2—2 of FIG. 1;

FIGURE 3 is a detailed, cross-sectional view taken on the line 3—3 of FIG. 2; and

FIGURE 4 is an enlarged perspective view of the construction of the end of the spooler shaft.

This invention is related to improvements in continuous wire spooling machines of the type disclosed in United States Patent No. 2,424,021, issued July 15, 1947, to John Cook, and in United States Patent No. 2,600,841, issued June 17, 1952, to Carl O. Bruestle.

In the drawing, annealing, spinning and similar processing of wire, modern efficient operation favors the use of spooling mechanism which can be run continuously. In other words the spooling mechanism is so arranged that without interrupting the feed of the wire when one spool of an associated pair is full the wire is transferred to the related spool of the pair. The wire between the two spools is severed and the full spool is then replaced on that portion of the machine with an empty spool. Thus the wire can go continuously from any previous processing operation and be continuously spooled twenty-four hours a day if necessary without ever stopping the feeding of the wire.

In the prior machines of this type there are at the present time two phases of operation which are not as entirely satisfactory as might be desired. One of these phases is related to the fact that in transferring the wire from a full spool to an empty spool the conditions of operation are such that the wire is excessively stressed causing a reduction in diameter, and therefore a deviation from specifications. The result is that a tail is formed which has to be cut off and becomes waste. The mechanism of this invention so reduces the shock on the wire at the time of transfer so that it is little if any excessively stressed and hence no waste results.

The other phase of the matter is that in some operations the users of the spooled wire require a longer initial exposed tail for the end of the wire. This is now available with machines of this type. In accordance with this invention a simple arrangement is provided whereby considerable variation in the length of the initial tail can be easily provided for.

As is well understood in the art and as appears from the above mentioned patents, a wire distributing mechanism is provided for guiding the wire to one spool until it is filled, laying it on in fairly uniform layers, and then suddenly transferring the wire to the empty spool until it is subsequently filled. Immediately after transfer or at the time of transfer the end which extends between the two spools is broken or severed and the full spool is then removed from the machine. The subject matter of this invention is similarly operated and the improvements relate to reducing the stress on the wire at the time of transfer from the full spool to the empty spool and providing for varying initial lengths or tails, as will be explained later.

Referring to the drawings, there are shown a pair of aligned spooler shafts 12 and 14 which rotate on a common axis. Each shaft is driven by a suitably controlled motor of which the motor 10 is indicated for the shaft 12. A similar motor, not shown, drives the shaft 14. At this point it will be noted that all of the construction described in connection with the spooler 10—12 is duplicated for the spooler which includes the shaft 14. With regard to spooler 10—12 there is keyed to the shaft 12 adjacent the motor by means of the key 18, a disc 16 on the face of which two or more drive pins 20 are mounted. The spool is indicated generally at S1 and includes a central sleeve which fits snugly on the shaft 12, as shown, and an outer concentric sleeve forming the core for the winding. At each end of these concentric sleeves are the spool heads which in this case are shown as being formed of discs of thin metal superposed and secured together as by welding to provide a metal spool of a type very commonly used in the industry. The heads of the spools are provided with properly positioned apertures into which the drive pins 20 can project, as shown, so that the spools will be driven by the related shafts.

The subject matter of this invention includes a sub-assembly comprising a disc 22 which has a curved peripherial edge 24 dimensioned to partially overlap the beaded edge of the adjacent spool head, as clearly shown in FIG. 1. When in assembled position the disc 22 is properly spaced from the outer face of the spool head by means of a ring 26. Positioned concentrically with the ring 26 and on the other side of the disc 22, is a ring 28. As clearly illustrated in FIG. 3, the ring 26, the disc 22, and the ring 28, are assembled as above described, into a unitary construction by means of a series of machine screws 38, which pass through the ring 28 and the disc 22 and are threaded into the ring 26.

Arranged coaxially with this assembly is a disc 30 which is secured to a fixture 32 by rivets, as shown. This assembly is provided with several pins 40 fixedly attached thereto and arranged to seat in apertures in the ring 28 so that this assembly will rotate with the ring. Lying in a central aperture in the fixture 32 is a nut 34 which has flanged head on one side and is held in the fixture by means of a snap ring 36 so that the nut 34 can be rotated with respect to the fixture 32. As shown in FIG. 1, the shaft 12 is tubular and internally threaded so as to receive the nut 34. Secured to the outer face of the disc 30 in uniformly spaced relation in a circumferential direction are the curved arms 42, the ends of which, as shown in FIG. 2, project a short distance beyond the periphery of the disc 24.

It will be seen then that the sub-assembly comprising the disc **22**, the rings **26** and **28** and the connected parts **30**, **32** and **34**, can be attached to the end of the shaft **12** after the spool has been slipped on by causing the nut **34** of the sub-assembly to engage the internal threads of the shaft **12**. Thus the sub-assembly is fixed coaxial with and on the shaft **12** so as to rotate with the spool **S1**. In order to prevent relative rotation of the sub-assembly with the shaft **12** it is preferred that the end thereof be notched to provide axially projecting lugs **12***a*, as shown in FIG. 4, which project into openings **44** in the fixture **32**. Thus the sub-assembly is further locked against relative rotational movement with respect to the shaft **12**. This arrangement does not interfere with the function of the nut **34**.

The arrangement of shaft **14** is the same and the corresponding parts are numbered similarly to the parts for the shaft **12** by increasing the number by **100**. Thus the disc corresponding to the disc **22** becomes disc **122** and so forth.

Assuming the machine is running, when spool **S1** is full, the distributor will suddenly shift the wire from that spool to a point in alignment with the ring **128** associated with the spool **S2**. The distributor will stay in this position until the desired initial length of wire is wound on the ring **128** whereupon the distributor will shift further to the right to guide the wire onto the spool **S2**.

As is well understood in this art the relative speeds of the two shafts **12** and **14** at the time of transfer are such that the surface speed of the cylinder of wire on the full spool **S1** will be the same as the surface speed of the core of the spool **S2**. It should be noted that the external diameters of the rings **28** and **128** are substantially the same as the external diameters of the cores of the spools **S1** and **S2**, so that the wire will be demanded by the spoolers at the proper rates at those times.

As the distributor reshifted from the position of feeding wire to the full spool **S1** into position to feed wire to the ring **128**, the wire is caught under one of the curved arms **142** and guided downwardly, thereby onto the surface of ring **128**. Since the surface speed of the wire coiled on the full spool is the same as the surface speed of the core of the spool **S2**, the spool **S2** is actually rotating considerably faster than the spool **S1**. It follows, therefore, that one of the curved arms **142** of the righthand assembly will engage the wire when guided down on the ring **128** without interference from the curved arms **42** of the other assembly.

The desired number of turns will be applied to the ring **128** during shifting of the distributor from one spool to the other, as determined by the spool speeds and the speed of movement of the transfer mechanism. The length of wire extending between the two spools is then cut by mechanism well known in the art, or else by reason of actual relative rotation of the two spools, is broken, so that the whole assembly, including the spool **S1**, can be moved aside, as is well understood in the art, so that the spool can be removed from the shaft **12**. It is obvious that this removal is effected by loosening the nut **34** to disengage it from the threads of shaft **12**, whereupon the connected parts **30**, **32** and **42** with the nut **34** attached can be removed. The few turns of wire on the ring **28** can then be pulled off axially to provide the

long initial tail spoken of above. The sub-assembly comprising the disc **22**, the ring **26** and the ring **28** can then be removed whereupon the full spool can be taken off the shaft **12** and replaced by an empty spool. The parts are then reassembled in reverse order and the spooler moved back into alignment with the other spooler on which the spool is being filled and ready for the reverse operation.

From this arrangement it will be seen that by adjusting the speed of the distributor while effecting a transfer any number of initial turns can be applied to the rings **28** and **128**, and that at the time of transfer the wire is not under stress and hence substantially no waste results.

One feature of the arrangement as described is that the turns comprising the long initial tails can be easily removed from the rings **28** and **128** by slipping them off axially. However, it is within the scope of this invention to connect the assembly comprising the parts **30**, **32** and **42** permanently to the assembly comprising the disc **22**, the ring **26** and the ring **28**, so that there is formed a sort of short length spool as a mechanical unit. The difficulty with this arrangement is that in order to remove the turns comprising the long tail wrapped on the ring **28** it is necessary to unwrap the wire a turn at a time, which is slower than being able to slip it off the ring axially.

Attention is called to the fact that the radial wire engaging arms **42** and **142** on their leading edges **42***a* and **142***a* are made smooth and preferably rounded, so as not to present any sharp corners which might damage the wire when they strike it. In addition to provide smooth continuous edges the wire is smoothly guided down onto the rings **120** and **128** without any undue strain thereon.

From the above description it will be apparent to those skilled in the art that the subject matter of this invention is capable of variation in some of its details, and it is intended, therefore, that the construction illustrated for descriptive purposes is to be taken as exemplary and that the scope of the invention is to be determined by the appended claims.

What is claimed is:

1. In a continuous wire spooling machine, a pair of axially aligned spool shafts and coil supporting assemblies detachably secured to the opposed ends of said shafts, each assembly including a ring, having substantially the same external diameter as the external diameter of the cores of the spools to be used therewith, upon which the initial end of the wire being supplied is first wound, and radially extending rigid arms secured to each of said assemblies at points radially inwardly of the associated core surface for directing the wire onto said rings at the time of transfer of the wire from one spool to the other.

2. In the combination of claim 1, said assemblies each including a disc onto one face of which is secured the related ring, and a second disc detachably connected to the other face of the ring and to which said arms are connected.

References Cited in the file of this patent

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