April 11, 1950 E. F. ANDERSON 2,503,987

WIRE STRANDING DIE

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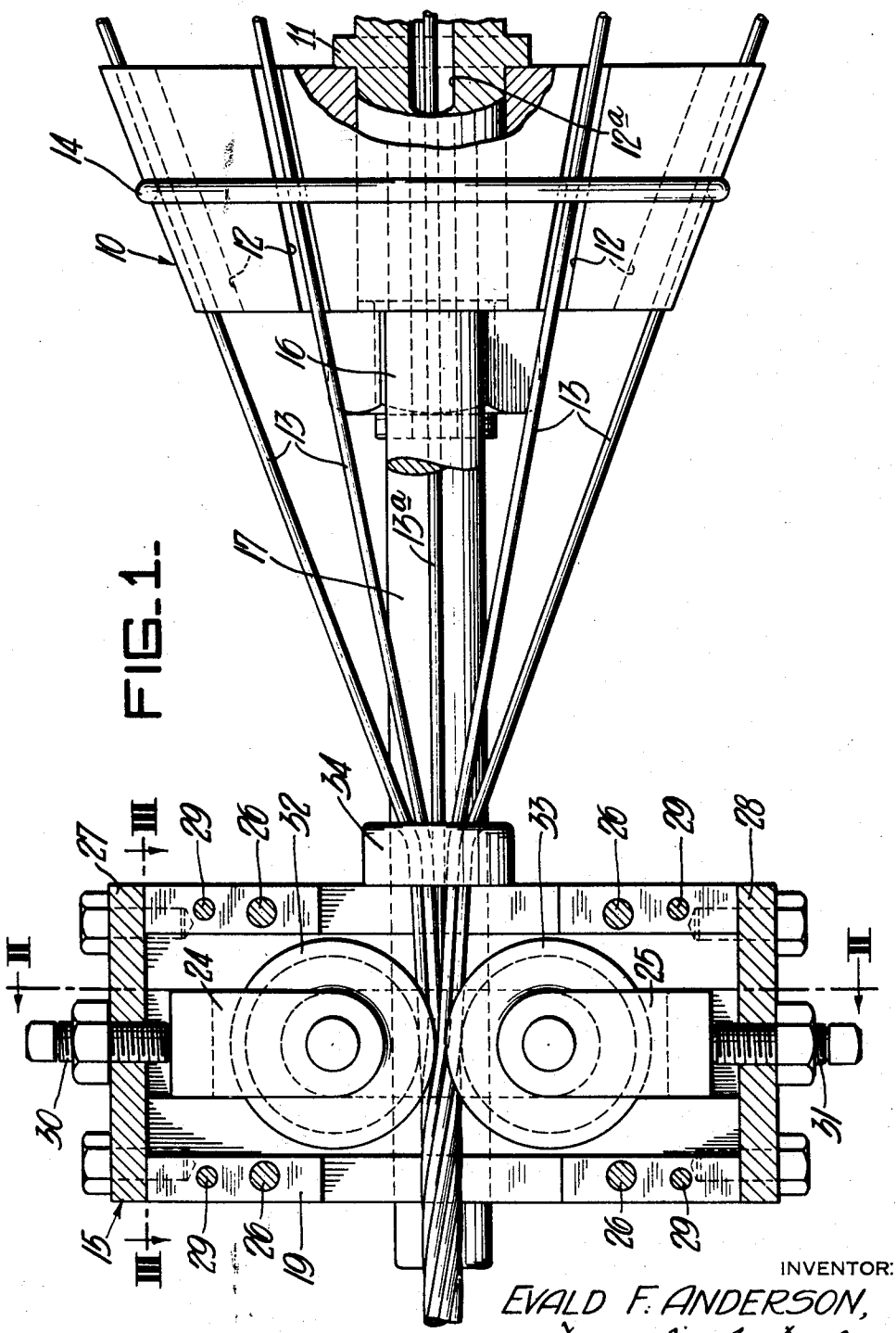


FIG. 1.

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FIG. 3.

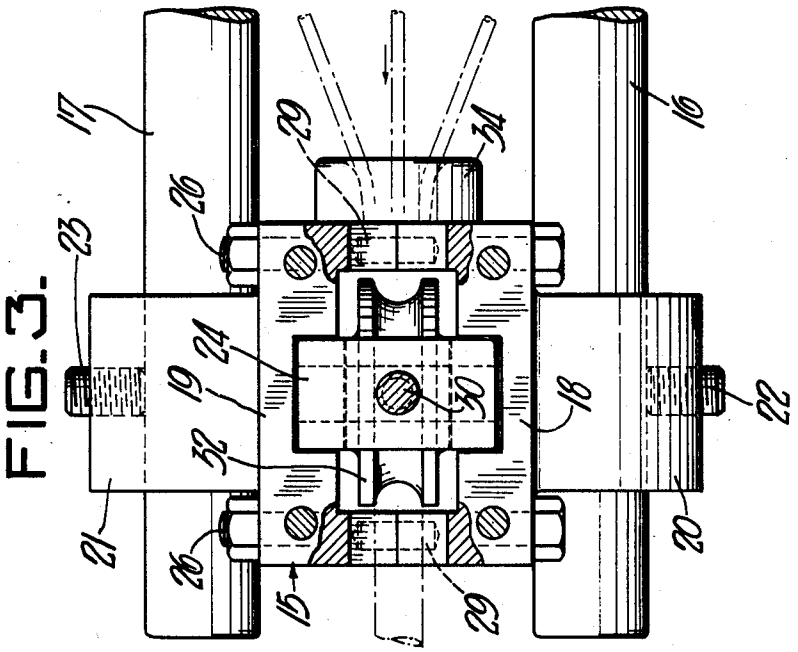
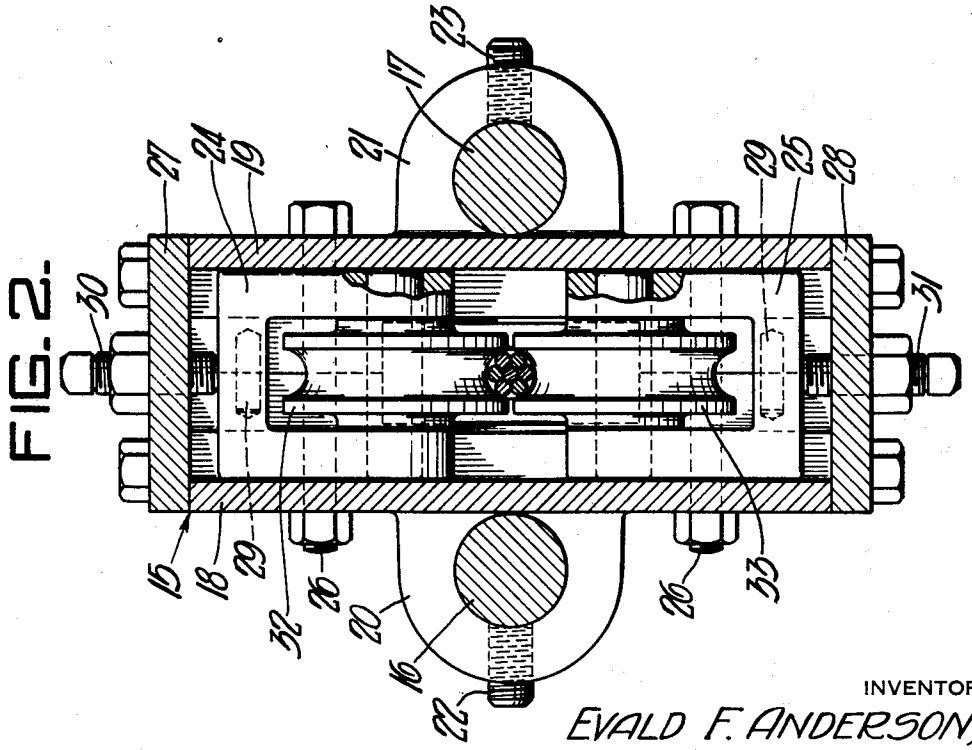


FIG. 2.



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WIRE STRANDING DIE

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5 Claims. (Cl. 57—138)

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This invention relates to improvements in wire stranding dies and to improved methods for fashioning stranded wire structures.

As used herein, the term "wire stranding die" refers generically to dies for intertwisting individual wires to form strands or for intertwisting strands to form ropes or cables. The term "stranded wire structure" refers generically to a strand composed of individual wires or to a rope or cable composed of several strands.

An object of the present invention is to provide wire stranding die assemblies having improved means for reducing friction between the die and the wires, thereby largely eliminating the need for lubrication of the wire.

A further object of the invention is to provide improved wire stranding dies having friction reducing die sheaves mounted on a frame to rotate with the usual slotted stranding head and being adjustable to vary die pressure.

A further object of the invention is to provide improved wire stranding dies wherein the need for lubricants is largely eliminated and which do not mark or scratch the wire surface, thereby providing dies particularly suited for producing stranded electrical conductors, where lubricants or scratches are objectionable.

A further object of the invention is to provide improved methods for fashioning stranded wire structures facilitating production without the use of lubricants.

In accomplishing these and other objects of the present invention, I have provided improved details of structure preferred forms of which are shown in the accompanying drawings, wherein:

Figure 1 is a side elevational view of an improved stranding die embodying features of the present invention, one of the housing sections being removed to show other parts more clearly;

Figure 2 is a vertical sectional view taken substantially on line II—II of Figure 1; and

Figure 3 is a horizontal sectional view taken substantially on line III—III of Figure 1.

Referring more in detail to the drawings:

In Figure 1 there is shown a wire stranding head 10 fixed to a rotatable tubular nose piece 11 of a strander or twister, rotation being preferably, though not necessarily, on a horizontal axis. The stranding head is of frusto-conical shape and has guide grooves 12 in its outer surface and an axial guide bore 12a. Outer wires or strands 13 are led through grooves 12 and a core wire or strand 13a through bore 12a to the stranding die, hereinafter described. Preferably the stranding head is surrounded by a circumferential locking ring 14 for maintaining the wires or strands in the guide grooves.

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Numerous designs of stranding heads are known and those of other designs may be suitable for use with the die of the present invention. Therefore, I wish the particular design of stranding head shown to be considered as exemplary and not limiting. Likewise numerous mechanisms are known for feeding wires or strands to the stranding head and for reeling the stranded wire structure beyond the die. Since per se the feeding and reeling mechanisms are not parts of the present invention, such mechanisms are not illustrated, and I do not wish to be limited to any particular mechanisms. In some types of stranded wire structures core wire 13a is replaced by a core of fibrous material, and I do not wish to exclude such structures.

In accordance with the present invention a stranding die 15 is secured to stranding head 10 in axially aligned, spaced relation to rotate therewith. A pair of diametrically opposed rods 16 and 17 are affixed to said stranding head and extend from the forward face thereof parallel to the axis of rotation. The housing for die 15 includes sections 18 and 19 which have protruding apertured bosses 20 and 21, respectively, Figure 2. The apertures in said bosses slidably receive rods 16 and 17. The die is thereby supported on the stranding head and the spacing therefrom may be adjusted by sliding the die housing on the rods. The die is secured in adjusted position on the rods by set screws 22 and 23.

The interior faces of housing sections 18 and 19 form guideways for sheave bearings or stirrups 24 and 25, which are slidable therein in a radial direction. The housing sections are secured together by a plurality of bolts 26 and end plates 27 and 28 bolted to said sections. Accurate positioning of the sections may be obtained by dowels 29 therebetween, Figures 2 and 3. Thrust screws 30 and 31, threaded into said end plates and equipped with lock nuts as shown, bear against the outer faces of the sheave bearings and function to limit outward movement and adjust the position thereof. The front and rear faces of the housing sections are open for passage of wires 13.

Sheave bearings 24 and 25 rotatably mount die sheaves 32 and 33, respectively. Said die sheaves have circumferential grooves which mate to form a circular die opening concentric with the axis of rotation of the stranding head.

Wires or strands 13 and 13a are lead from the stranding head to the die through a floating ring

34, which is at the point of twist where outer wires 13 are converged about core wire 13a, Figure 1. Said ring is of a hard material and has a bore tapering in the direction of the die. The ring bore in its region of minimum diameter is somewhat larger than the bore of the die circle. The ring reduces the angle of approach of outer wires 13 as they enter the die opening so that they are guided accurately into said opening and are thus prevented from projecting into the points of contact of the sheaves.

In operation, wire is fed from a suitable source behind stranding head 10, through the guide grooves and center of said head, through floating ring 34, through the die opening between sheaves 32 and 33, and onto a suitable reel. Nose piece 11 is rotated by suitable mechanism, not shown, and with it stranding head 10 and die 15 are rotated as a unit. Wires or strands 13 are stranded together in the region of die 15 to fashion a stranded wire structure.

As the stranded wire structure passes between said sheaves, the latter rotate freely within sheave bearings 24 and 25. At the same time they rotate with the wires or strands from the stranding head and around the stranded wire structure. Thus friction between the wires or strands and the stranding die is minimized. The friction is sufficiently slight so that wire lubricant may be dispensed with entirely for wires of certain materials, such as copper or aluminum.

The pressure exerted by the sheaves on the stranded wire structure may be adjusted by adjustment of thrust screws 30 and 31.

While I have shown and described only a single embodiment of the invention, it is apparent that modifications may arise. Therefore I do not wish to be limited by the disclosure set forth, but only by the scope of the appended claims.

I claim:

1. A stranding die assembly comprising a rotatably mounted stranding head, means on said stranding head for guiding wires, a stranding die, means mounting said stranding die in axially aligned spaced relation with respect to said stranding head to rotate therewith, and annular floating means adjacent said stranding die in advance of the point of twist for guiding wires from said stranding head to said stranding die, said stranding die including a pair of freely rotatable die sheaves and means for adjusting the spacing of said sheaves.

2. A stranding die assembly comprising a rotatably mounted stranding head, means on said stranding head for guiding wires, a pair of rods fixed to said stranding head and extending parallel to the axis of rotation thereof, a stranding die, and annular floating means, said stranding die including a housing supported on said rods to rotate with said stranding head, a pair of sheave bearings radially slidable in said housing, die sheaves rotatably mounted on said sheave bearings and having grooved circumferential edges forming a circular die opening concentric with the axis of rotation of said stranding head, and means for adjusting the spacing of said sheaves and sheave bearings, said annular floating means

being interposed between said stranding head and said stranding die adjacent the latter in advance of the point of twist to guide the wires from said stranding head to said stranding die.

3. A stranding die including a pair of similar housing sections having interior radial guideways, a pair of U-shaped bearings slidably mounted in said guideways, means fixing said housing sections together, end plates closing the ends of said housing sections, set screws in said end plates limiting the outward positions of said bearings, the front and back faces of the housing sections being open, and die sheaves rotatably mounted in said bearings and having grooved circumferential edges.

4. A stranding die assembly comprising a rotatably mounted stranding head, means on said stranding head for guiding wires, a pair of rods fixed to said stranding head and extending parallel to the axis of rotation thereof, a stranding die, and annular floating means, said stranding die including a pair of housing sections one of which is adjustably received on each of said rods to rotate with said stranding head and which have radial interior guideways, a pair of U-shaped bearings slidably mounted in said guideways, means fixing said housing sections together, end plates closing the ends of said housing sections, set screws in said end plates limiting the outward positions of said bearings, the front and back walls of said housing sections being open, and die sheaves rotatably mounted in said bearings and having grooved circumferential edges forming a circular die opening concentric with the axis of rotation of said stranding head, said annular floating means being interposed between said stranding head and said stranding die at the point of twist to guide the wires from the former to the latter.

5. A stranding die assembly comprising a rotatably mounted stranding head, means on said stranding head for guiding wires, a stranding die, means mounting said stranding die in axially aligned spaced relation with respect to said stranding head to rotate therewith, and a floating ring adjacent said stranding die in advance of the point of twist for guiding wires from said stranding head to said stranding die, said stranding die including a pair of freely rotatable die sheaves and means for adjusting the spacing of said die sheaves, the inside diameter of said ring being appreciably larger than the die opening of said sheaves.

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