

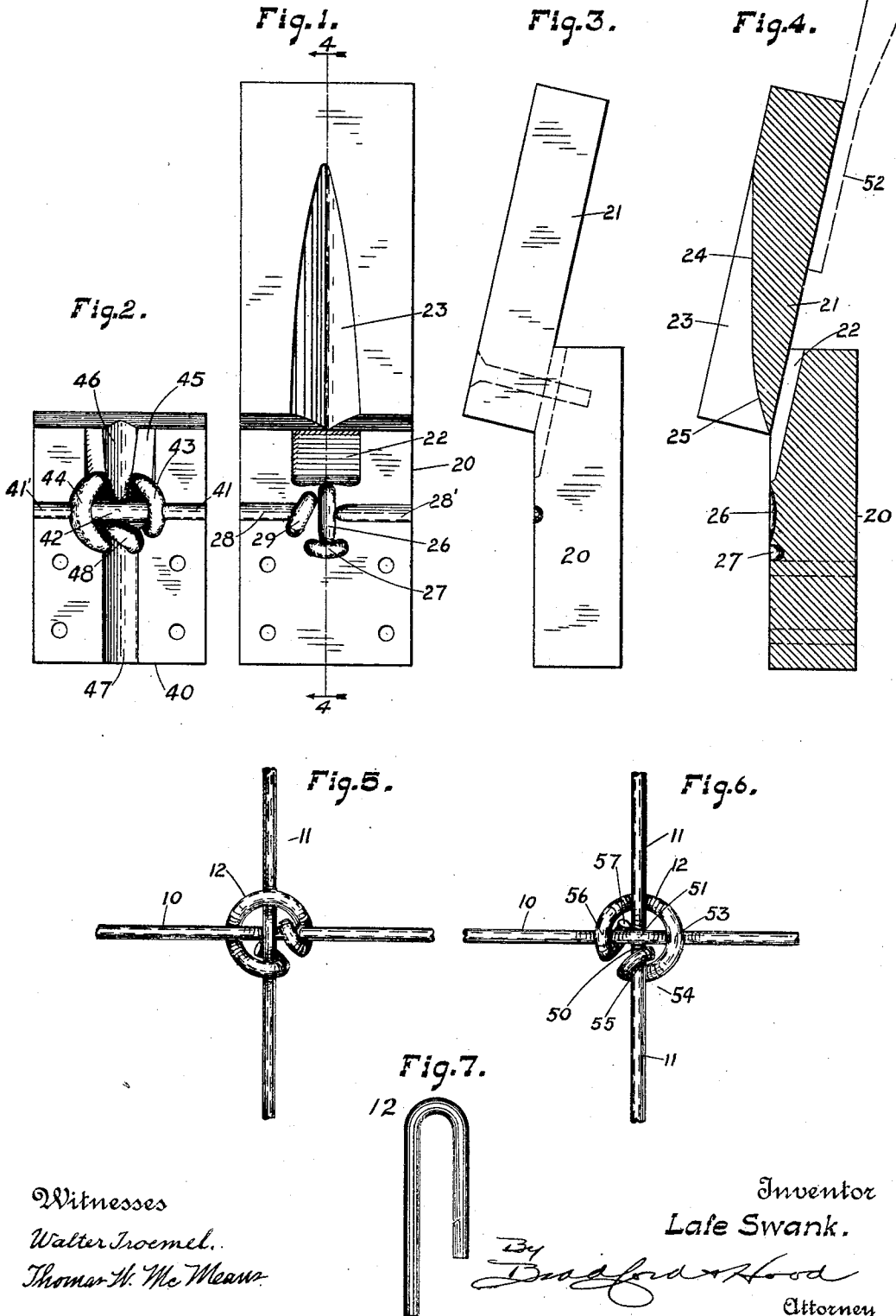
L. SWANK.

DIE.

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UNITED STATES PATENT OFFICE.

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To all whom it may concern:

Be it known that I, LAFE SWANK, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Dies, of which the following is a specification.

The object of my invention is to produce a die capable of applying a wire staple to crossing wires of a wire fabric in such manner that it will assume substantially the form shown in the drawings wherein the staple at its middle will pass under one of the crossing wires and have its end passed over and wrapped under the other crossing wire, and the opposite leg of the staple will pass over one of the crossing wires and have its end passed under the other wire and wrapped around said other wire, the tips of the tying staple being turned inwardly toward the point of intersection of the crossing wires.

A further object of my invention is to so form the die that the staple in its initial application to the crossing wires will be held between die parts which are relatively immovable, either integral or firmly fastened together.

The accompanying drawings illustrate my invention.

Figure 1 is a face elevation of the main die member; Fig. 2 a face elevation of the cooperating die member; Fig. 3 a side elevation of the die member shown in Fig. 1; Fig. 4 a section on line 4—4 of Fig. 1; Fig. 5 an elevation of one face of a product of the dies; Fig. 6 an elevation of the opposite face of the product of the dies, and Fig. 7 an elevation of the tying staple in initial condition.

For the sake of convenience of description I shall denominate the wire 10 as a running wire and the wire 11 as a stay wire, although it is to be understood that wire 10 might be considered the stay wire and wire 11 the running wire.

In the drawings 20 indicates the main body of a die member having an extension 21 which lies at a convenient angle to the face of the portion 20 to permit the formation through the die, of an inclined feeding channel 22 through which the previously formed staple tie 12 is introduced, said channel 22 extending at an angle to the plane of the crossing wires 10 and 11, and

the inner end of said channel 22 opening into the face of the portion 20 immediately at the inner end of the portion 21 of the die.

Formed in the face of die portion 21 is a V-shaped notch 23 the main portion 24 of the bottom of which lies substantially parallel with the face of die portion 20, but at a short distance above the same, and connected with said face of said die portion 20 by deepening the notch 23, as at 25, so as to join with the channel 22 at its point of entrance into the face of die portion 20. Formed in the face of die portion 20 beyond channel 22 and in alinement with notch 23, is a shallow groove 26 which is deeper at its middle than at its ends, merging at one end into the inner end of channel 22 and at the other end merging into a shallow transverse groove 27 which is deeper at its middle than at its ends and lies transversely of the line of groove 26. Formed in the face of die portion 20 are two shallow grooves 28, 28' which are in alinement with each other and at right angles to groove 26 said grooves being, at their outer ends, equal in depth to half the diameter of the running wire 10.

At its inner end, groove 28' is shallowed so as to merge into the side of groove 26 but considerably above the bottom thereof. Similarly the inner end of groove 28 is shallower so as to merge into the side of an angularly placed groove 29 which lies alongside of groove 26. Groove 29 is considerably deeper at its middle than at its ends and the said deeper middle portion lies below the inner end of groove 28 an amount equal to the diameter of the tie wire 12, the middle of groove 27 also lying below the bottom of the adjacent end of groove 26 an amount equal to the diameter of the tie wire 12. The other die member 40, which is to cooperate with the die portion 20, has formed in its face a pair of grooves 41 and 41' which are of a depth substantially equal to half the diameter of the running wire 10 and are adapted to register with the grooves 28 and 28' respectively of the die portion 20. Between the inner ends of grooves 41 and 41' is a deeper groove 42 in alinement with the grooves 41 and 41' and deeper at its middle than at its ends. Formed between the inner end of groove 41 and the adjacent end of groove 42 is a curved groove 43 which extends transversely of grooves 41 and 42 and

across the same, said groove 43 being deeper, at its middle, than the adjacent grooves 41 and 42 by an amount equal to the diameter of the tie wire 12. Similarly formed between the inner end of groove 41' and the adjacent end of groove 42 is a curved transversely extending groove 44 which also is deeper at its middle than at its ends and lies below grooves 41' and 42 an amount equal to the diameter of the tie wire 12.

Extending from the upper end of die member 40 in the face thereof, is a shallow channel 45 which, at its beginning, has substantially no depth, increasing in depth toward the inner end. Said channel corresponds in size and position to the inner end of channel 22 of die member 20 and formed in the bottom of the middle of said channel is a groove 46 which lies substantially at right angles to grooves 41, 42 and 41'. This groove 46 comes into alinement with groove 23 and its outer end is deeper than its inner end so that a stay wire lying in groove 23 may be embraced in groove 46 as die 40 is brought into conjunction with die portion 20. At its inner end groove 46 curves abruptly toward the face of the die and intercepts the side of groove 42 at a point above its bottom substantially equal to the diameter of the running wire 10. Formed in alinement with groove 46 is a groove 47 having a depth slightly in excess of the diameter of the stay wire 11. Formed at the inner end of groove 47 between said inner end and groove 42, and lying at an intermediate angle between groove 47 and groove 42, is a deep groove 48 which, at its right hand end (Fig. 2) begins at the face of the die, and its left hand end lies slightly deeper than the left hand end of groove 42.

For a complete understanding of the exact shapes of the parts attention is now called to Figs. 5 and 6, as well as the remaining figures. Supposing a pair of crossing wires 10 and 11 to be extended across the face of die 20 with wire 10 in alinement with grooves 28, 28', and wire 11 in alinement with grooves 23 and 26, the operation is as follows: Die member 40 will be brought into conjunction with die portion 20 so that its grooves 41 and 41' will engage wire 10. The point of conjunction between grooves 46 and 42 will also engage wire 11 and force the same down into groove 26 thus putting a kink 50 in wire 11 and a mating kink 51 in wire 10, and clamping said two wires firmly in desired relation to each other. Thereupon the staple 12 (Fig. 7) is dropped into channel 22 with its legs straddling wire 11 and projecting into the initial ends of grooves 43 and 44. Thereupon a plunger 52, of usual form, is brought down upon the middle or bow of the staple 12 and the staple is forced inwardly, one leg passing through groove 44 over wire 10 at 53 and

thence downward to a point beneath wire 11 at 54 where it enters groove 27 and by it is directed substantially at right angles across wire 11 into the initial end (right-hand end, Fig. 2) of groove 48 where it is directed diagonally over and across wire 11 and its tip 55 turned downward so as to embrace wire 11 and inward toward wire 10. Simultaneously the other leg of wire 12 is deflected by groove 43 over wire 10, at 56, and thence into the lower end of groove 29 by which it is directed diagonally under wire 10 and its tip 57 turned upward into one of the crotches between wires 10 and 11. During this action the middle portion of the staple is firmly held between the two die portions 20 and 21 which are relatively immovable; although, for convenience of manufacture, it is convenient to make the two members 20 and 21 of separate pieces and firmly fasten them together by any suitable means. By this arrangement a permanent and unvarying guide is formed for the plunger 52.

I claim as my invention:—

A tying die for wire fabrics comprising a member having formed in its mating face a pair of alined semi-circular grooves 28 and 28', a groove 26 crossing the line of grooves 28 and 28' between said grooves, a groove 29 crossing the line of grooves 28 and 28' and lying between grooves 28 and 26 and at an angle to both of said grooves, and a curved groove 27 arranged substantially at right angles to groove 26 and at one end thereof, said member also having a plunger slot formed therethrough and emerging closely adjacent one end of groove 26; and also comprising a mating die member having formed in its face a pair of separated alined grooves 41 and 41' adapted to register with grooves 28 and 28' respectively, an intermediate groove 42 in alinement with grooves 41 and 41', a pair of alined grooves 46 and 47 lying substantially at right angles to the line of grooves 41 and 41' and upon opposite sides thereof, a curved groove 43 crossing the line of groove 41 between said groove and groove 42 and of a depth greater than said grooves, a curved groove 44 lying between grooves 41' and 42 and crossing the same and of greater depth than said groove, and a groove 48 lying between grooves 47 and 42 at an angle to both of said grooves and of greater depth than said grooves, all substantially as shown and described.

In witness whereof, I, have hereunto set my hand and seal at Indianapolis, Indiana, this fifth day of January, A. D. one thousand nine hundred and nine.

LAFE SWANK. [L. S.]

Witnesses:

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