No. 742,551. PATENTED OCT. 27, 1903.

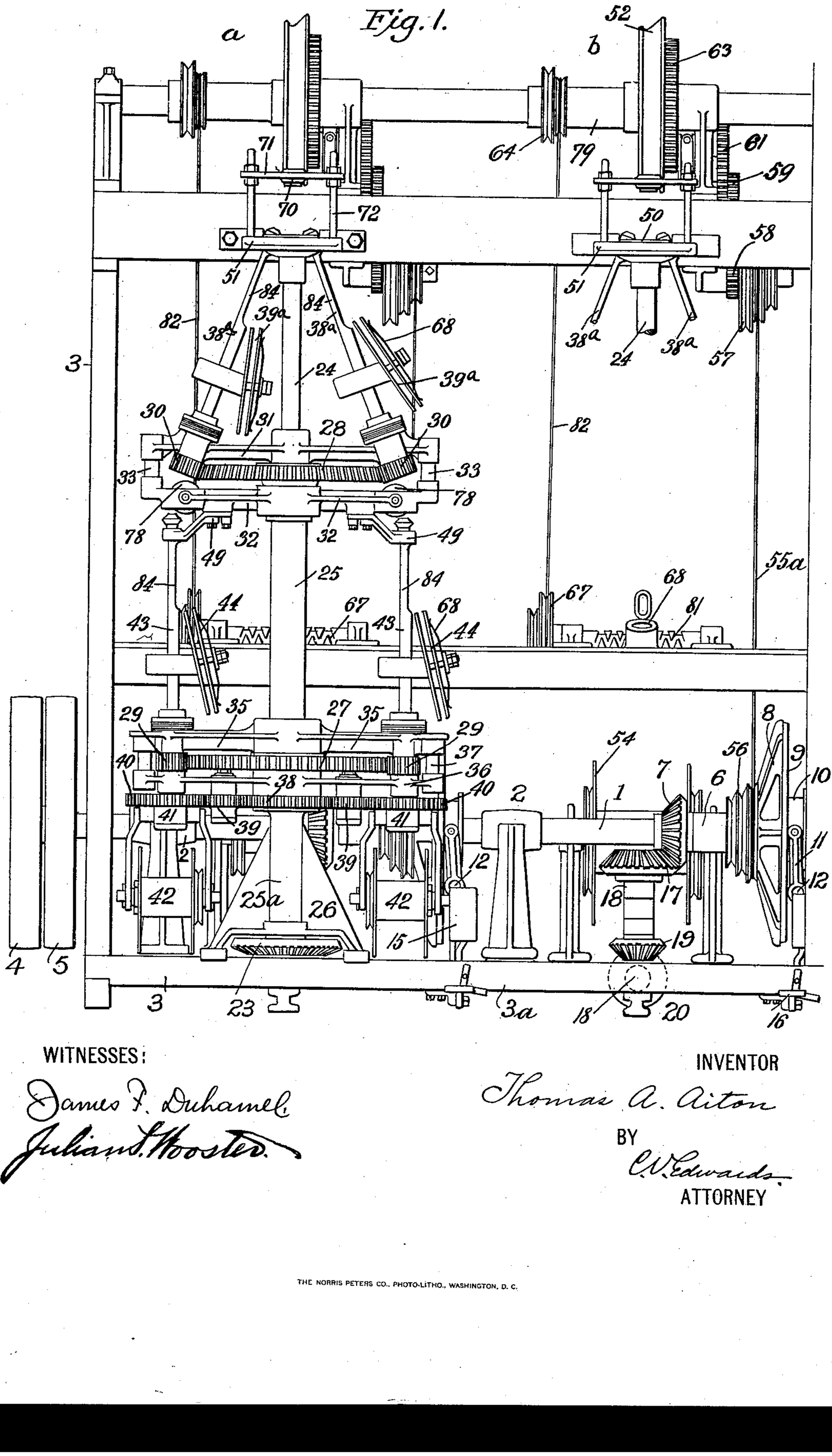
T. A. AITON.

WIRE CORE MACHINE.

APPLICATION FILED MAY 4, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



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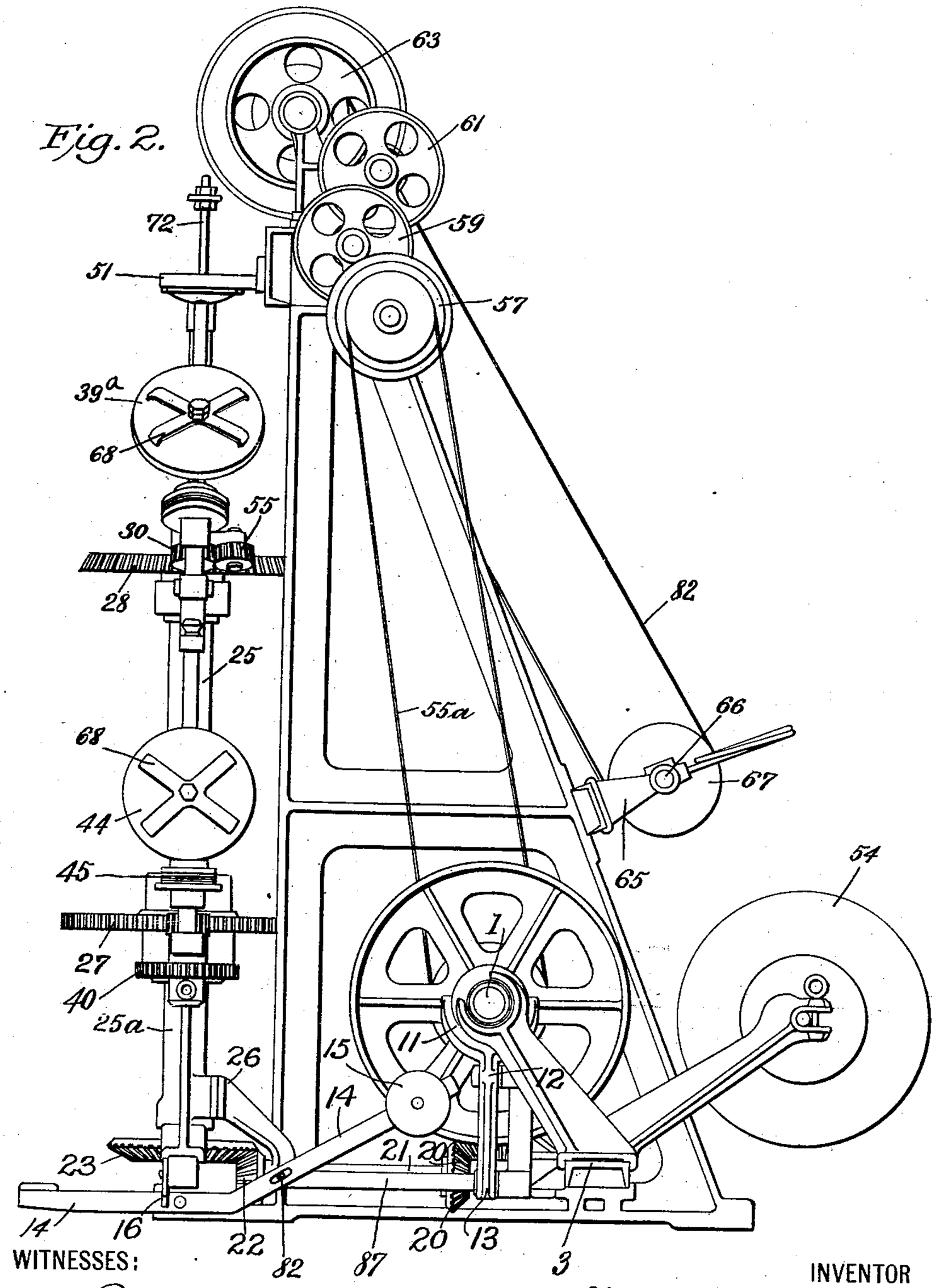
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

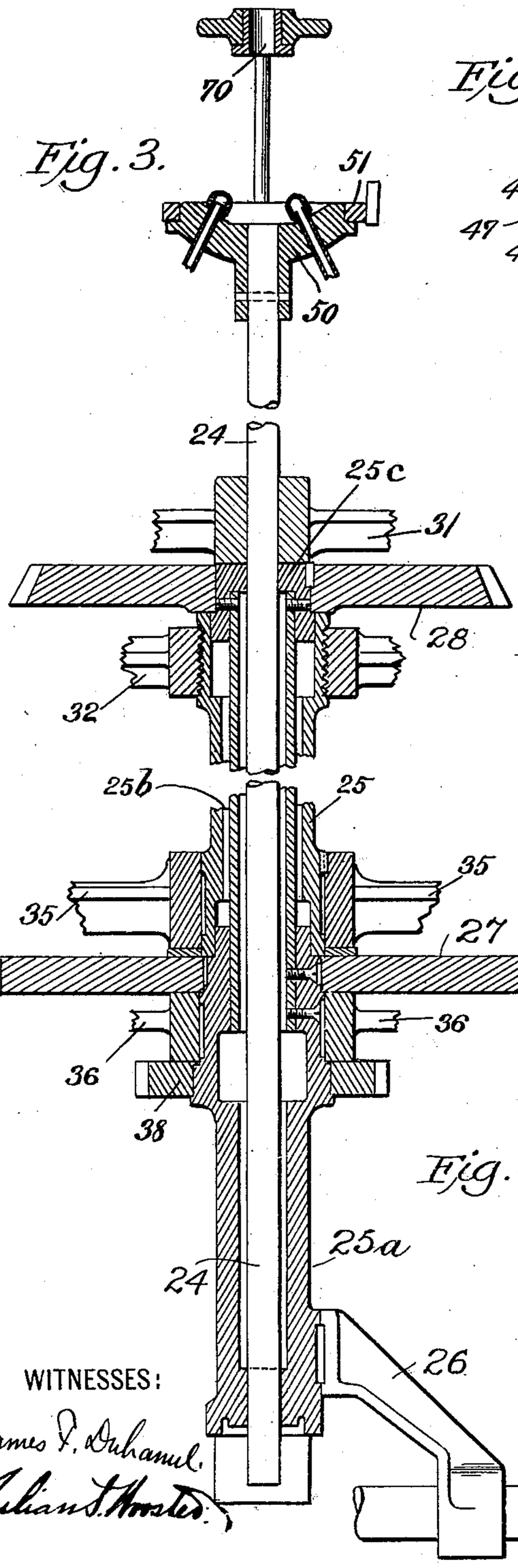


Fig. 4.

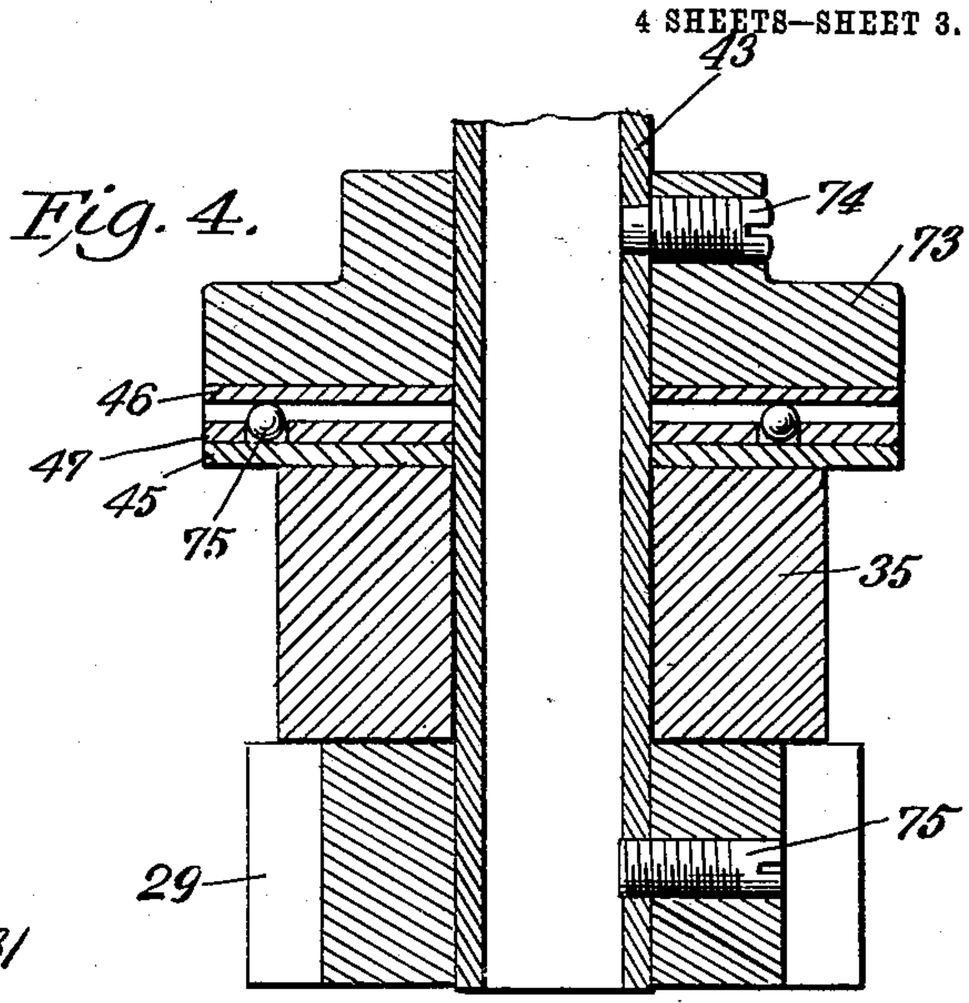


Fig. 5.

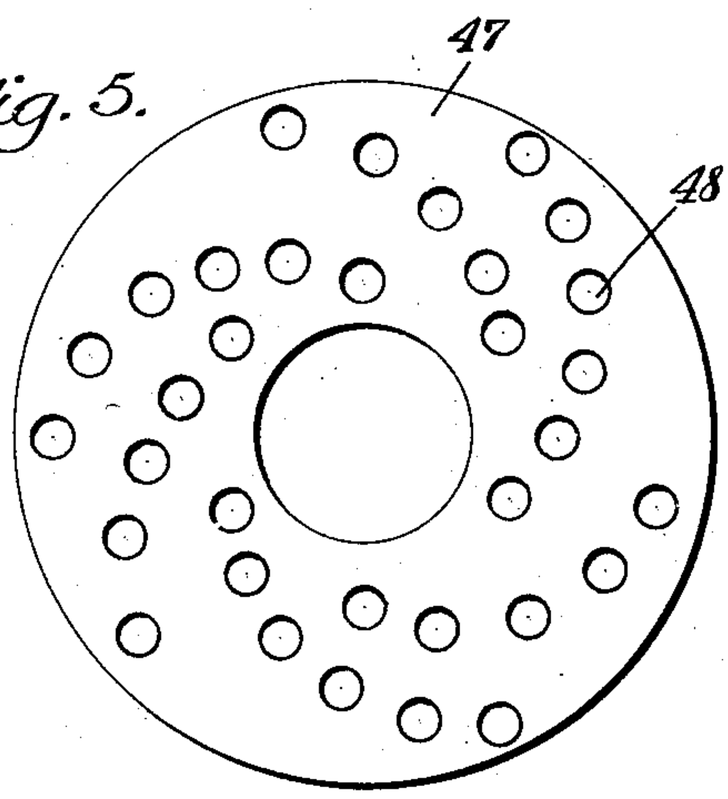
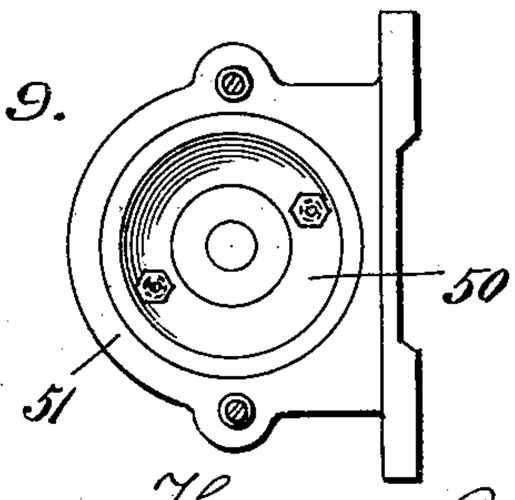


Fig. 9.



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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 6.

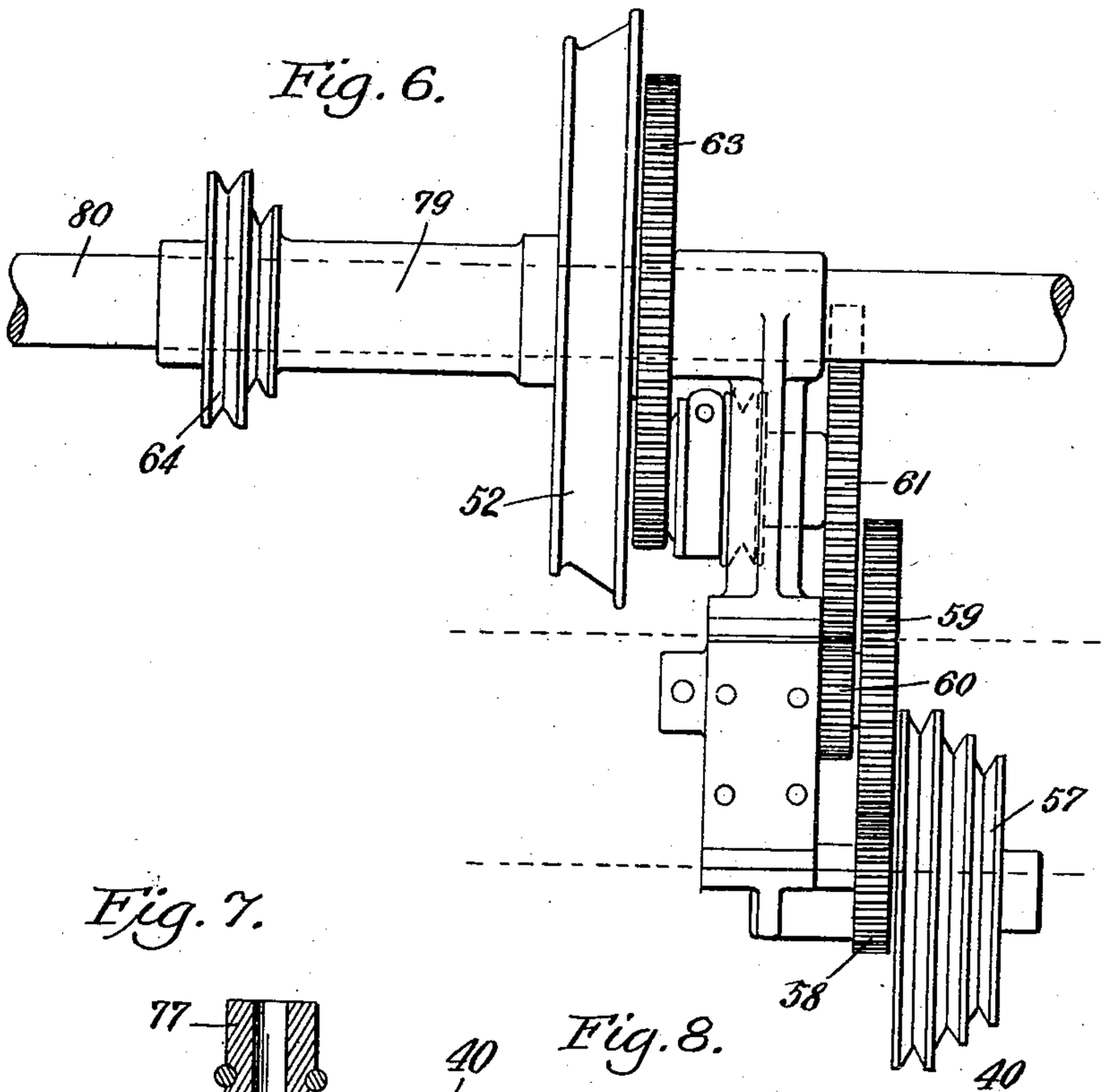


Fig. 7.

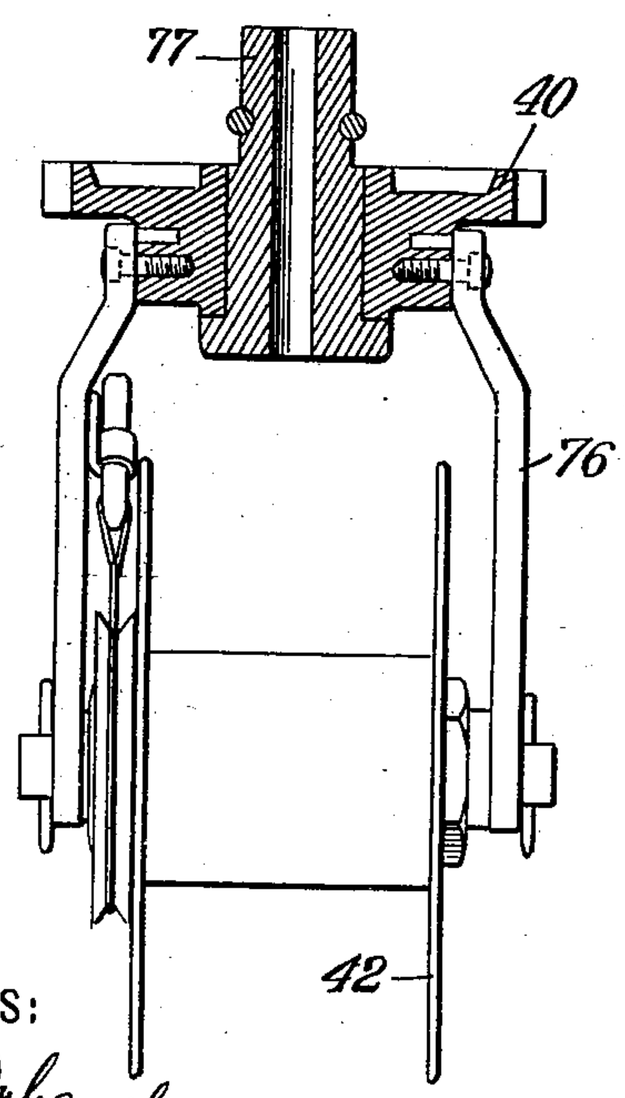
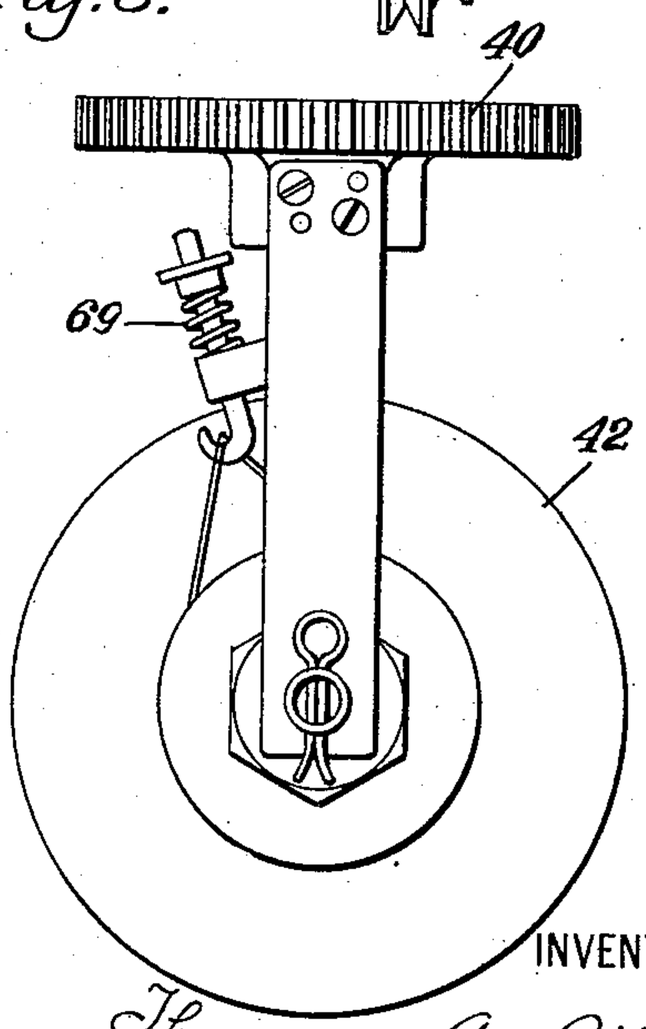


Fig. 8.



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No. 742,551. Patented October 27, 1903.

UNITED STATES PATENT OFFICE.

THOMAS ARCHIBALD AITON, OF NEW YORK, N. Y.

WIRE-CORE MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,551, dated October 27, 1903.

Application filed May 4, 1903. Serial No. 155,538. (No model.)

To all whom it may concern:

Be it known that I, THOMAS ARCHIBALD AITON, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Wire-Core Machines, of which the following is a full, clear, and exact specification.

This invention relates to wire-core machines, and has for its objects to provide a machine which shall be adapted to wrap two or more telephone or other wires with strips of insulating material and to twist such wrapped strands together to form a core.

Heretofore it has been customary to form telephone pairs or cores by separate operations, the wires being first wrapped in one machine and then twisted or cored in another machine. Besides the increased time necessary where two machines are used more operatives are necessary to handle the product in the intermediate stages.

In order to carry out the objects of my invention, I have devised a machine having one or more heads in which a plurality of wires may be simultaneously wrapped and then twisted to form a core. In practice the machine comprises a plurality of independently-operated heads each of which forms a core. It is essential that the heads be independently operated, so that if an accident happens to one head the other will not be affected. Each head comprises a rotatable frame carrying two or more reels of bare wire and one or more idlers for covering each wire. The wrapped wires are twisted together by the rotation of the frame with respect to a lay-plate fixed on the structure of the machine. The core is pulled through the lay-plate and wound on a reel by suitable mechanism which may be driven from the main shaft. As the frame carrying the wire rotates each wire rotates with it, and consequently is itself twisted once for each rotation of the frame. This result is objectionable, because it varies the electrical properties of the wire, and to overcome this I have provided a compensating mechanism which revolves each reel of wire reversely to the rotation of the frame. This overcomes the possibility of any torsion in the individual strands and is important in machines of this type.

The invention will be more particularly described in connection with the accompanying drawings, in which—

Figure 1 is a front view showing one head complete and a portion of another head. Fig. 2 is an end view. Fig. 3 is a sectional view showing the driving mechanism for one frame. Fig. 4 is a detail view in section of the bearing for one of the fliers. Fig. 5 is a detail plan view of a ball-retainer for the flier-bearing. Fig. 6 is a detail of the variable-speed gear for driving the draw-off mechanism. Fig. 7 is a partial sectional view of a reel-carrier for the bare wire. Fig. 8 is a side view thereof. Fig. 9 is a plan view of the top of the frame.

1 is the main driving-shaft, carried in brackets 2, attached to the channels 3 of the framework of the machine.

4 and 5 are fast and loose pulleys for driving the shaft 1.

The shaft 1 carries a series of clutch-disks 9, splined thereon, as many as there are heads, each of which engages with a disk 8, carried on a rotatable sleeve 6. The clutch-disk 9 is operated by a fork 11, which engages in the groove 10 and is pivoted on a horizontal pivot 12. The fork is operated to throw the clutch in and out from a treadle 14, which engages with a pin 82 on the rock-shaft 87. The rock-shaft 87 carries a double-arm lever which engages with the arm 13 of the fork 11. The weight 15 normally holds the front end of the treadle lifted and the clutch in engagement. When it is desired to stop the machine, the front of the treadle is depressed, raising the weight and throwing the clutch out.

16 is a pivoted latch which automatically engages with the treadle to hold it down and the clutch out. The latch falls by gravity and is tripped by the foot of the operator when it is desired to start the machine. The sleeve 6 carries a gear 7, which meshes with a gear 17 on a shaft 18, which carries a gear 19, meshing with a gear 20 on a shaft 21, which carries a gear 22 and meshing with a gear 23 on the end of the shaft 24. The shaft 24 extends through a support comprising a step 25^a and a tube 25, which is carried on the said step. The step 25^a carries the dead-gear 27 and a pipe 25^b, which latter has a collar 25^c, carrying the gear 28. The gears 27 and

28 mesh with the fixed gears 29 and 55 to drive the fliers 44 and 39ª. The fliers 39ª are rotated oppositely to the fliers 44 by means of the intermediate pinion 55, meshing with the pinion 30.

I will now describe the construction of the rotatable frame which wraps and twists the wires to form a core. The frame comprises arms 31, attached to the shaft 24, and the arms 32, connected with arms 31 by short rods 33. The arms 32 are connected to the tube 25, as shown in Fig. 3, and carry brackets 49, in which the rotatable guide-tubes 43 are carried. The guide-tubes 43 are carried at their other ends in arms 35, which are also connected to tube 25 similarly to the arms 32. The arms 35 are connected by short rods 37 with arms 36, freely mounted on the step 25ª. The arms 31 carry bearings in which are mounted the rotatable tubes 38ª, which are borne at their other ends in a rotatable head 50, carried in a bearing-ring 51, mounted on the frame of the machine. The wrapped wires lead from the tubes 38ª to a die or lay-plate 70, which is carried by a die-holder 71 on studs 72, mounted on the ring 51. It will be seen that the head 50, the tube 38ª and 43, the arms 31 32 35 36, the tube 25, the rods 33 37, and the brackets 49 together form a rotatable frame upon which the fliers, the compensating mechanism, and the rolls of bare wire are mounted, all being driven by the shaft 24. The fliers 39ª and 44 are of similar construction and a description of one will suffice for the others. The rotatable tubes 43 have a bearing in the brackets 49 and in the arms 35. A detail of the bearing in the arms 35 is shown in Fig. 4.

73 is a collar attached to the tube 43 by a set-screw 74. The collar 73 carries a hardened plate 46, and the arm 35 carries a similar plate 45, between which plates balls 75 are retained by a plate 47, having holes 48, each hole being adapted to retain a single ball. The holes are so disposed that no two balls will revolve in exactly the same circle. By this means the balls will not wear deep grooves in the plates 46 and 45. On account of the high speed of the fliers it is necessary that some kind of ball-bearing be adopted. The tube 43 is driven by the gear 29, which is made fast by a set-screw 75. The gear 29 meshes with the dead-gear 27. The fliers 39ª are mounted in the same manner, but are rotated oppositely by the intermediate gear 55, between the gear 28 and the pinion 30.

68 represents adjustable tension devices for the fliers 44 and 39ª. The fliers carry rolls of insulating material—as, for instance, paper. The reel-carriers 76 are attached to gears 40, which are rotatably carried on a tube 77, mounted in the arm 36. The gears 40 mesh with idlers 39, mounted on arms 36, which idlers 39 mesh with a dead-gear 38, attached to the step 25ª. By this mechanism it will be seen that the reel-carriers 76 will be rotated reversely to the shaft 24 and that consequently the individual wires will not be twisted on themselves, as would be the case without this compensating mechanism. The reels 42 are detachably mounted in the reel-carriers 76 and have a suitable adjustable tension device 69 thereon. The wire leads from the reel through the tube 77, the tubes 43, over the rollers 78, and through the tubes 38ª to the die 70. The tubes 38ª and 43 are partially cut away, as at 84, in order to permit the wires to be wrapped. By this construction the uncutaway portion of the tube forms a support for the wire and enables it to be wrapped more closely and uniformly than where merely the tension of the wire is depended on to form a support.

When the wires have reached the die 70, they have been wrapped with two layers of insulation and have been twisted together.

52 is a draw-off wheel, which is driven by means of pulley 56 on sleeve 6, the rope 55ª, pulley 57, gears 58, 59, 60, 61, 62, and 63. From the wheel 52 the core passes to a winding-reel 54, which is driven in any suitable manner and removed when full. The draw-off wheel 52 is mounted on a sleeve 79, which has a bearing on the cross-bar 80 of the machine-frame. The sleeve 79 carries a pulley 64, which has a belt 82, driving a pulley 67 on a shaft 66, carried in a bracket 65. The shaft 66 carries a double thread 81.

68 is a traveler which is reciprocated back and forth by the double thread 81. The traveler carries a pivoted follower which is guided in the groove of the thread. When the follower reaches one end of the groove, it is turned slightly, so as to bend the point the other way, and moves the traveler in the reverse direction. The core leads from the pulley 52 through the traveler 68 to the winding-reel 54.

I do not desire to be limited to the exact construction shown, as modifications may be made without departing from the spirit of the invention.

Having thus described my invention, I declare that what I claim as new, and desire to secure by Letters Patent, is—

1. In a wire-core machine, the combination with a rotatable frame having a plurality of wire-carriers, of a plurality of oppositely-rotatable covering mechanisms mounted on said frame, and a draw-off mechanism fixed relatively to the frame, substantially as described.

2. In a wire-core machine, the combination with a rotatable frame having a plurality of wire-carriers, of a plurality of oppositely-rotatable covering mechanisms independently mounted on said frame, and a draw-off mechanism fixed relatively to said frame, substantially as described.

3. In a wire-core machine, the combination with a rotatable frame having a plurality of wire-carriers, of a plurality of oppositely-rotatable covering devices for each wire mounted on said frame, and a draw-off mechanism, substantially as described.

4. In a wire-core machine, the combination with a rotatable frame having a plurality of wire-carriers, of a plurality of oppositely-rotatable covering mechanisms independently mounted on said frame, and a draw-off mechanism fixed relatively to said frame, substantially as described.

5. In a wire-core machine, the combination with a rotatable frame having a plurality of wire-carriers, of a plurality of covering devices oppositely rotatable to each other for each wire mounted on said frame, and a draw-off mechanism, substantially as described.

6. In a wire-core machine, the combination of a rotatable frame having a plurality of carriers, compensating mechanism for moving the carriers reversely to the frame and a draw-off device, substantially as described.

7. In a wire-core machine, the combination of a rotatable frame having a plurality of carriers, compensating mechanism for moving the carriers reversely to the frame, covering mechanism, and a draw-off device, substantially as described.

8. In a wire-core machine, the combination of a rotatable frame having a plurality of carriers, compensating mechanism for moving the carriers reversely to the frame, covering mechanisms rotatably mounted oppositely to each other, and a draw-off device, substantially as described.

9. In a wire-core machine, the combination with a rotatable frame having a plurality of carriers, compensating mechanism for moving the carriers reversely to the frame, covering mechanism mounted on the frame, and a draw-off device, substantially as described.

10. In a wire-core machine, the combination with means for doubly covering and twisting together a plurality of wires at one operation, of a draw-off device and driving mechanism, substantially as described.

11. In a wire-core machine, the combination with means for doubly covering in opposite directions each of a plurality of wires, and means for twisting said wires together at one operation, of a draw-off device and driving mechanism, substantially as described.

12. In a wire-core machine, a rotatable frame, a plurality of tubes having cut-away portions and carrying fliers rotatably mounted in the frame and means for rotating the tubes through the rotation of the frame, substantially as described.

13. In a wire-core machine, the combination of a rotatable frame, a fixed die and a plurality of rotatable wire-covering devices movable oppositely to each other mounted on said frame and rotated by it, substantially as described.

14. In a wire-core machine, the combination with a rotatable wire covering and twisting frame, of a reel-carrier mounted thereon, and means for rotating the reel-car-rier reversely to the frame, substantially as described.

15. In a wire-core machine, the combination with a rotatable wire covering and twisting mechanism, of a reel-carrier mounted thereon and rotated by the movement of the frame in the direction opposite thereto, substantially as described.

16. In a wire-core machine, the combination of a rotatable frame, rotatable fliers thereon, compensating mechanism, fixed gearing for driving said fliers and said compensating mechanism, substantially as described.

17. In a wire-core machine, the combination of a rotatable frame, two sets of rotatable fliers thereon, and fixed gearing for rotating them in opposite directions through the rotation of the frame, substantially as described.

18. In a wire-core machine, the combination of a rotatable frame, two sets of rotatable fliers thereon, compensating mechanism, and fixed gearing for rotating the compensating mechanism, and for rotating the fliers in opposite directions, substantially as described.

19. In a wire-core machine, the combination of a wire-carrier, of means movable in opposite directions, for covering two or more wires simultaneously, means for twisting said covered wires, and draw-off mechanism, substantially as described.

20. In a wire-core machine, the combination of a support, two gears rigidly attached thereto, a shaft in said support, an arm attached to said shaft above the upper gear, a second arm movably connected to said support below said gear, a third arm movably connected to said support adjacent said second gear, connections between said arms to form a frame, rotatable tubes on said arms having pinions engaging said fixed gears, fliers, and a draw-off gear, substantially as described.

21. In a wire-core machine, the combination of a support, two gears rigidly attached thereto, a shaft in said support, an arm attached to said shaft above the upper gear, another arm movably connected to said support, connections between said arms to form a frame, wrapping devices on said arms having pinions meshing with said fixed gears, and a draw-off gear, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS ARCHIBALD AITON.

Witnesses:

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ANTHONY J. ERNEST.