G. GUSTAVE.

REELING MACHINE.

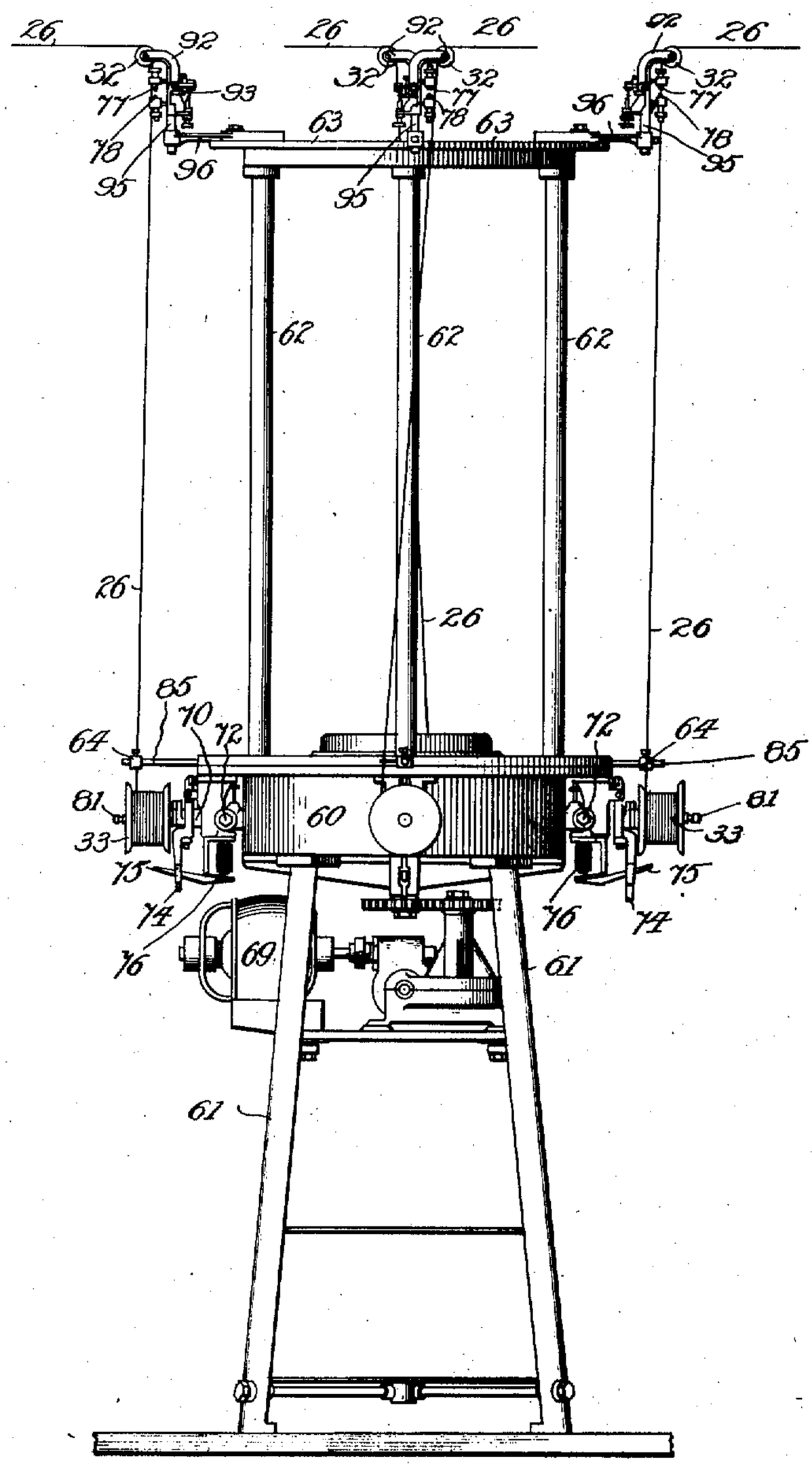
APPLICATION FILED AUG. 15, 1907.

966,827.

Patented Aug. 9, 1910.

6 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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6 SHEETS—SHEET 2.

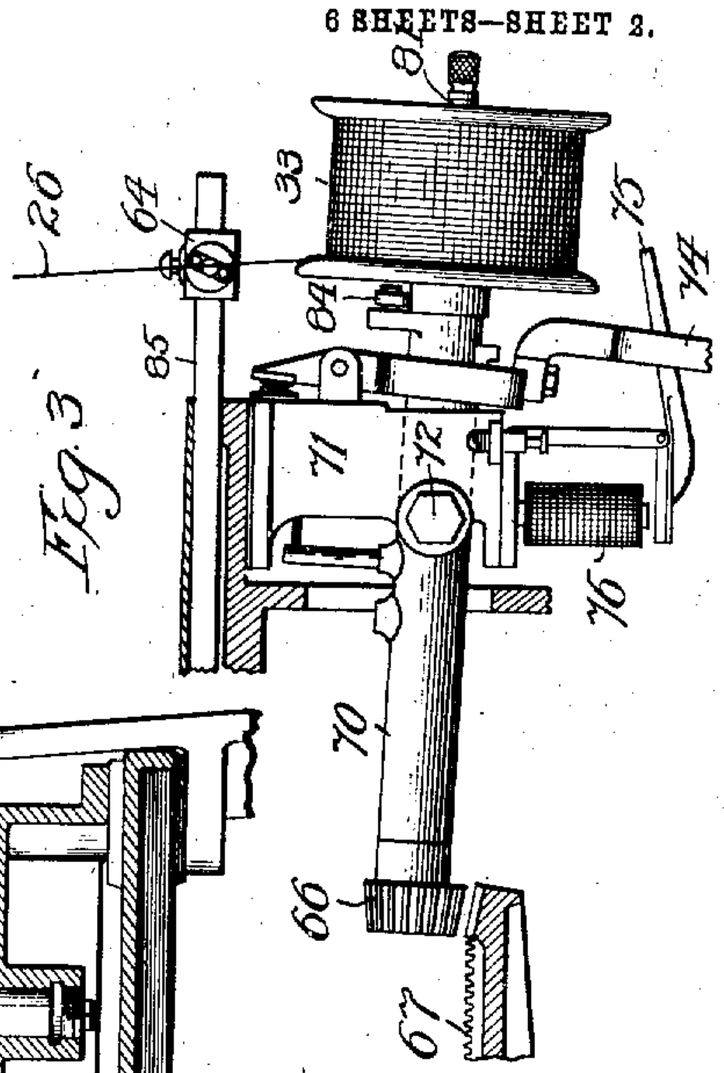

Fig. 3

Fig 2

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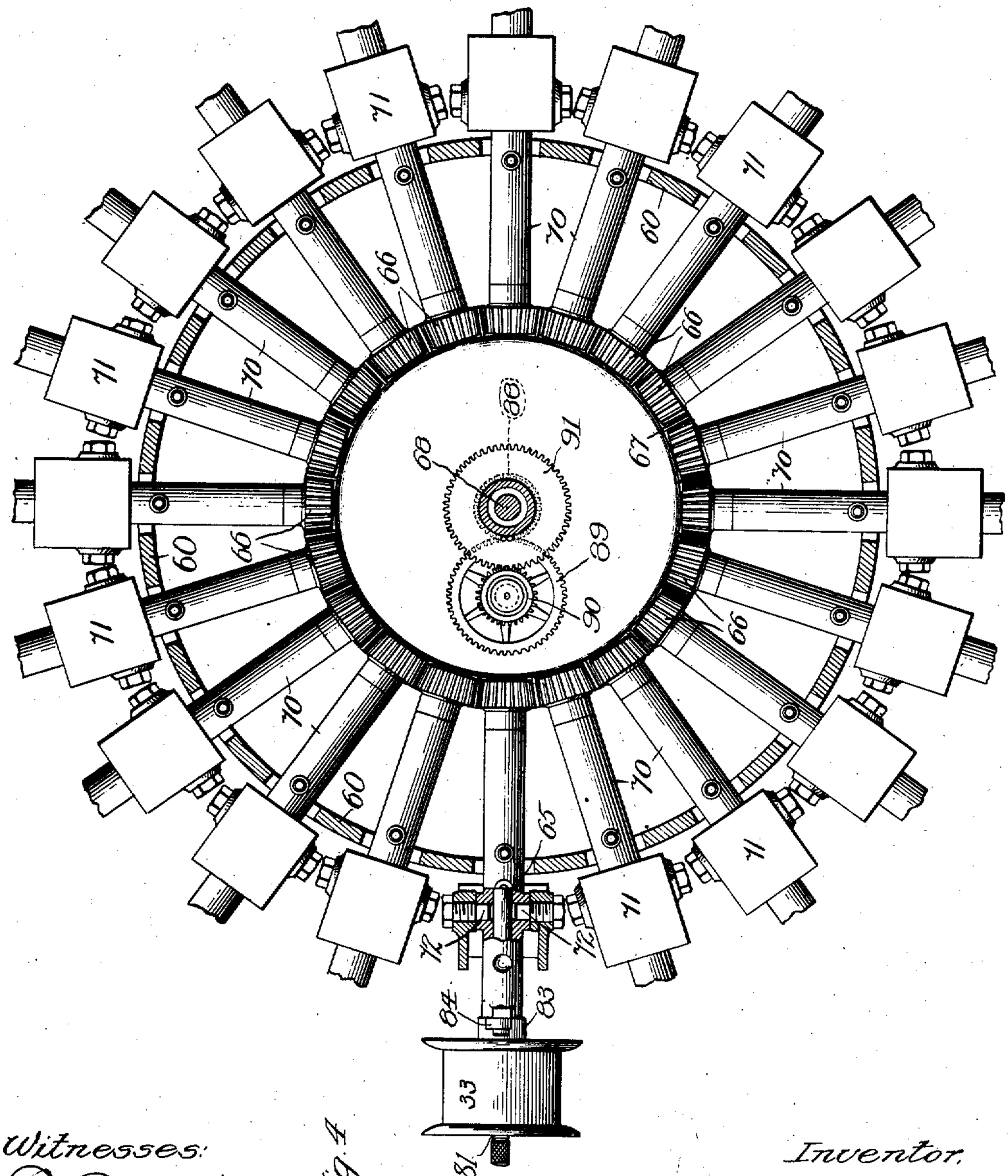

Fig. 4

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6 SHEETS—SHEET 4.

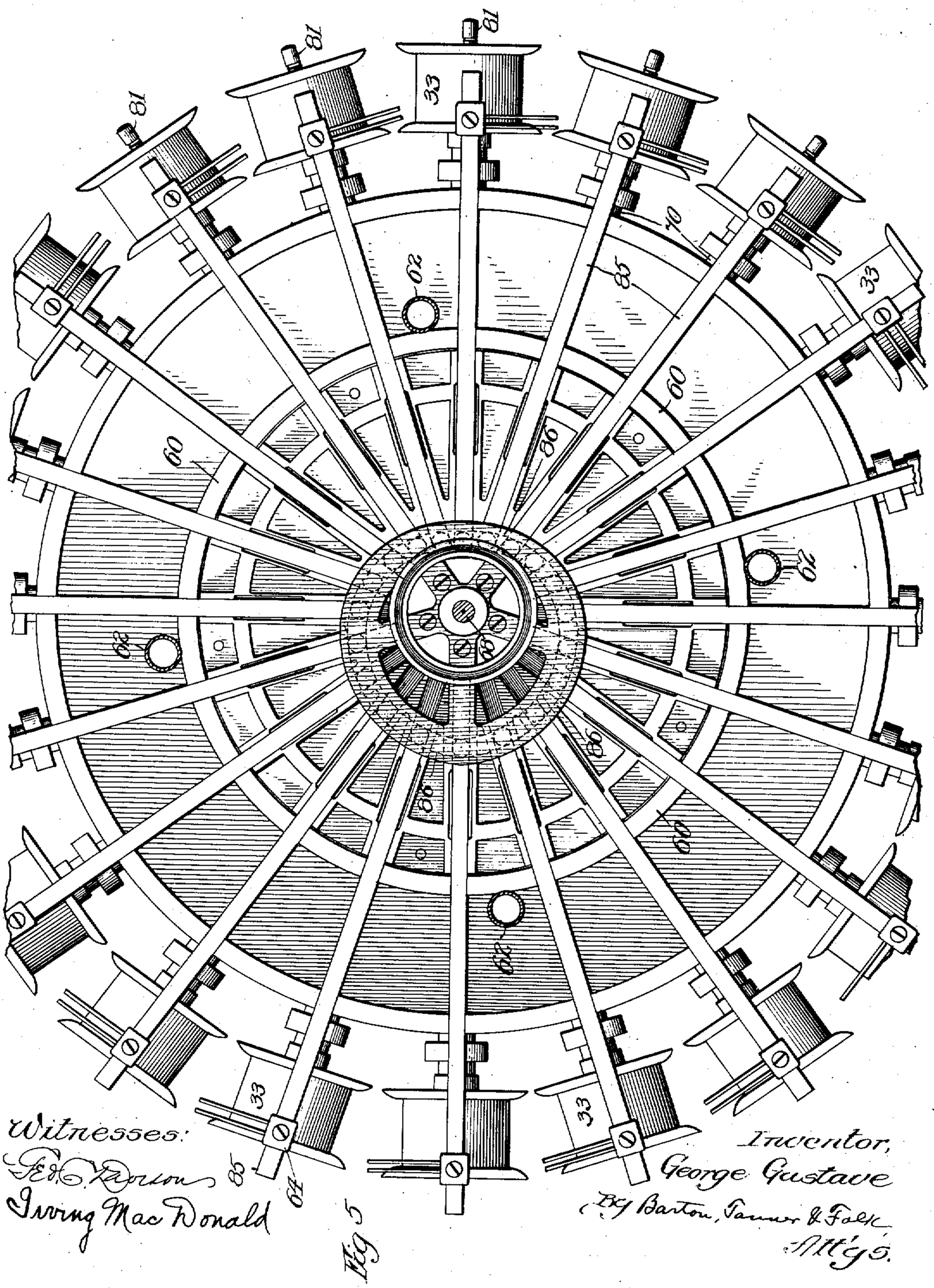

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Fig 5

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6 SHEETS—SHEET 5.

Fig. 6

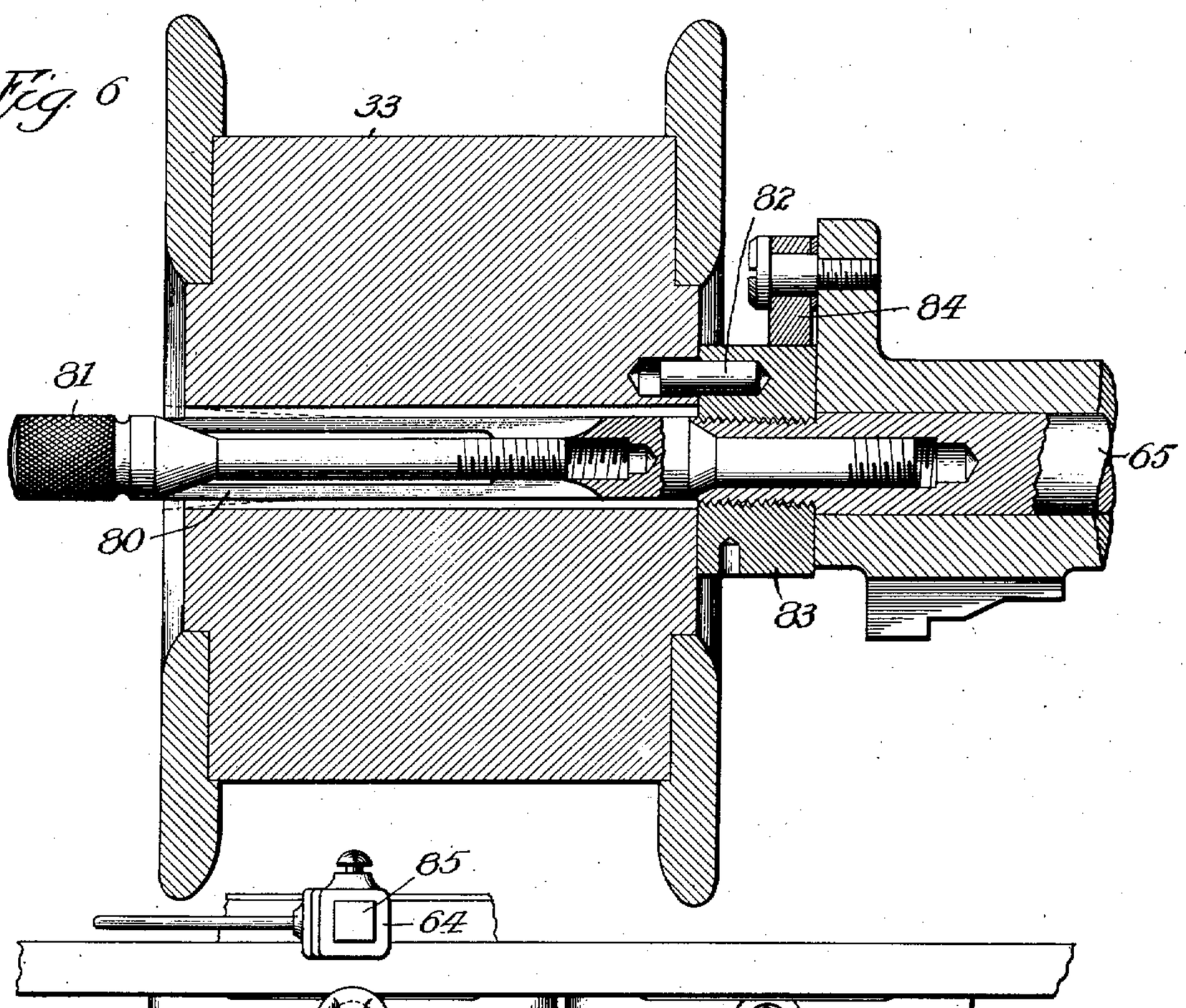
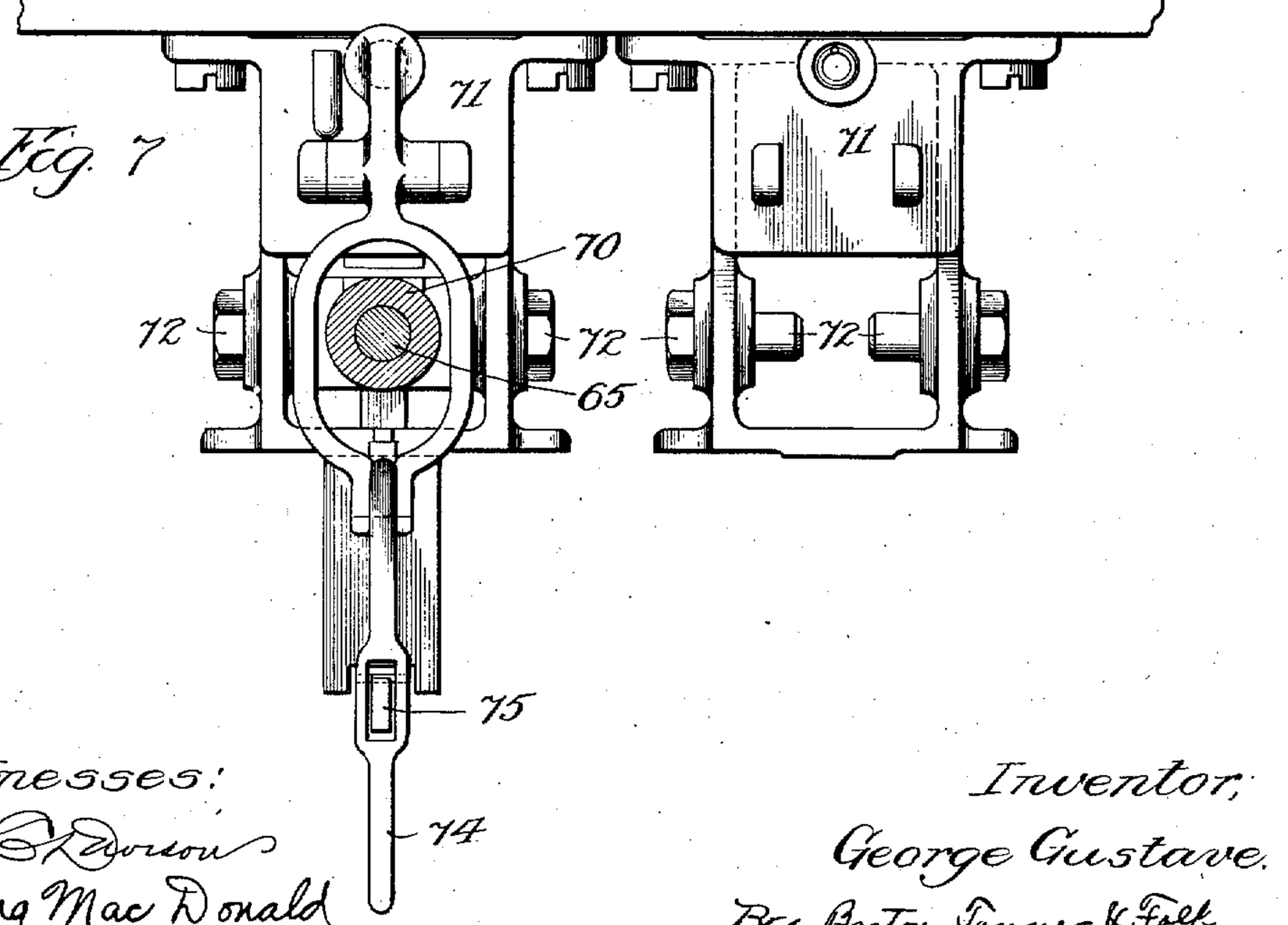


Fig. 7



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6 SHEETS—SHEET 6.

Fig 8.

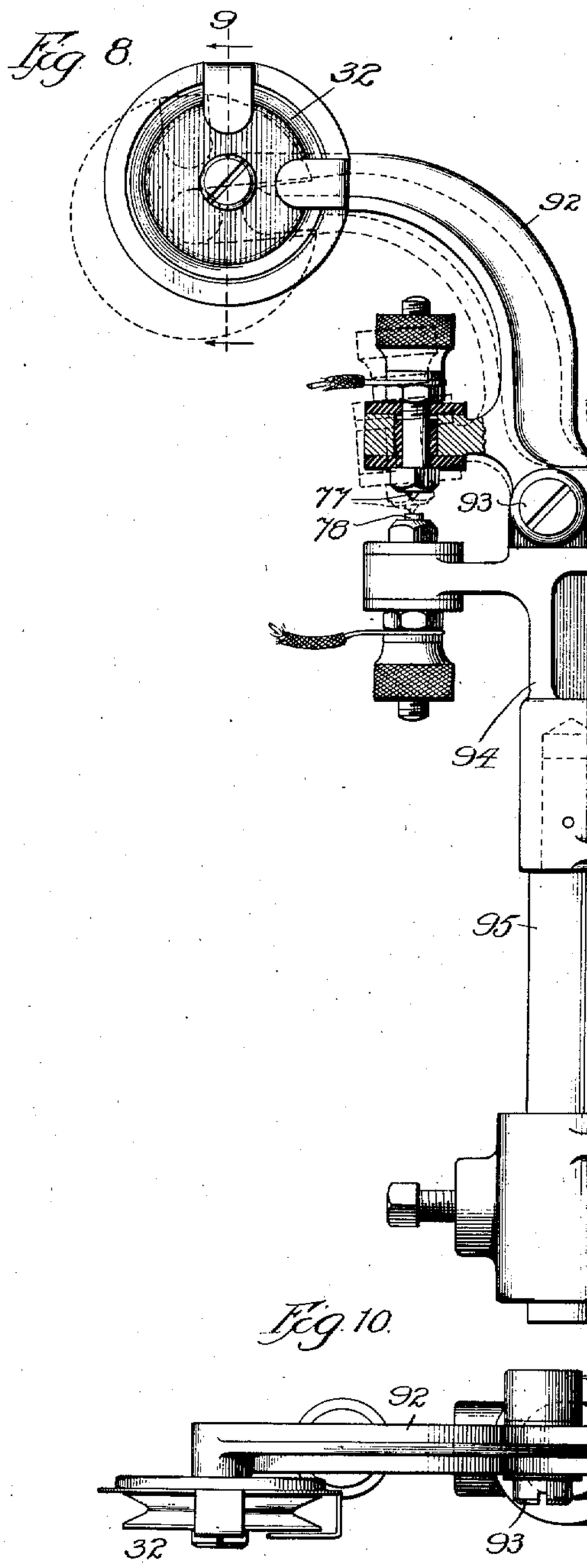

Fig 9

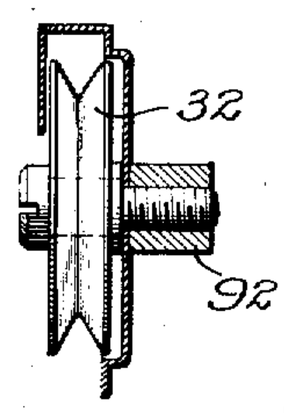

Fig. 10.

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George Gustave,
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UNITED STATES PATENT OFFICE.

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REELING-MACHINE.

966,827. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed August 15, 1907. Serial No. 388,638.

To all whom it may concern:

Be it known that I, GEORGE GUSTAVE, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Reeling-Machines, of which the following is a full, clear, concise, and exact description.

This invention relates to a machine for winding wire upon spools, and its object is to provide a machine which will be capable of handling a large number of individual wires in such a manner that they may all be conveniently accessible, and may be individually controlled.

In another application, Serial No. 398,327, filed October 21st, 1907, I have described a machine for applying and baking a coat of insulating enamel upon wire, the wire carrying apparatus being arranged around a central annular furnace.

The winding machine of the present invention is particularly intended for use in association with a wire coating machine of the type referred to in my said other application, it being intended that the individual wires from the coating machine shall be led to spools upon the reeling or winding machine, upon which said wires will be wound, thereby drawing the wires from the spools upon the coating machine, through the coating apparatus of said machine, and through the furnace thereof, the wire when thus completely insulated being wound upon spools of the reeling machine. The wires in passing from one machine to the other are preferably led over guide pulleys at the tops of the respective machines, in order that said wires may be out of the way of the attendant.

In the machine of the present invention, the winding spools are preferably arranged at intervals around a central driving mechanism by which they are rotated. Each of the spools may be provided with a wire-distributing guide individual thereto for laying the wire evenly upon the spools, the wires being passed to the spools over guide pulleys correspondingly arranged at the top of the machine. The machine is also preferably constructed so that each of the individual spools may be stopped or otherwise controlled without affecting the other spools.

My invention will be described in detail, and further features thereof pointed out by reference to the accompanying drawings, in which—

Figure 1 is a view of the winding machine in elevation. In order to avoid confusion in the drawing, however, the winding mechanism for only three wires are shown; Fig. 2 is a detail sectional elevation of the spool driving mechanism; Fig. 3 is a detail view of a portion of the mechanism illustrated in Fig. 2, showing how a spool-carrying shaft may be tilted to throw its pinion out of engagement with the driving gear; Fig. 4 is a sectional plan view on line 4—4 of Fig. 2, showing the radially-arranged spool-carrying shafts and the central driving gear therefor; Fig. 5 is a plan view of the mechanism shown in Fig. 2, the upper casing being removed, and showing the radially-arranged slide rods which carry the wire distributers for the various spools and the cam for operating said slide rods; Fig. 6 is a detail sectional view of one of the winding spools, and the mounting therefor; Fig. 7 is a detail end view of the controlling apparatus for throwing a spool into or out of operative connection with the central driving gear; Fig. 8 is a detail side view of one of the guide pulleys at the top of the machine, and the swivel mounting therefor permitting said guide pulleys to be adjusted in any angular position, and also showing an electric contact arranged to be actuated by said guide pulley when a wire is subjected to an undue tension; Fig. 9 is a detail sectional view of the guide pulley on line 9—9 of Fig. 8; Fig. 10 is a detail plan view of the guide pulley and the mounting shown in Fig. 8.

The same characters of reference indicate the same parts wherever they are shown.

Referring first to Fig. 1, the winding spools 33 are arranged radially around the periphery of a central drum or casing 60 in which the driving gear for said spools is located. The drum 60 is supported at a convenient distance above the core upon a pedestal base 61; and supporting-rods 62 extending upwardly from said drum 60 carry a circular frame 63 at the top of the machine upon which the individual supports for the various guide pulleys are mounted. The wire 26 to be reeled upon the spools 33 is intended to be led horizontally from the top

of the coating machine (not shown) over the guide pulleys 32 and thence downward through a reciprocating wire-distributer 64 onto the spools 33, upon which it is reeled up. Each of the spools 33 is mounted upon the outer end of a shaft 65, the inner end of which shaft carries a pinion 66. The several spool-driving shafts are arranged radially with respect to a central driving crown gear 67 with which the pinions 66 of all said shafts are adapted to mesh. The crown gear 67 is carried by a central shaft 68 which is arranged to be driven in any suitable manner, as by an electric motor 69, operating through suitable reducing gears. The rotation of the various spools 33 may be controlled individually, by throwing the pinions of their corresponding driving shafts into or out of engagement with the central driving gear. This may be accomplished by the mechanism shown in Fig. 2, in which each of the shafts 65 is mounted in a pivoted bearing 70, whereby the shaft may be tilted to bring its pinion into mesh with the central crown gear 67, or when tilted in the opposite direction will disengage the pinion and stop the rotation of the spool.

As shown in Figs. 2, 5 and 7, the bearing-tubes 70 for the shafts 65 are sustained by brackets 71 mounted upon a central supporting frame 60, pivot pins 72 extending from said brackets into recesses in the sides of the shaft bearings. A spring 73 is arranged to act upon the pivoted bearing of each shaft in such a manner that said shaft bearing tends to tilt in a direction to throw the pinion 66 of the shaft out of engagement with the driving gear. A handle 74 is provided by which the pivoted bearing can be tilted to bring the pinion 66 of the shaft into engagement with the driving gear, and a latch 75 is arranged to hold the parts in this operative position under the control of an electromagnet 76. The magnet 76 is in an electric circuit controlled by contacts which are governed by the tension upon the wire being wound. Such contacts are shown in connection with the pivoted supporting arm of the guide pulley 32 shown in Fig. 8, and are also diagrammatically indicated in Fig. 2. The circuit for the magnet 76 controlled by the contacts 77 and 78 of the corresponding guide pulley 32 is also preferably controlled by a pair of contacts 79 associated with the pivoted bearing of the spool shaft and arranged to be opened when the bearing is tilted to disengage the shaft pinion from its driving gear. The pivoted bearing 70 of the spool shaft carries a vertical arm 79^1 from the upper end of which projects a lateral extension 79^2 adapted to engage one of the contact springs 79 to separate said spring from its mate when said bearing 70 is tilted on its pivot. By this arrangement when the magnet 76 is once actuated to trip the driving mechanism of the spool and stop the rotation thereof, the continuous flow of current through said magnet is prevented by the opening of the circuit at contacts 79. Undue waste of current is thus prevented.

The manner of removably mounting the spools 33 upon their driving shafts is indicated most clearly in Figs. 2 and 6. The end of the shaft 65 is fitted with a hollow split mandrel 80 over which the spool 33 is slipped, and a spreader 81 is arranged to screw into the end of said hollow mandrel to spread the end thereof within the bore of the spool and hold said spool in place. A pin 82, carried by a rotary collar 83 upon the shaft 65 is also preferably provided, to engage a hole in the abutting end of the spool 33, to take the rotary thrust. Means are also preferably provided for checking the tendency of the spools to unwind, or rotate in a reverse direction, under the pull of the wire, when disconnected from the driving gear. Such means may consist of an eccentric cam 84 arranged to engage a rotary part such as the collar 83 carried by the shaft 65. The effect of this cam is to permit rotation of the shaft in one direction, but to wedge against said rotary part 83 upon any reverse rotation of the shaft to check such reverse rotation.

In order to insure that the wire shall be evenly wound upon the spools 33, I provide a wire-distributer for each spool which may consist of a pair of pins constituting a wire guide, carried upon a reciprocating slide rod 85. The distributer slide rods 85 for all of the spools may be arranged radially, parallel to the respective spool driving shafts and may all be operated by a central cam 86. This cam mechanism for actuating the wire distributer slide rods, is shown most clearly in Figs. 2 and 5. Each of the slide rods 85 has a lug or button 87 upon its inner end which is adapted to slide in a groove in the cam 86 so that as said cam rotates all the slide rods are reciprocated to actuate the distributers or wire-guides in such a manner to cause the wire to be laid evenly upon all of the spools.

As shown in Figs. 2 and 5, the cam may be rotated from the driven shaft 68 through the agency of suitable intermediate reducing gears. As shown, the shaft 68 carries a pinion 88 which meshes with an idler gear 89 carrying a pinion 90. The pinion 90 meshes with a gear 91 carried by the same tubular shaft which carries the cam 86; whereby said cam 86 is driven from said shaft 68.

The guide pulleys 32 at the top of the machine are mounted so that they may receive the wire at any angle and direct such wire onto the corresponding receiving spool 33. As shown most clearly in Fig. 8, the guide pulley 32 is rotatably mounted upon the free end of a bell-crank lever 92, pivoted

at 93 to a frame 94, which is swiveled upon a post 95 in such a manner that the arm 92 carrying pulley 32 may be turned in any direction. The post 95 may be mounted upon a frame 96 secured to the main upper supporting frame 63, supported by the uprights 62. A tension spring 97 is arranged to act between the swiveled frame 94 and the bell crank lever 92 carried by said frame, in such a manner as to oppose the rocking of said arm 92 under the pull of the wire. The frame 94 also carries a contact anvil 78; and a contact point 77 carried by but insulated from the pivoted arm 92 is adapted to engage said contact anvil 78 when the arm 92 is tilted against the tension of spring 97 by an undue tension upon the wire passing over the pulley 32. The contacts 77, 78 control the circuit of the stop magnet 76, as before stated.

The machine above described, having the wire-carrying parts all arranged circularly around a central support, and driven by a central driving mechanism, is advantageous because it permits a very large number of individual wires to be handled by the one machine, in comparatively small space, and permits the carrying mechanism for each individual wire to be easily accessible and separately controlled without interfering with any of the other wires. The driving mechanism, and the means for reciprocating the wire-distributers for the several spools, is greatly simplified by having the spool-carrying shafts and the slide rods arranged radially with respect to a central driving gear. As shown in Fig. 4, twenty spools may be driven from the single crown gear 67; and the corresponding twenty slide-bars for the wire-distributers may all be operated from the single central cam 86.

It will be understood that various modifications may be made in the details of the machine shown in the drawing, without departing from my invention, and certain of the distinctive features of construction described herein and shown in the drawings may be adopted in types of winding machines not in all respects like the one shown, and which may or may not embody all of the various details herein disclosed, and may or may not have, as a whole, the same operation; and I desire my claims to be understood accordingly.

I claim:—

1. A winding machine of the class described, having a plurality of spools arranged at intervals around the circumference of a central supporting frame, guide pulleys at the top of the machine over which wires are passed to the various spools, and pivotally-adjustable frames for said guide pulleys adapted to swing in substantially horizontal planes, whereby said wires may be received at various angles.

2. A winding machine of the class described, having a central crown-gear, shafts radiating therefrom, a pinion carried by each shaft, adapted to mesh with said crown gear, a winding spool driven by each shaft, and a pivoted bearing for each shaft, permitting the same to be tilted to throw its pinion into or out of engagement with said crown gear, means tending to disengage said pinion from said crown gear, a catch for maintaining said pinion in engagement with said crown gear and electromagnetic mechanism for controlling said catch.

3. A winding machine of the class described, comprising a driving gear, a spool-driving shaft carrying a pinion adapted to mesh with said gear, a bearing for said shaft adapted to be tilted to move the pinion into or out of engagement with said driving gear, said bearing and associated parts being arranged normally to maintain said pinion out of engagement with said gear, a catch arranged to maintain said pinion in operative engagement with said driving gear, and electromagnetic mechanism for controlling said catch.

4. A winding machine of the class described, comprising a driving gear, a shaft having a pinion at one end adapted to mesh with said gear, a winding spool mounted upon the other end of said shaft, an intermediate bearing for said shaft, and a pivotal support for said bearing, permitting said shaft to tilt in a direction to move its pinion out of engagement with the driving gear, means for holding said parts in position to maintain said pinion in engagement with said driving gear, and a trigger controlling said means.

5. In a winding machine, the combination with a guide pulley, of a swivel-mounted frame, an arm pivoted to said frame to move on an axis at an angle to the swivel-axis upon which the frame turns, said pulley being mounted upon said pivoted arm, a tension device acting upon said arm to sustain the same against the pull of the wire upon said guide pulley, and an electric contact device mounted upon said swiveled frame and arranged to be actuated by the movement of said pivoted arm under the pull of the wire.

6. In a winding machine of the class described, the combination with a central driving gear and a plurality of spool driving shafts arranged around said gear and driven thereby and pivoted bearings for said shafts, of means for maintaining said shafts in operative relation to said driving gear, an electromagnet controlling said means, a guide pulley individual to each spool shaft, around which the wire is passed to each spool thereof, a movable frame for said guide pulley controlled by the pull of the wire, and an electric contact operated by

said movable pulley frame, controlling a circuit for said electromagnet.

7. In a winding machine, the combination with a winding spool, of a gear for driving the same, means for operatively disconnecting said spool from said driving gear to stop the rotation of said spool, an electromagnet controlling said means, an electric circuit for said magnet, a contact controlling said circuit and means for operating said contact governed by undue tension of the wire, a second contact for said circuit and means for operating said second contact in disconnecting the driving gear to maintain said circuit open, independent of said first mentioned contact.

8. In a winding machine, the combination with a base, of a central casing-drum, winding-spools mounted at intervals around the circumference of said drum, a driving gear within said drum for rotating the several spools, wire-distributers individual to said spools arranged above said driving gear, mechanism within said central casing drum for operating said distributers, an upright supporting-frame extending above said drum and its associated mechanism, and guide pulleys over which the wires are passed to the various spools, said guide pulleys being mounted at the upper part of said supporting frame.

9. In a winding machine of the class described, the combination with a rotating winding spool and a shaft therefor, of a collar for said shaft, a bearing in which said shaft is journaled and an eccentric cam supported thereby, said cam being arranged to wedge against said collar in a reverse direction of the spool to check said reverse direction.

10. In a machine of the class described, the combination with a frame support, of a vertical main driving shaft journaled therein, a central gear wheel and a plurality of radially disposed spool shafts driven thereby, a central cam driven by said main shaft, and a plurality of radially disposed guide rods operated by said cam, said guide rods being arranged above said spool shafts in a plane parallel to said spool shafts.

In witness whereof, I, hereunto subscribe my name this 13th day of August A. D., 1907.

GEORGE GUSTAVE.

Witnesses:
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