No. 828,156. PATENTED AUG. 7, 1906.

O. H. WATKINS.

WIRE COILING MACHINE.

APPLICATION FILED JULY 31, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

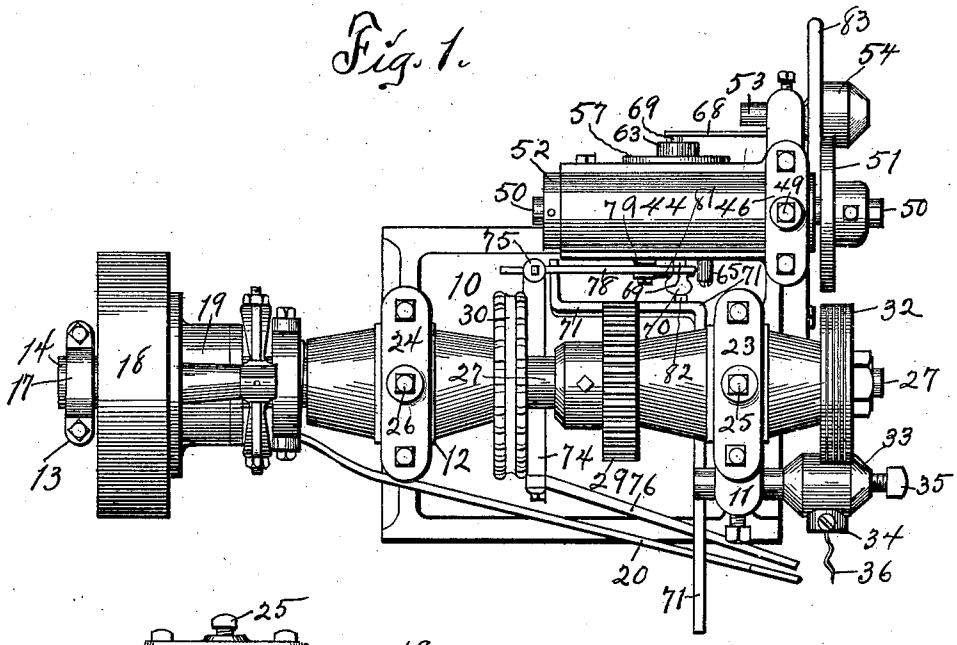
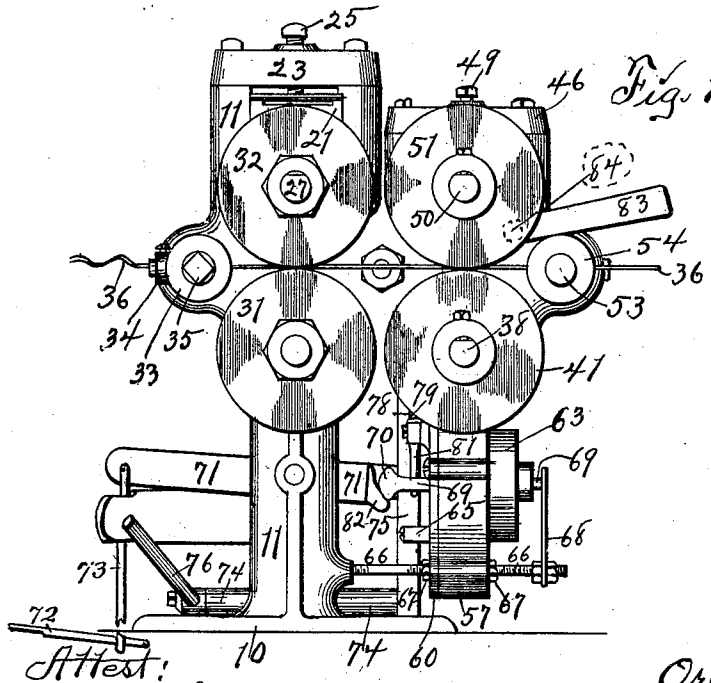


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

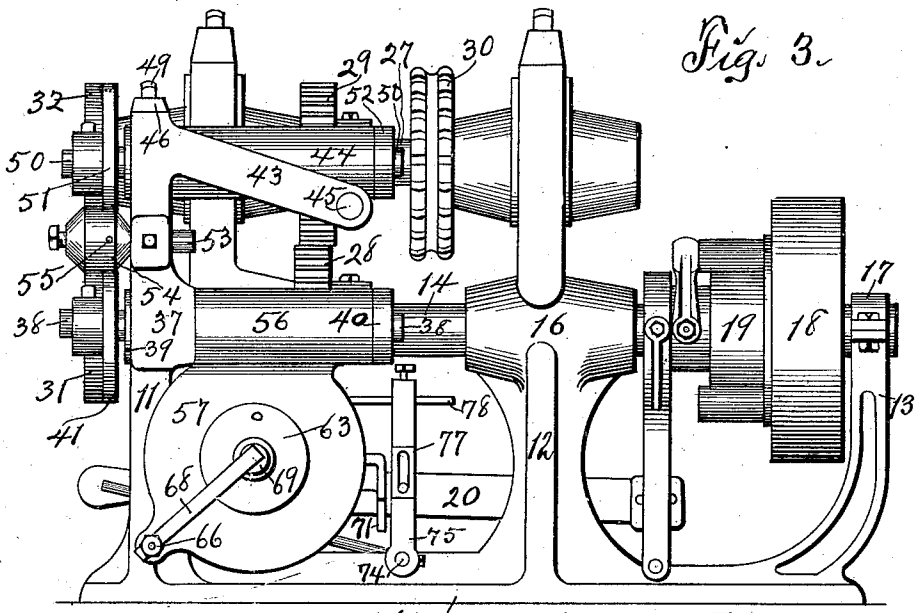
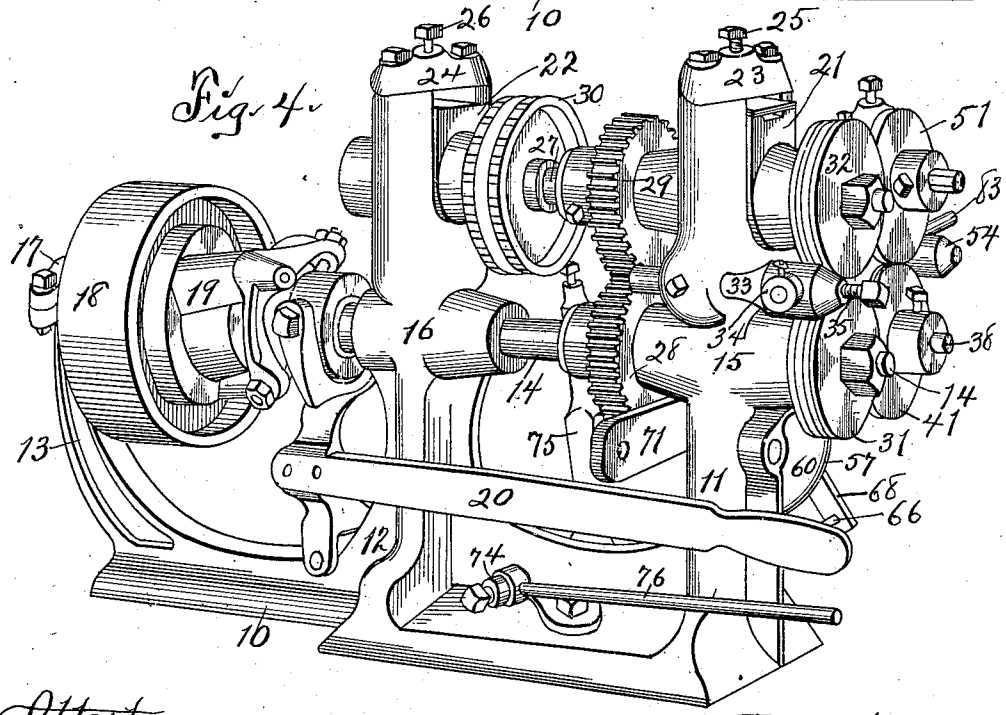


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

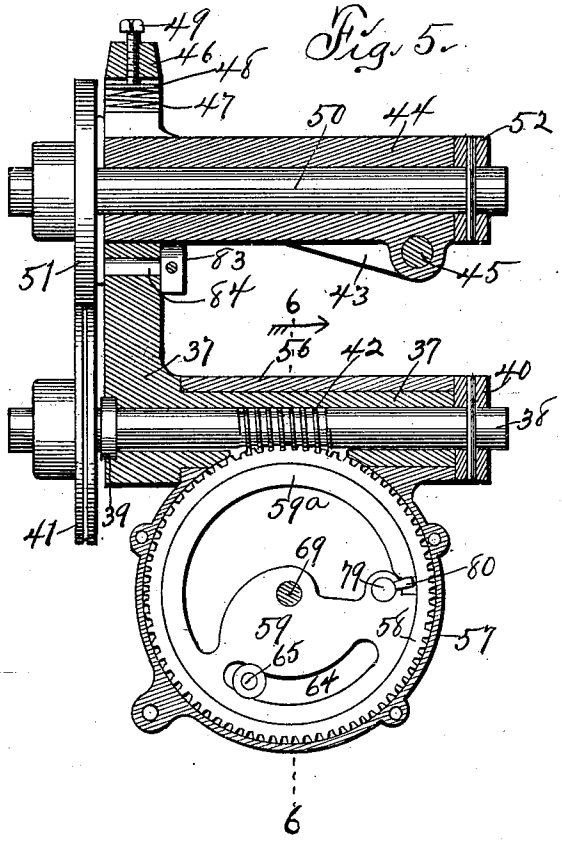
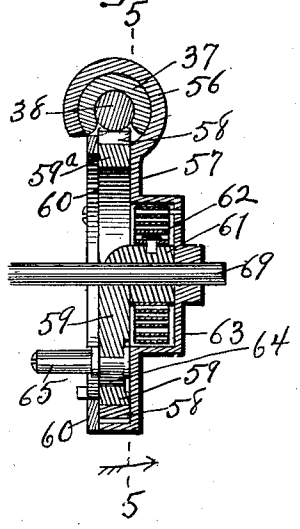


Fig. 6.



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UNITED STATES PATENT OFFICE.

ORLA H. WATKINS, OF AMES, IOWA.

WIRE-COILING MACHINE.

No. 828,156. Specification of Letters Patent. Patented Aug. 7, 1906.

Application filed July 31, 1905. Serial No. 271,951.

To all whom it may concern:

Be it known that I, ORLA H. WATKINS, a citizen of the United States of America, and a resident of Ames, Story county, Iowa, have invented a new and useful Wire-Coiling Machine, of which the following is a specification.

The object of this invention is to provide an improved construction for wire-coiling machines.

A further object of this invention is to provide improved means for weaving wire bed-bottoms or mattresses.

A further object of this invention is to provide improved means for positively stopping the machine when a given, fixed, and determined length of wire has passed therefrom.

My invention consists in the construction, arrangement, and combination of elements hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a plan of the complete machine. Fig. 2 is an end elevation of the machine. Fig. 3 is a rear elevation of the machine. Fig. 4 is a perspective of the machine. Fig. 5 is a detail vertical section of parts of the measuring and tripping mechanisms employed in the machine, and Fig. 6 is a detail cross-section on the indicated line 6 6 of Fig. 5.

In the construction of the machine as shown, the numeral 10 designates a base, from which standards or heads 11, 12, and 13 rise approximately in parallel planes. A drive-shaft 14 is mounted for rotation in alining-bearings 15, 16, and 17 in the standards or heads, and said shaft is driven intermittently by a wheel 18 thereon, which wheel is driven by connection to a prime mover (not shown) and is controlled manually by a clutch device of conventional form (designated generally by the numeral 19) through the medium of a lever 20. The upper end portions of the heads 15 and 16 are bifurcated, and bearing-boxes 21 22 are loosely mounted therein and have some freedom of movement vertically. Cap-plates 23 24 are bolted to the upper ends of the heads 15 16 and bridge the bifurcations thereof, and adjusting-screws 25 26 are mounted in said cap-plates and impinge the bearing-boxes. A shaft 27 is mounted for rotation in the bearing-boxes 21 22. Gear-wheels 28 29 of like diameter are mounted rigidly on the shafts 14 and 27, respectively, and mesh with each other. A hand-wheel 30 is mounted rigidly on the shaft 27 between the head 12 and the gear-wheel 29, whereby manual force may be applied to rotate said shaft at times. Feed-wheels 31 32, formed with grooved perimeters, are mounted rigidly on the forward ends of the shafts 14 and 27, respectively, and the faces of said feed-wheels are in close proximity to each other. A stem 33 is mounted adjustably in and projects horizontally from the head 11 across the plane of the adjacent faces of the feed-wheels 31 32, and a coiler or coiling-spindle 34 is mounted adjustably in and transversely of said stem and extends outward in a horizontal plane tangent to the adjacent faces of said wheels. The coiler or coiling-spindle 34 is of conventional form and is held adjustably in the stem 33 by a screw 35. A wire 36 lies between and is frictionally engaged by the feed-wheels 31 32 and is forced by said feed-wheels through the coiler 34. The wire 36 is located in and guided by one or another of the grooves in the faces of the feed-wheels, and a plurality of said grooves are provided to increase the life or lasting properties of the feed-wheels in use. Hence the desirability of adjusting the stem in the head 11 and the coiler in the stem to aline the bore of the coiler with the grooves it is desired to employ. A bearing 37 is projected rearwardly from the head 11, and the bore thereof is of considerable length and is parallel with the shaft 14. A counter-shaft 38 is mounted loosely in the bearing 37, and longitudinal movement of said counter-shaft is limited in one direction by a collar 39 engaging the head 11 and in the other direction by a collar 40, keyed to the opposite end of said shaft. A friction-wheel 41, formed with a single groove in its perimeter, is mounted rigidly on the outer end portion of the shaft 38 immediately at the rear of the feed-wheel 31. A worm 42 is formed on the shaft 38 intermediate of its ends, and an opening is formed in the bearing 37 beneath and to provide access to said worm. A yoke 43 is formed on and inclines downward from the head 11 toward the head 12 at the rear of the shaft 27. A bearing 44 is mounted in the yoke 43 and is fulcrumed at its rear end on a pin 45, connecting the extremities of the arms of the yoke, while its forward end portion has some freedom of vertical movement in the forward

end of the yoke. A cap-plate 46 is bolted to and bridges the forward end portion of the yoke 43, and a coil-spring 47 and pressure-plate 48 are mounted between said cap-plate and the forward end of the bearing 44.

It is the function of the spring 47 to hold the bearing 44 at rest in the bottom of the yoke 43, and the tension of the spring is adjusted by a screw 49, seated through the cap-plate 46 and engaging the pressure-plate 48. A counter-shaft 50 is mounted loosely in the bearing 44 and longitudinal movement of said shaft in the bearing is limited in one direction by a friction-wheel 51, rigidly mounted on the forward end of said shaft and abutting the yoke 43 and in the other direction by a collar 52, keyed to the opposite end of said shaft and abutting the rear end of the bearing 44. The wire 36 lies between the friction-wheels 41 and 51 and is drawn or forced forward by the feed-wheels 31 32. The pressure of the spring 47 is such that the wire 36 frictionally engages the wheels 41 and 51 with sufficient force to rotate both of said wheels and the shafts on which they are mounted, together with mechanism (about to be described) connected to the shaft 38. A stem 53 is mounted adjustably on and projects forward from the head 11 at the rear of the meeting-point of the friction-wheels 41 and 51, and a wire guide 54 is mounted in said stem and is provided with a hole 55, through which the wire 36 is drawn before it enters between the friction-wheels. It is the function of the guide 54 to straighten and direct the wire to the friction-wheels. A sleeve 56 is mounted loosely on the bearing 37 and is confined against longitudinal movement in one direction by the bearing and in the other direction by the collar 40. A casing 57 is formed integral with and depends from the sleeve 56, and a ring 58 is mounted loosely in said casing and is formed with a worm-gear on its circumference meshing with and adapted to be driven by the worm 42 on the shaft 38. A plate 59 is mounted within and in close proximity to the inner surface of the ring 58. The plate 59 is of skeleton formation and has a segmental arm 59^a, free at one end, following closely the inner surface of approximately one-half the ring 58, Fig. 5. A retaining-ring 60 is fixed to the inner margin of the rim of the casing 57 and overlies the ring 58 and marginal portion of the plate 59 and arm 59^a. A hub 61 is formed on the plate 59 and is connected by a convolute spring 62 to a central boss 63 of the casing 57. It is the function of the spring to return the plate 59 and its arm to normal position after the same has been moved as hereinafter described. A segmental slot 64 is formed in the plate 59 diametrically opposite the arm 59^a and a stud 65 is mounted in and may be adjusted into any position throughout the length of said slot. An adjusting-screw 66 is mounted in the lower portion of the head 11 and extends rearward therefrom through bearings in the casing 57 and ring 60 and to the rear of said casing. Jam-nuts 67 adjustably connect the casing and ring 60 to the screw 66. A spring 68 is adjustably mounted on the rear end portion of the adjusting-screw 66, and the free end of said spring impinges the rear end of a plunger 69, mounted for reciprocation in the casing and through the center of the plate 59. The forward end portion of the plunger 69 is formed with a convex-faced head 70, and the plate 59 journals on the plunger intermediate of its ends. A lever 71 is fulcrumed intermediate of its ends on the lower portion of the head 11 and extends transversely of and beneath the shafts 14 and 38. The lever 71 crosses the upper margin of the lever 20, and a pedal 72 is connected to the forward end thereof by a rod 73, whereby said lever 71 may be depressed at times. The lever 71 is offset toward the head 12 at its rear end and its rearmost extremity is extended rearward parallel with its body portion and in proximity to and beneath the rear end of the counter-shaft 38. A rock-shaft 74 is mounted in bearings transversely of the base 10 between the heads 11 12, and an arm 75 is fixed to and rises from the rear end portion of said rock-shaft, while a lever-arm 76 is fixed to and extends horizontally from the forward end thereof. It is the function of the lever-arm 76 to hold the arm 75 upright and in contact with the rearmost extremity of the lever 71. A plate 77 is mounted adjustably on the arm 75 and is provided with a shoulder extending toward the rearmost extremity of the lever 71 and adapted to engage and support said extremity at times. A pin 78 is mounted adjustably in the upper portion of the arm 75 and projects into the path of travel of the stud 65. A rock-shaft 79 is mounted through the plate 59 and a stud 80 is formed on said rock-shaft and engages the free end of the arm 59^a. An arm 81 is formed on one end of the rock-shaft 79 and extends across the plunger 69. It is the function of the plunger to move the arm 81 away from the center of the plunger and in so doing rock the shaft 79 in one direction and cause the stud 80 to engage the free end of the arm 59^a and expand said arm into frictional engagement with the inner surface of the ring 57. Such function of the plunger is set in operation by movement of the plunger against the resilience of the spring 68 by engagement of a cam-lug 82 on the lever 71 with the convex face of the conical head 70, whereby said conical head engages and moves the arm. When pressure of the conical head is relaxed from the arm 81, the resilience of the arm 59^a pushes back the lug 80 and disengages

said arm 59ª from the ring 57. A lever 83 is fulcrumed by a pivot 84 to the head 11 and engages the bearing 44 at the forward end. Manual force may be applied to the lever 83 to lift the bearing 44, shaft 50, and friction-wheel 51, as required in starting the wire 36 to the feed-wheels 31 32.

In practical use of the machine the wire 36 is fed by hand through the guide 54 between the friction-wheels 41 51, between the feed-wheels 31 32, and into the bore of the coiler 34. The screws 25 and 26 are then adjusted to depress the bearing-boxes 21 22 and bind the feed-wheel 32 to the desired pressure on the wire. Then the lever 71 is oscillated by the pedal 72 and in turn depresses the lever 20 and actuates the clutch device 19, to the end that the machine is started, and the feed-wheels draw the wire through the guide 54, between the friction-wheels 41 51, and force it through the coiler 34. The movement of oscillation of the lever 71 by the pedal 72 raises the cam-lug 82 and causes it to move the plunger 69 rearward and actuate the arm 81, lever-shaft 79, and lug 80 to the expansion of the arm 59ª into frictional engagement with the ring 57. As soon as the machine is started the ring 57 is rotated by the worm 42 on the shaft 38, said shaft being actuated by friction with the wire 36 being drawn between the wheels 41 51, The ring 58 rotates the arm 59ª and plate 59 until the desired length of wire has been forced through the coiler 34, and the desired length of wire is determined by adjustment of the stud 65 in the slot 64 of said plate. The plate 59, therefore, is rotated until the stud 65 contacts with the pin 78 and moves the arm 75 rearwardly and removes the shoulder of the latch-plate 77 from sustaining position beneath the rearmost extremity of the lever 71. Thereupon the rear portion of the lever 71 falls and the forward end thereof rises and releases the lever 20, and said lever 20 also rises and the clutch device automatically releases the shaft 14 and the machine stops. As the rear portion of the lever 71 falls the plunger 69 is moved forward and permits the resilience of the arm 59ª to release said arm and the plate 59 from rotation by the ring 57, whereupon the plate and arm are reversely rotated by the spring 62 preparatory to another starting of the machine by the pedal 72 and another feeding of the wire 36.

I claim as my invention—

1. A coiling-machine, comprising feeding and coiling devices, clutch-controlled mechanism driving said feeding devices, and tripping mechanism mounted for reciprocation and adapted to be operated by the object being fed to release said clutch mechanism.

2. A wire-coiling machine, comprising feeding and coiling devices, clutch-controlled mechanism driving said feeding devices, and tripping mechanism mounted for rotary reciprocation and adapted to be operated by the object being fed to release said clutch mechanism, and returned independent thereof.

3. A coiling-machine, comprising feeding and coiling devices adapted to feed a wire, clutch mechanism controlling said feeding devices, tripping mechanism mounted for reciprocation and acted upon by the wire being fed to trip said clutch mechanism, and manually-operated devices to set said clutch mechanism.

4. A coiling-machine, comprising feeding devices adapted to feed a wire, clutch mechanism controlling said feeding devices, reciprocatory tripping mechanism adapted to release said clutch mechanism, and measuring devices actuated by said wire to advance said tripping mechanism.

5. In a coiling-machine, feeding mechanism adapted to feed a wire, clutch mechanism controlling said feeding mechanism, tripping mechanism adapted to release said clutch mechanism, a worm-gear operating said tripping mechanism, and friction-wheels acted upon by said wire to operate said worm-gear.

6. In a wire-coiling machine, feeding mechanism adapted to feed a wire, clutch mechanism controlling said feeding mechanism, tripping mechanism arranged for travel to and fro through an arc and adapted to release said clutch mechanism, and friction devices acted upon by said wire and adapted to move said tripping mechanism in one direction.

7. In a wire-coiling machine, feeding mechanism adapted to feed a wire, clutch mechanism controlling said feeding mechanism, tripping mechanism arranged for travel to and fro through an arc and adapted to release said clutch mechanism, a worm-gear operating said tripping mechanism in one direction, and friction devices acted upon by said wire to operate said worm-gear.

8. In a coiling-machine, a feeding mechanism, adapted to feed a wire, clutch mechanism controlling said feeding mechanism, a lever controlling said clutch mechanism, a stop engaging said lever, measuring-wheels engaged by said wire, a tripping-plate mounted for rotary oscillation and actuated in one direction by said measuring-wheels and spring-actuated in the opposite direction, and a stud on said tripping-plate adapted to engage and trip said stop from said lever.

9. In a machine of the class described, a clutch-lever, measuring mechanism, tripping mechanism acted upon by said clutch-lever, said tripping mechanism adapted to be rotated in one direction by said measuring mechanism and returned independent of said measuring mechanism, a stop engaging said clutch-lever at times, and a stud on said tripping mechanism adapted to engage and re-

lease said stop from said lever on a predetermined advance of the measuring mechanism.

10. A wire-coiling machine, comprising feeding and coiling devices, clutch-controlled mechanism driving said feeding devices, friction-wheels mounted in opposition to each other and adapted to be engaged by the object being fed, one of said wheels arranged for oscillation relative to the other, tripping mechanism acting on said clutch-controlled mechanism, and gear connections between said tripping mechanism and the lowermost friction-wheel.

11. In a coiling-machine, a feeding mechanism adapted to feed a wire, clutch mechanism controlling said feeding mechanism, friction-wheels mounted opposite each other and adapted to be rotated by engagement with said wire, a ring geared to one of said friction-wheels, an expansible plate within said ring and adapted to be frictionally engaged therewith at times, and a stud adjustably mounted on said plate and adapted to trip said clutch mechanism.

12. In a coiling-machine, a feeding mechanism adapted to feed a wire, clutch mechanism controlling said feeding mechanism, friction devices adapted to be engaged and operated by said wire, a ring geared to one of said friction-wheels, an expansible plate within said ring, manually-operated trigger devices adapted to expand said plate into frictional engagement with said ring, whereby said plate is advanced by the ring, a spring for returning said plate to normal position, and a stud adjustably mounted on said plate and adapted to trip said clutch mechanism and said trigger devices.

Signed by me at Ames, Iowa, this 27th day of March, 1905.

ORLA H. WATKINS.

Witnesses:
W. M. GREELEY,
H. WERTERMAN.