J. A. HORTON.

INVERTED DRUM FOR WIREDRAWING MACHINES.

APPLICATION FILED APR. 18, 1906.

911,305.

Patented Feb. 2, 1909.

2 SHEETS—SHEET 1.

Fig. 1

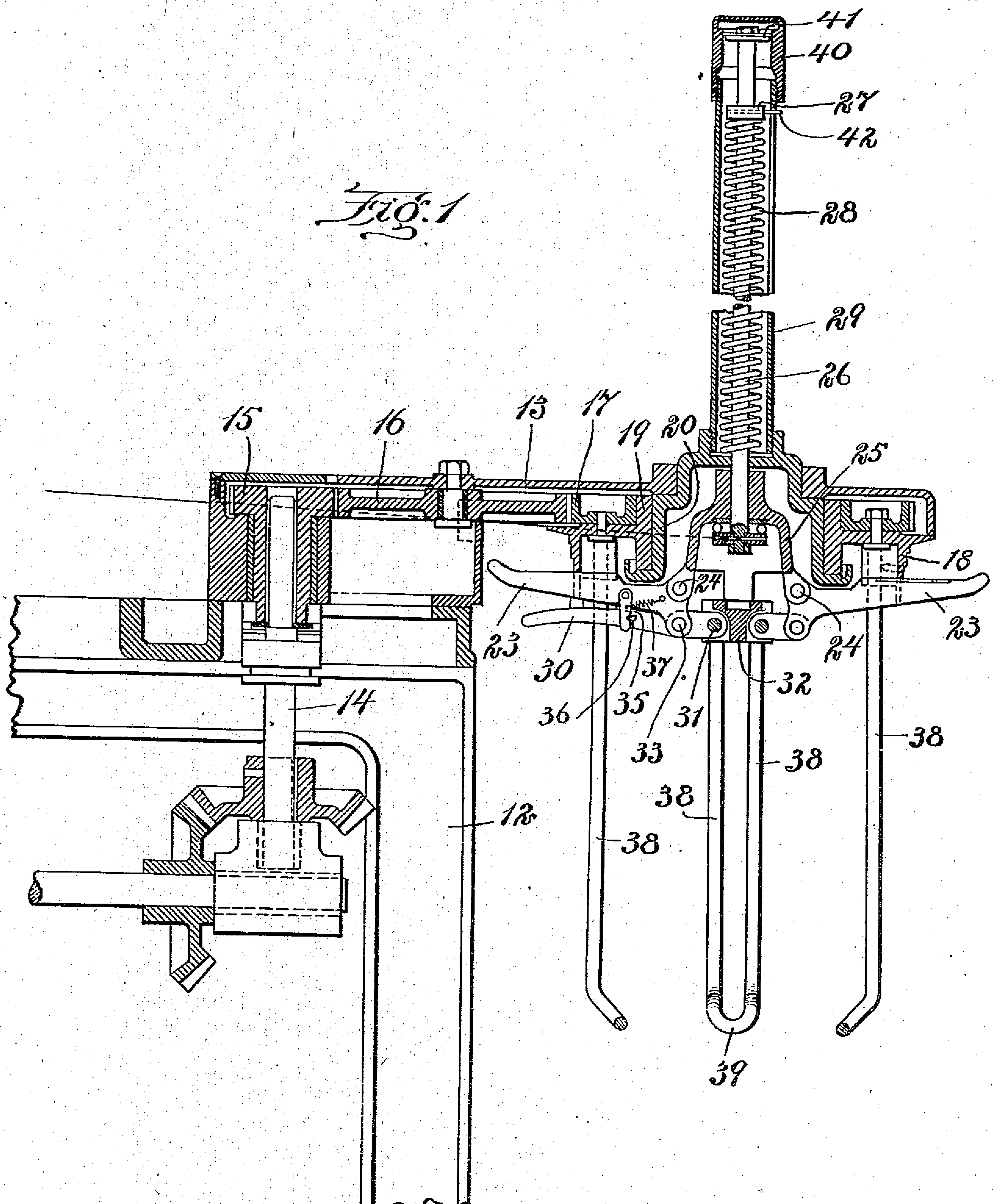

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Fig. 2

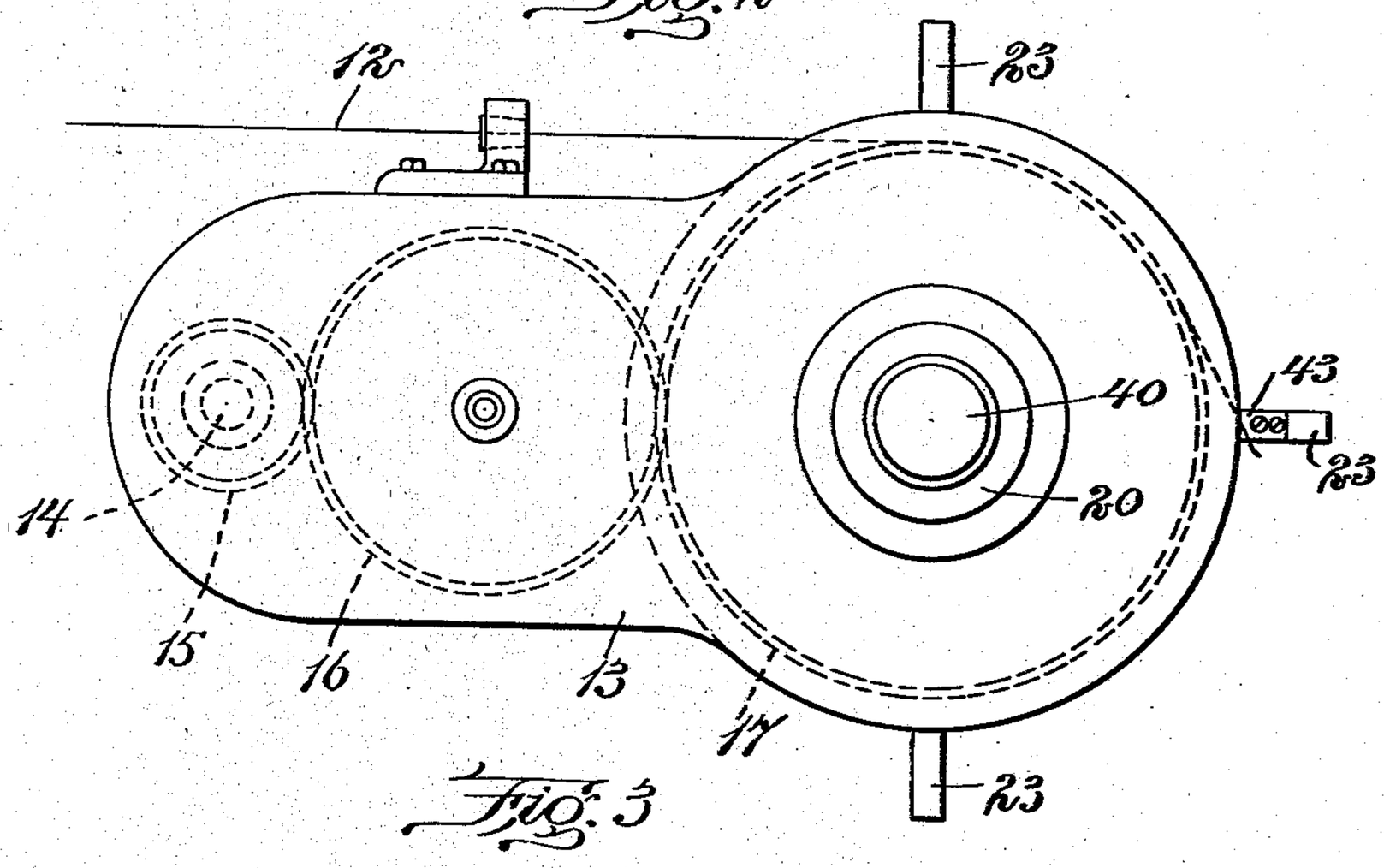


Fig. 3

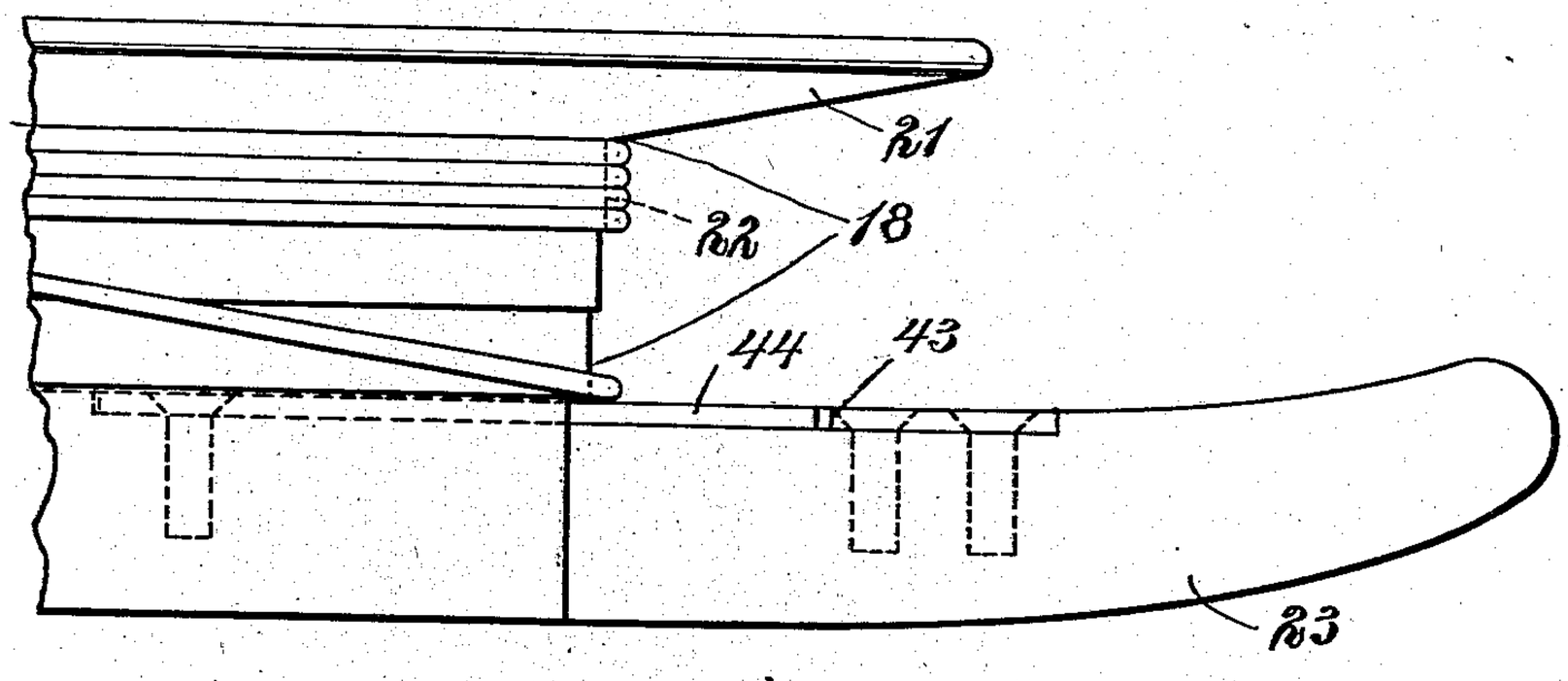
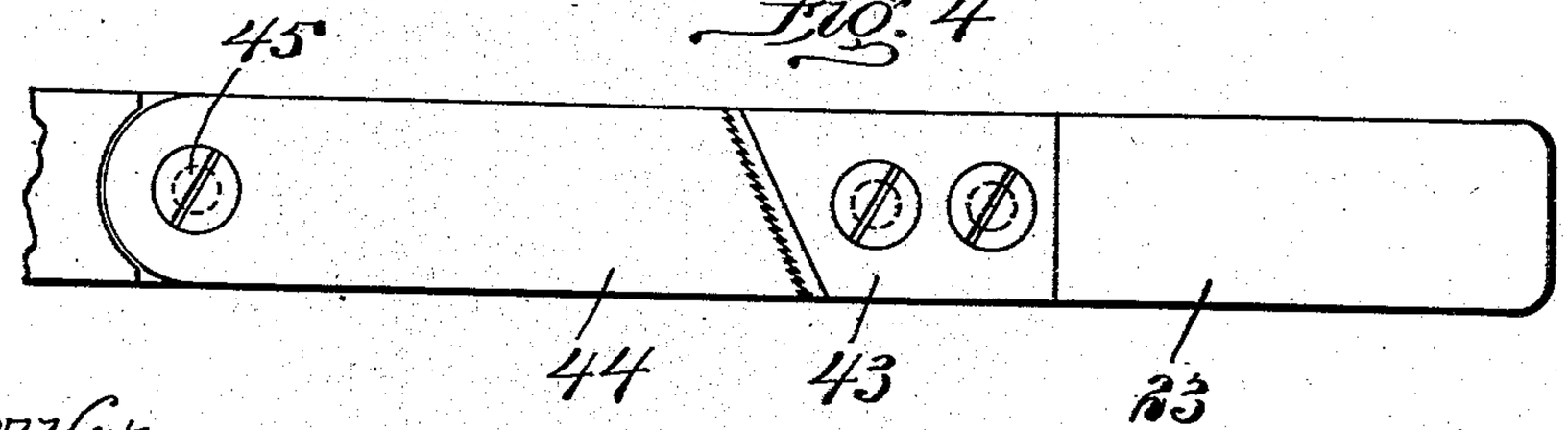


Fig. 4



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UNITED STATES PATENT OFFICE.

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INVERTED DRUM FOR WIREDRAWING-MACHINES.

No. 911,305. Specification of Letters Patent. Patented Feb. 2, 1909.

Application filed April 18, 1906. Serial No. 312,287.

To all whom it may concern:

Be it known that I, JAMES A. HORTON, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Inverted Drums for Wiredrawing-Machines, of which the following is a specification.

This invention relates to inverted wire-drawing drums, or those which discharge the wire downwardly from the initial drawing portion of the periphery of the drum, instead of upwardly as heretofore.

The invention has for its object to provide for the regular downward discharge of the wire, wrap by wrap, instead of its irregular discharge in masses or groups or wraps.

In drawing wire in the usual manner, on an upright drum, the accumulating coil is forced upward by the on-coming wire, which crowds between the previous wrap and the flange of the drum. The wire in the initial portion of the drum is held down by the increasing weight of the coil already drawn, also by its own weight by gravity. Upright drums therefore must be made tapering or inclined relatively to the axis of rotation, in order that the pull on the wire, due to the draft at the die, may lift the increasing coil. In an inverted drum, adapted to discharge downwardly, the conditions are different. The coil will fall by gravity if not sustained at or near the initial portion of the drum in order to prevent the coil from dropping from the drum. Heretofore it has been proposed to provide an inverted wire-drawing drum discharging the wraps of wire downwardly. The drum thus proposed has its periphery tapering from the flange at its upper end, to its lower end. This continuous taper provides for the frictional engagement of the wire with the drum, and provides for the release of the wire as it is forced downward; but experience has proved that with a taper, the wraps of wire do not drop from the drum singly, but in groups of indefinite number. These falling with greater or less force according to their weight, cause the wire to be drawn at such an angle through the die that it is liable to break or scratch the wire.

My invention has for its object to provide such formation of the periphery of an inverted drum as will prevent any irregular or spasmodic dropping of the wraps of wire from the drum, and will provide for a regular dropping of the wraps, one by one, upon the coil.

The invention also has for its object to enable the leading end of the wire forming a completed coil to be properly secured in the operation of tying or binding the coil.

The invention also has for its object to provide for indicating the weight of the coil of wire formed by the action of an inverted drum.

To these and other related ends, the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a vertical sectional view, showing an inverted drum embodying my invention, and adjacent parts of a wire-drawing machine to which the drum is applied. Fig. 2 represents a top plan view of the construction shown in Fig. 1. Fig. 3 represents a side view of a portion of the drum and one of the coil-supporting arms. Fig. 4 represents a top view of the arm shown in Fig. 3.

The same reference characters indicate the same parts in all the figures.

In the drawings,—12 represents a portion of the frame of a wire-drawing machine, to which is attached a bracket 13 projecting from one end of the frame.

14 represents a driving-shaft journaled in bearings on the frame 12 and driven by power imparted in any suitable way, the shaft 14 being provided with a small gear or pinion 15 meshing with an intermediate gear 16, which meshes with the drum-rotating gear 17 affixed to an inverted drawing-drum 18. The drum 18 is provided with a hub 19 mounted to rotate on a fixed bearing or hollow dead-stud 20 secured rigidly to the bracket 13. The drum is provided at its upper end with a flange 21, which projects outwardly from the initial or acting portion 22 of the periphery of the drum. This initial portion which is hereinafter referred to as the wire-engaging seat is of uniform diameter from edge to edge, or in other words, is cylindrical and has no taper. Its width is such that it is adapted to hold a sufficient number of wraps of wire to cause the friction of the wire on the drum to draw the wire through the accompanying die of the wire-drawing machine. In practice, I find that a width sufficient to receive from three to five wraps is sufficient, although the

invention is not limited in this respect. I regard it as important, however, that the initial portion or wire engaging seat 22 be limited in width, so that not more wraps will be accumulated upon it than are required to cause the initial friction. Below the initial portion 22, the periphery of the drum is reduced in diameter, perferably by one or more steps, as clearly shown in Fig. 3. This formation insures the prompt release or disengagement from forwarding contact with the drum, of the wraps of wire in excess of the number accumulated on the initial portion 22. In other words, the limited width of the initial portion of the periphery of the drum, together with its cylindrical form, causes each on-coming wrap of wire to displace and disengage from the periphery of the drum another wrap of wire; so that the wraps fall regularly, one by one, from the forwarding portion of the periphery of the drum upon the yielding support hereinafter described.

I desire to emphasize the distinction between the action of the initial portion 22 of the drum formed as described, and the action of a drum in which the entire periphery, including the initial portion, is tapered, the taper extending continuously from the flange to the lower end of the drum. In such tapered drum, there is no provision for the disengagement of the wraps of wire single and regularly, one by one. On the other hand, it has been found in practice that the wraps formed on a tapering drum are disengaged often in groups of varying numbers. When a group of wraps is disengaged and falls, it includes the topmost or initial wrap, and thus changes the angle at which the wire passes from the die to the drum, this change in angle often resulting in breakage of the wire. It will be seen that my improvement above described prevents this difficulty, and insures an absolutely uniform direction of wire from the die to the drum.

The wraps of wire disengaged from the drum are sustained in suitable proximity thereto, by a support which is yieldingly mounted and is adapted to sustain the increasing weight of the coil and gradually descend therewith sufficiently to keep the upper portion of the coil depressed below the initial or acting portion of the drum. The said support as here shown is practically the same as that shown in my application for Letters Patent of the United States filed June 15, 1903, Serial No. 161,566, and comprises a plurality of radiating arms 23 pivoted at their inner ends at 24 to a spider 25, which is revolubly mounted on a vertical rod 26 having at its upper portion a collar 27 bearing on a compressible spring 28 located in a casing 29, which is supported by the dead-stud 20. The arms 23 are therefore yieldingly supported by the spring 28, the spring yielding to permit the gradual descent of the arms as the weight of the coil increases. The provisions for tripping the arms 23 to release the coil are the same as in the above-mentioned application, and include levers 30 pivoted at their inner ends at 31 to a movable block 32, and pivoted also at 33 to ears on the arms 23. When the parts are in the position shown in Fig. 1, the levers 30 support the arms 23 in their operative position; and when the levers 30 are swung downwardly, they cause the arms 23 to also swing downwardly, and discharge the coil accumulated therein. In the present invention, I have departed from the construction shown in the former application, by applying to the arms 23 latches 35 engaging pins 36 on the levers 30, the latches being held in engagement with said pins by springs 37. The object of these latches is to prevent the accidental tripping or downward swinging of the levers 30 by their own weight when there is no load on the arms 23. It sometimes happens that the jar of the machine or other causes will cause the premature tripping of the arms 30. This is prevented by the latches.

38 38 represent guide-rods affixed to the drum and projecting downwardly from its lower end, the said guide-rods being offset inwardly from the lower end of the drum and arranged so that collectively they support the inner surface of the coil that accumulates on the arms 23 when said arms are depressed below the drum. The formation of the coil on the drum is such that while the coil is confined against inward movement of the drum, its cross-section is oblong and the major axis of the oblong cross-section is vertical. When the arms 23 descend sufficiently to permit the separation of the body of the coil from the body of the drum, the wraps of wire composing the coil re-arrange themselves, so that the coil has practically a circular cross-section. This involves an outward displacement of some of the wraps of the coil, and an inward displacement of other wraps, and a consequent contraction of the internal diameter of the coil. The guide-rods 38 are so located that they permit this contraction of the internal diameter of the coil, permitting the operator to tie or bind the wraps of the coil together while they are on the support and in contact with the rods 38. Thiis provision for confining the coil in proper shape for binding before it is released from the support and guide-rods. is very important, because it saves a great deal of time and labor over what would be involved in removing the coil from the machine before binding it.

The guide-rods 38 are preferably arranged in pairs, connected at their lower ends by a neck 39. The rods thus arranged

are utilized as guides for the arms 23, the latter passing between the guides of each pair. The engagement thus effected in the guide-rods and the arms causes the rotation of the arms with the drum.

On the top of the casing 39 is mounted a dash-pot 40, which coöperates with a piston 41 affixed to the upper end of the rod 26. The upward movement of the rod by the spring is retarded by air confined between the piston 41 and the upper end or head of the dash-pot.

The spring 28 and the arms 23 supported thereby constitute a weighing mechanism, which in this embodiment of my invention is completed and made available by suitable means for indicating the weight of a coil accumulated upon the arms 23. The said indicating means as here shown comprise a movable indicating member, which may be simply a pin 42 affixed to the rod 26 and projecting through a vertical slot in the casing 29, and a graduated scale on the casing, in position to coöperate with the pin 42.

To enable the leading end of the wire to be secured to the downwardly moving support, I provide one of the arms 23 with an automatically acting vise or clamp to engage the said leading end, as shown in Fig. 3. This vise comprises a fixed jaw 43 on the said arm, and a movable jaw 44 pivoted on the pin 45 to the arm 23. The acting edges of the jaws 43 and 44 are preferably tangential to the periphery of the drum, so that the wire passes at a tangent from the drum, between the jaws, as indicated by dotted lines in Fig. 3. The object of this wire-securing device is first to enable the operator to control the leading end of the wire and secure it in its proper place in the coil during the operation of binding the coil; secondly, to conveniently start the wire on the drum, the operator first drawing out from the die by other means, a short length of wire, and then attaching the end by the clamp.

I claim:

1. In a wire drawing machine, an inverted drum adapted to discharge its coil downwardly, and a coil support movable downwardly with the increasing coil, and adapted to engage the leading end of the wire, said drum having a cylindrical wire-engaging seat limited in width to that required for operative frictional engagement with the wire, whereby the wraps of wire are caused to fall independently one by one upon the coil support.

2. In a wire drawing machine, an inverted drum adapted to discharge its coil downwardly, and a coil support movable downwardly with the increasing coil, and means carried by the coil-support for engaging the leading end of the wire, said drum having a cylindrical wire-engaging seat, and limited in width to that required for operative frictional engagement with the wire, whereby the wraps of wire are caused to fall independently one by one upon the coil support.

3. A wire drawing drum mounted on a substantially vertical axis, and adapted to discharge its coil downwardly, said drum having an initial wire-engaging seat of uniform diameter from edge to edge and limited in width to that required for operative frictional engagement with the wire.

4. A wire drawing drum mounted on a substantially vertical axis and adapted to discharge its coil downwardly, said drum having its periphery formed in steps of different diameters, the initial step being of uniform diameter from edge to edge, and limited in width to that required for operative frictional engagement with the wire.

5. A wire-drawing drum adapted to discharge its coil downward, and coil guides projecting downwardly from the discharging end of the drum, and offset inwardly from the periphery of the drum to permit the contraction of the inner diameter of the finished coil, and the tying of the same in compact form, said guides being parallel with the axis of the drum, whereby the coil is given a uniform diameter from end to end.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JAMES A. HORTON.

Witnesses:
C. F. Brown,
E. Batchelder.