No. 871,848. PATENTED NOV. 26, 1907.

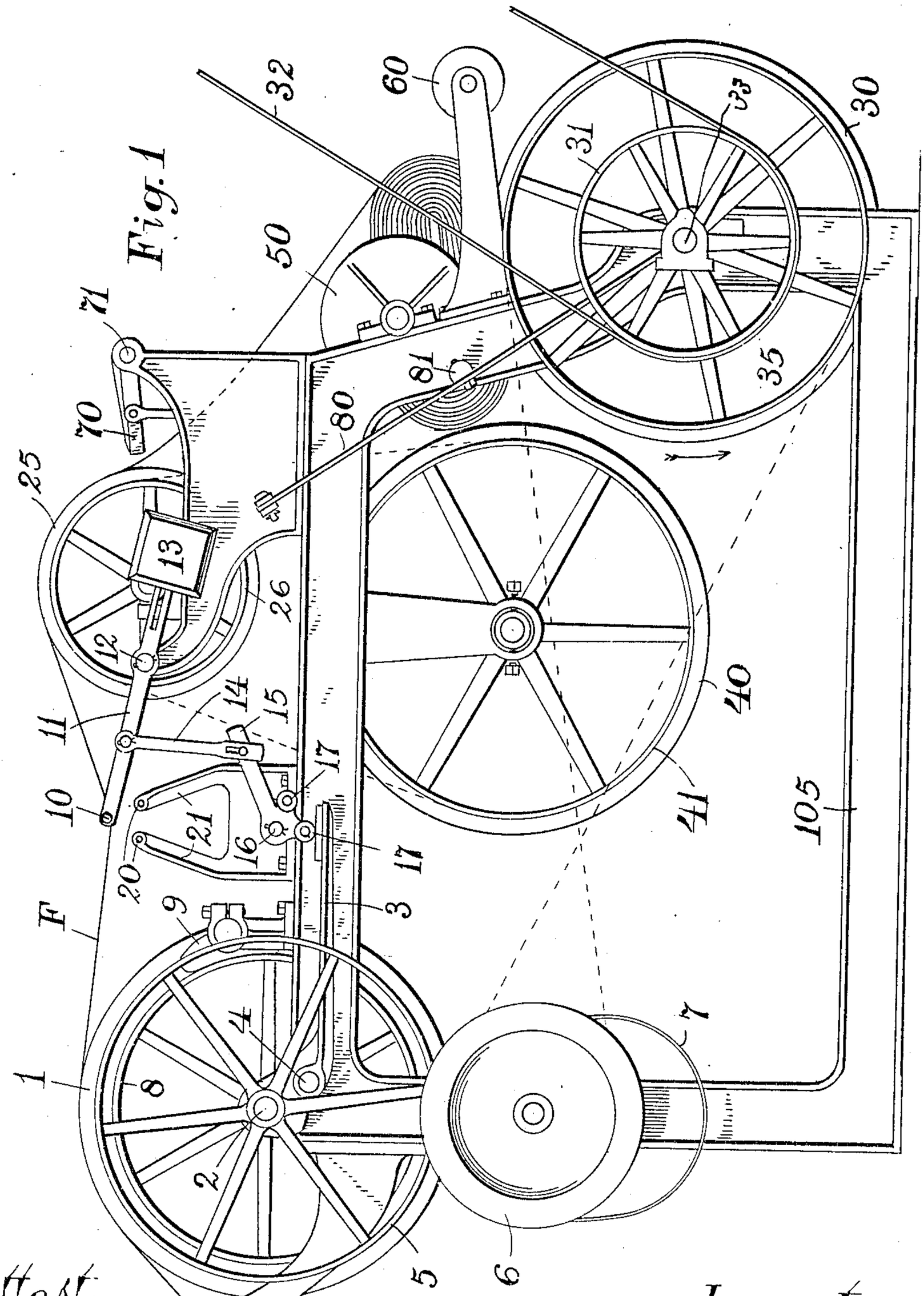
J. E. WINDLE.

UNWINDING MACHINE.

APPLICATION FILED JAN. 5, 1907.

6 SHEETS—SHEET 1.

Fig. 1



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5 SHEETS—SHEET 2.

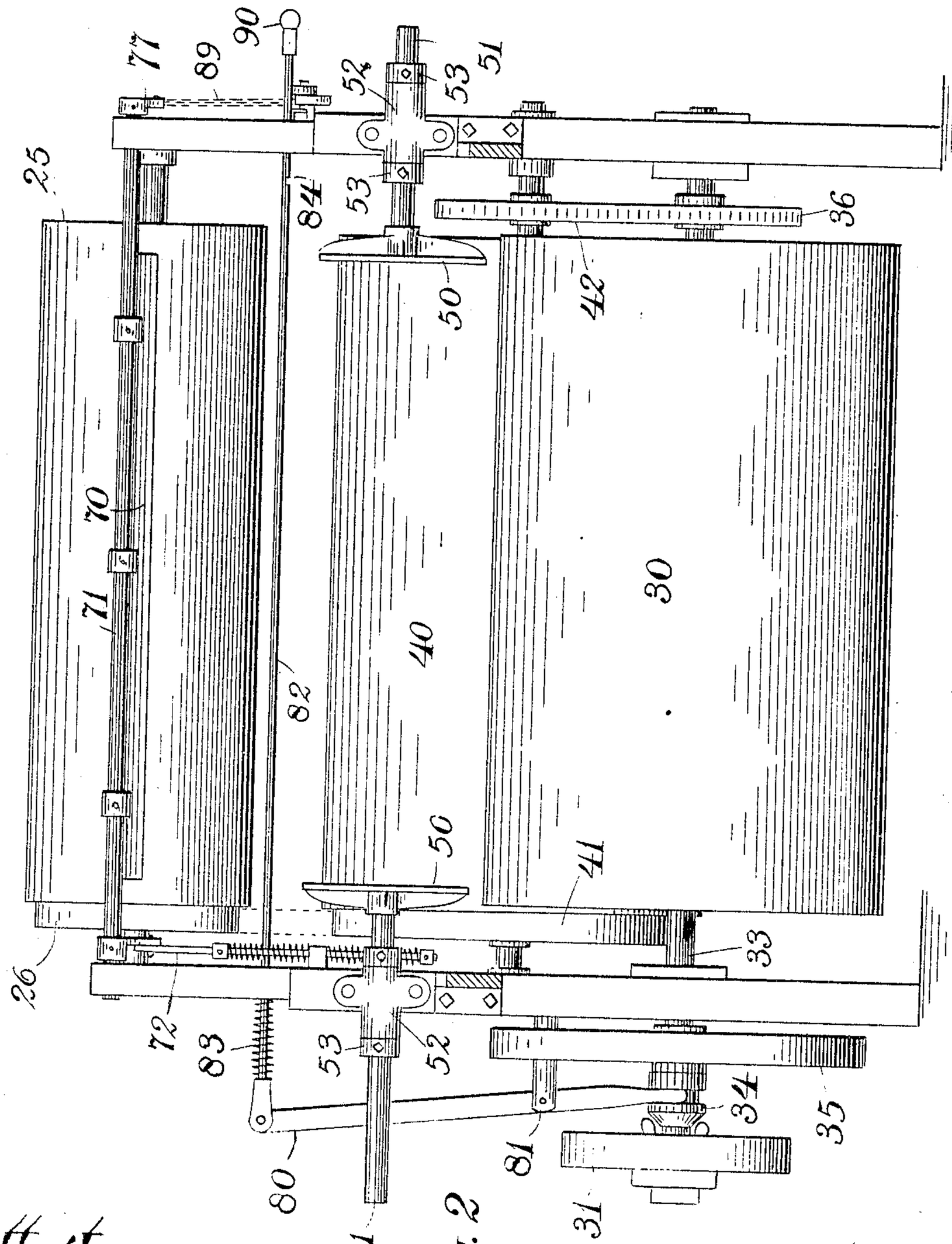

Fig. 2

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5 SHEETS—SHEET 3.

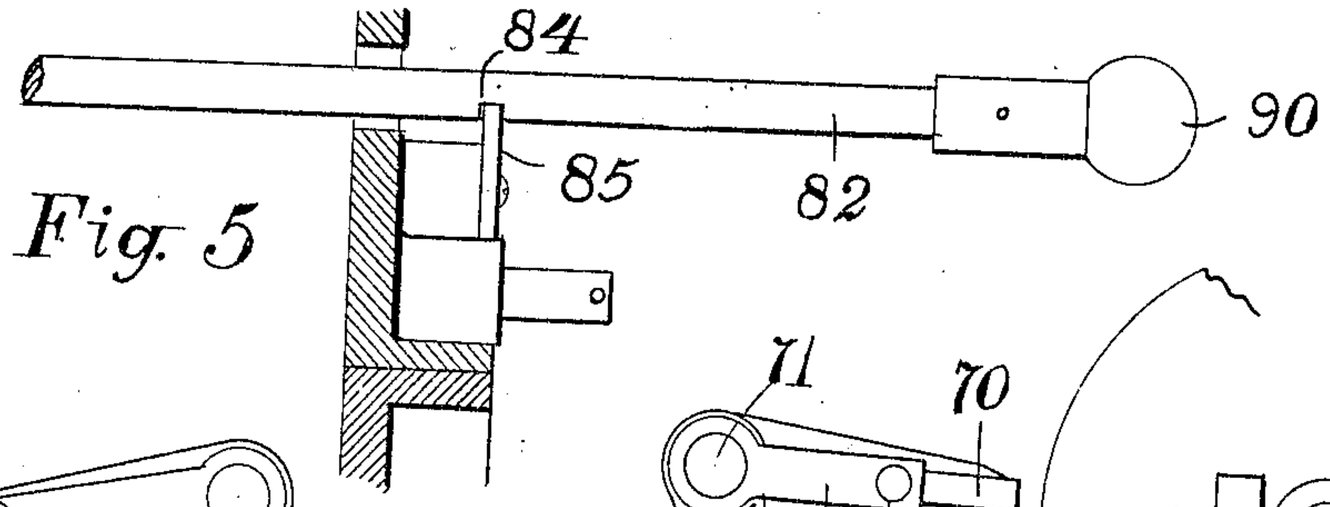

Fig. 5

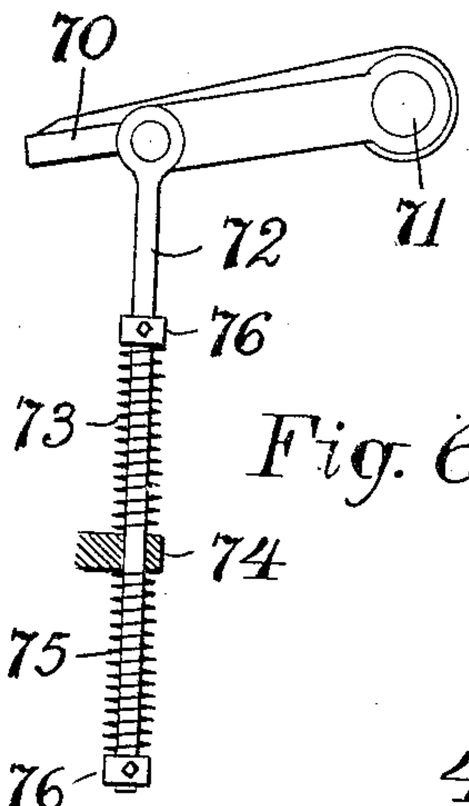

Fig. 6

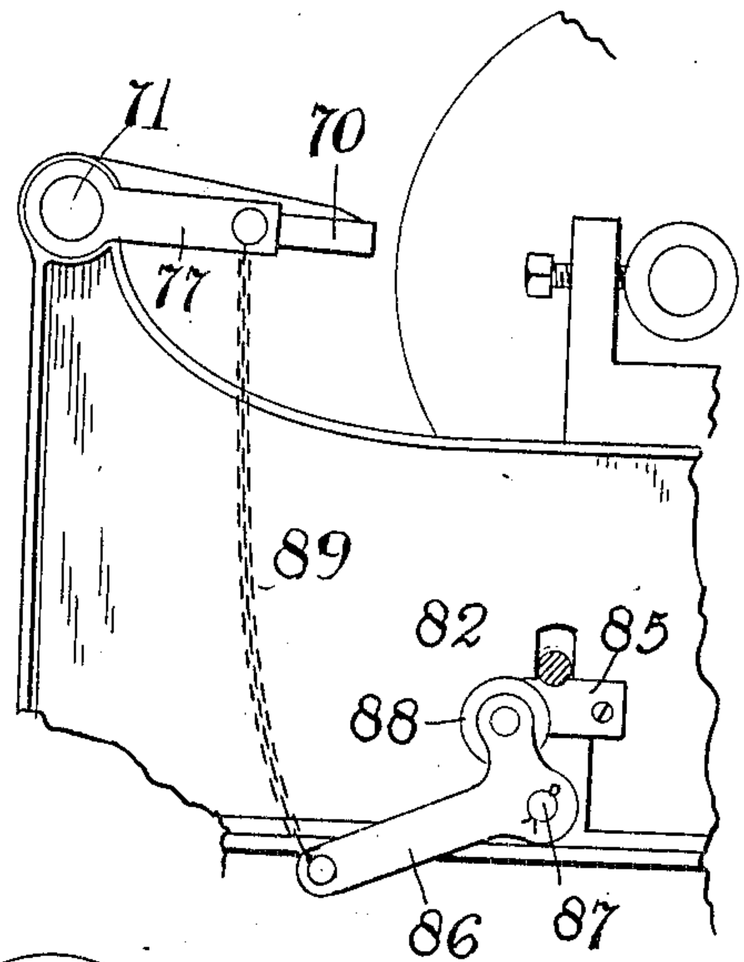

Fig. 4

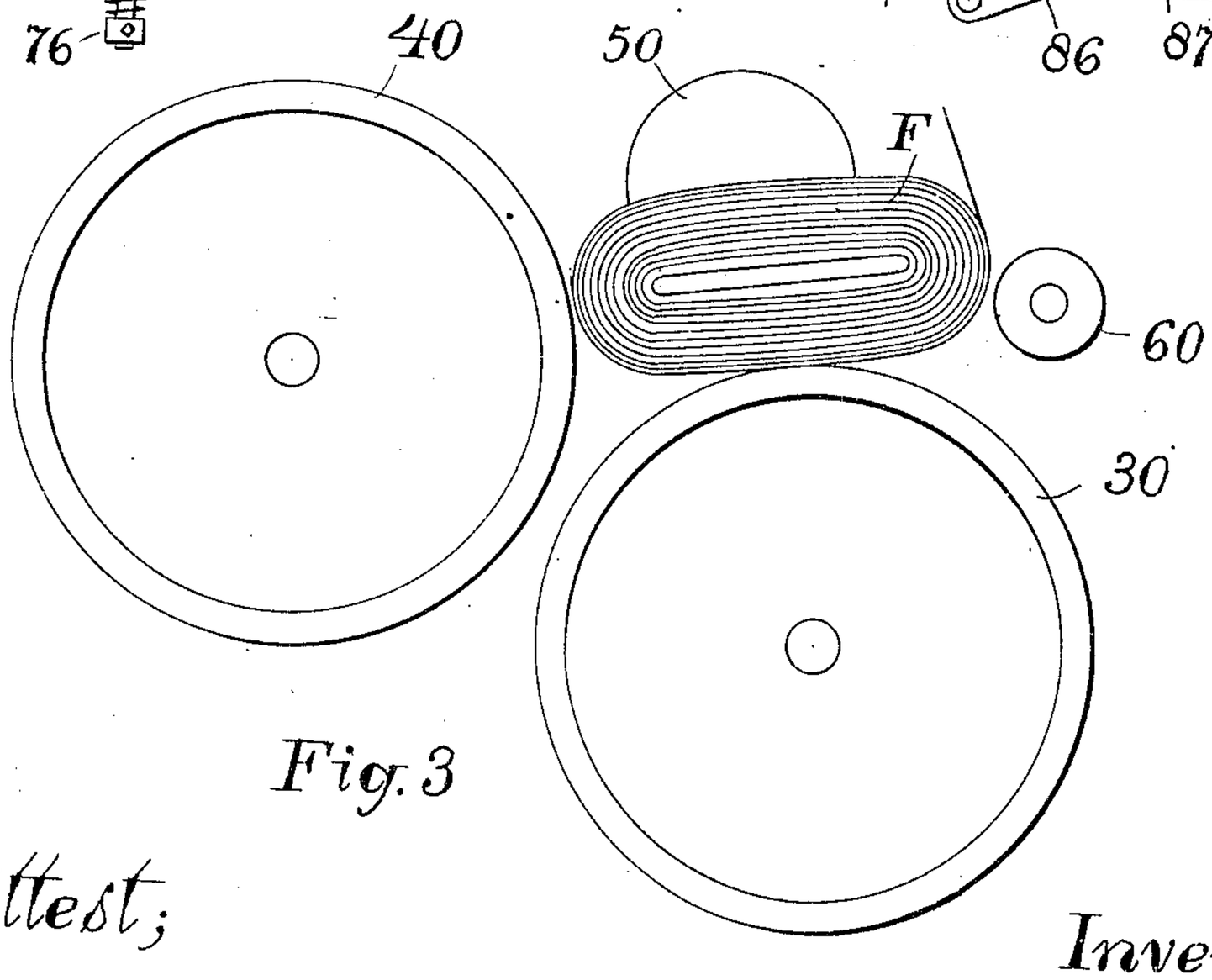

Fig. 3

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5 SHEETS—SHEET 4.

Fig. 7

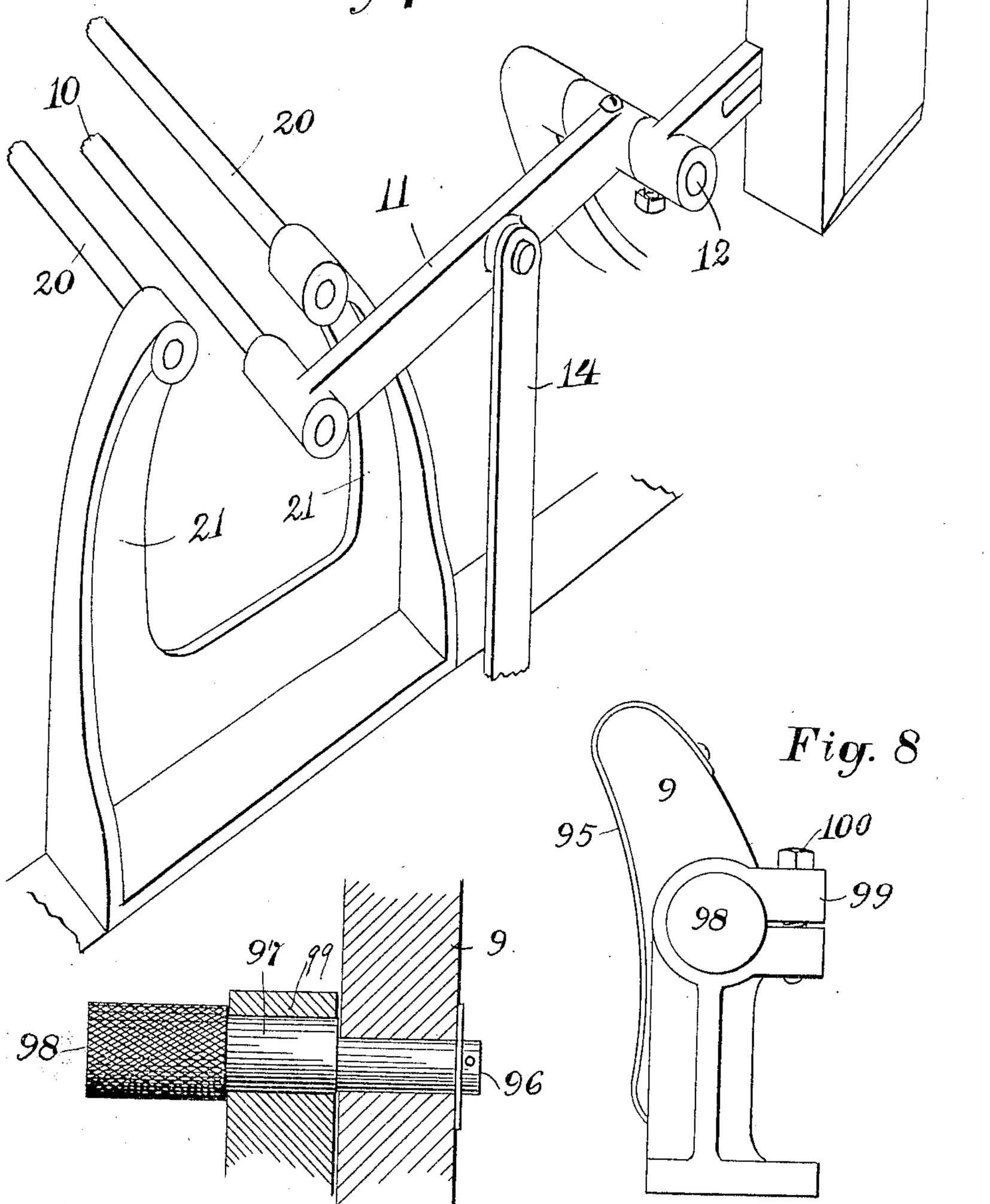

Fig. 8

Fig. 9

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5 SHEETS—SHEET 5.

Fig. 10

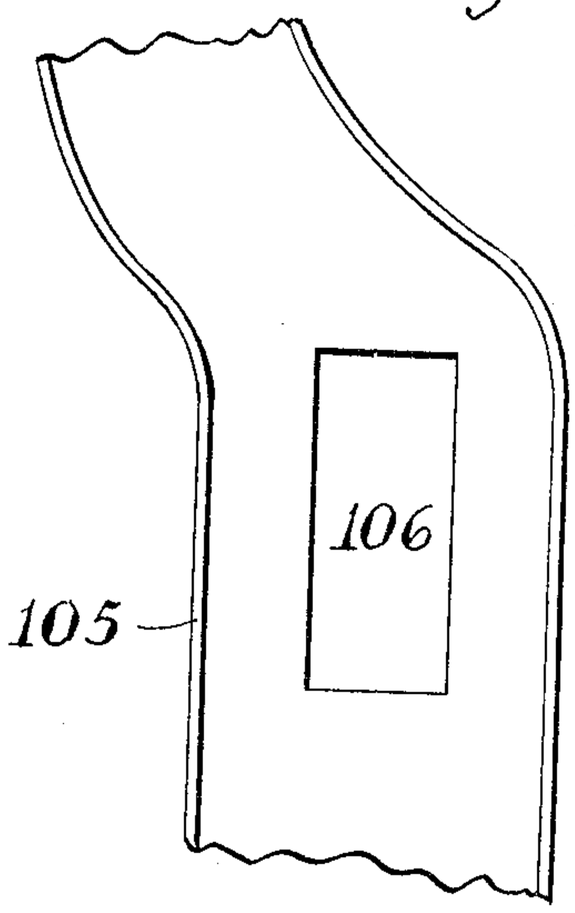


Fig. 11

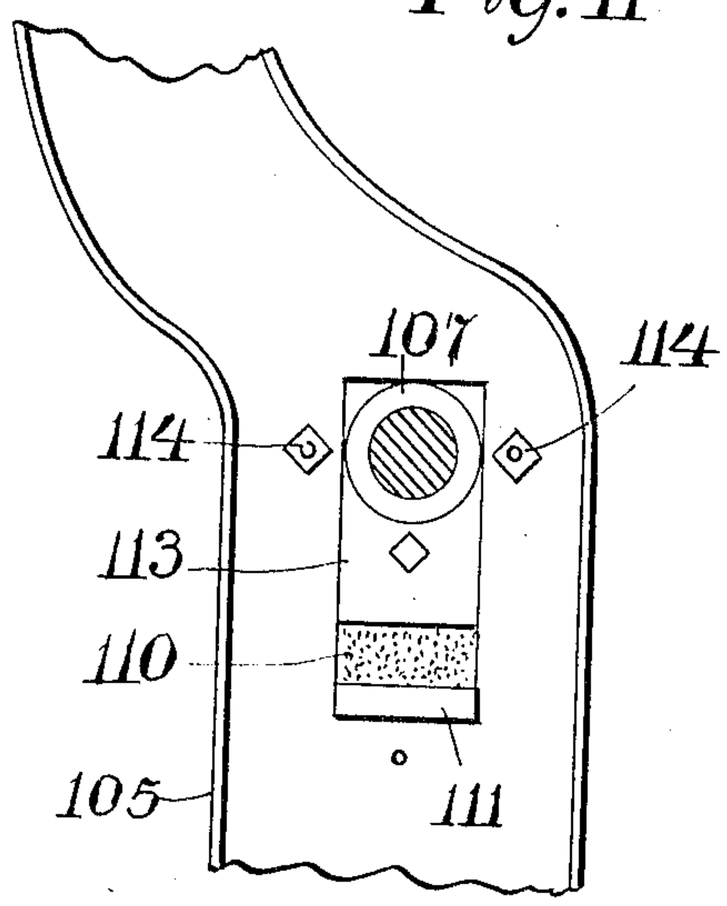


Fig. 13

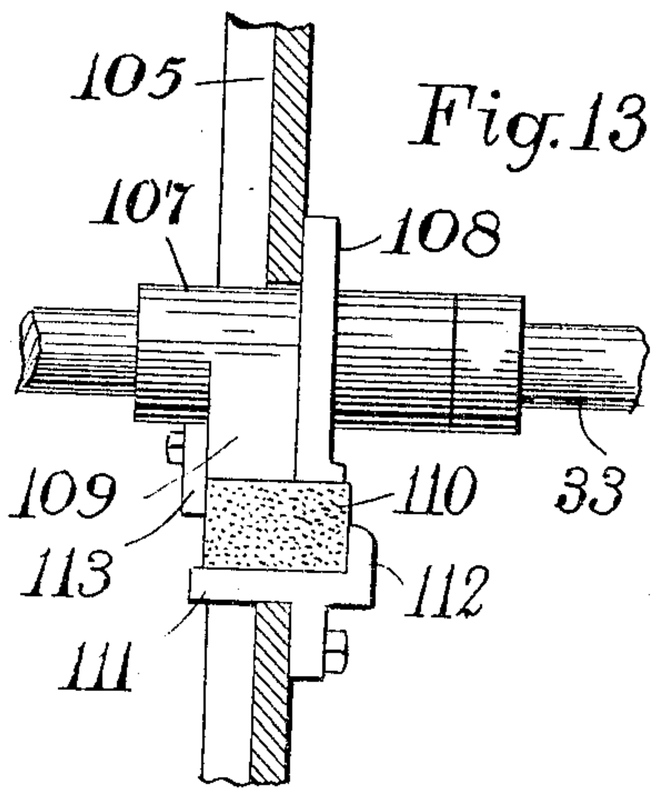
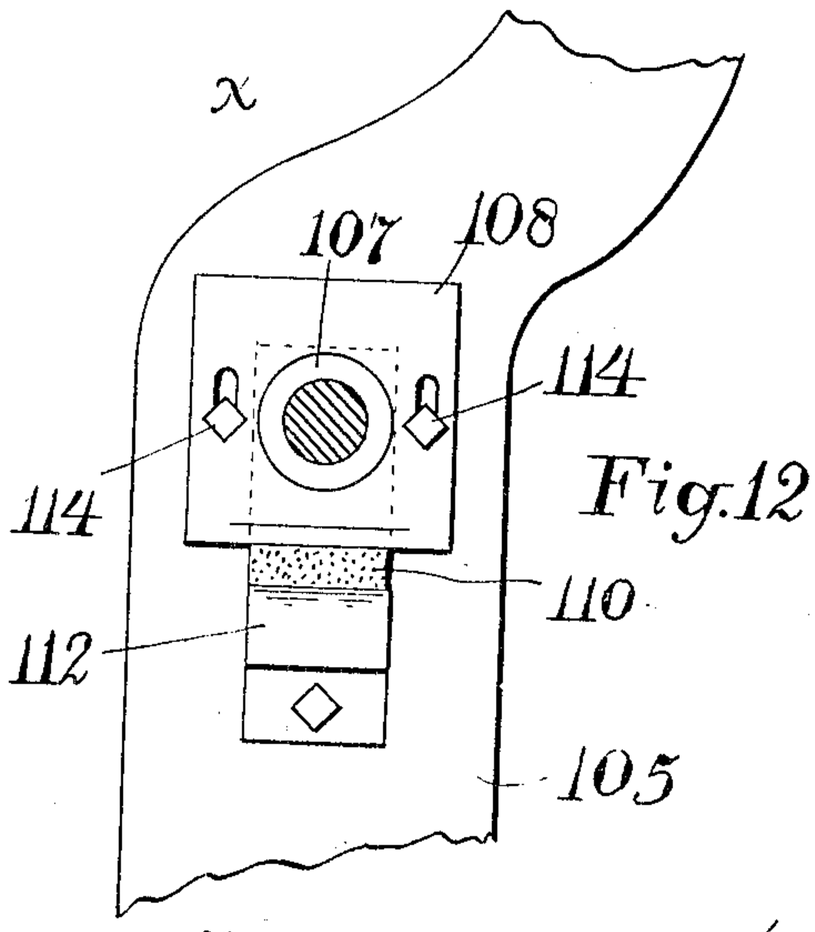


Fig. 12



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UNITED STATES PATENT OFFICE.

JOHN E. WINDLE, OF WORCESTER, MASSACHUSETTS.

UNWINDING-MACHINE.

No. 871,848. Specification of Letters Patent. Patented Nov. 26, 1907.

Application filed January 5, 1907. Serial No. 350,929.

To all whom it may concern:

Be it known that I, JOHN E. WINDLE, a citizen of the United States, and a resident of the city and county of Worcester, in the Commonwealth of Massachusetts, have invented certain new and useful Improvements in Unwinding-Machines, of which the following is a full, clear, and exact description.

The object of this invention is the construction of an improved machine for the purpose of unwinding fabrics; especially such as are wound in flat rolls.

In the machine illustrated in the drawings, I have shown this invention as applied to or formed as a part of, a measuring machine the construction of which is substantially like that forming the subject matter of my companion application Serial No. 279,677.

Referring to the drawings forming part of this specification, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a side view showing my arrangement for unrolling a flat roll. Fig. 4 is a detail view of the stopping device for switching off the power under certain contingencies. Fig. 5 is a view of another detail of the stopping device. Fig. 6 is a view of another detail of the same. Fig. 7 is a perspective view of a portion of the tension-controlling means. Fig. 8 is a side view nearly full size of the brake-shoe used in bringing the measuring cylinder more quickly to rest. Fig. 9 is a sectional view of the said brake-shoe showing its eccentric adjusting spindle. Figs. 10, 11, 12 and 13 are detail views of a resilient bearing-box.

The measuring cylinder 1 has one end of its shaft 2 supported in the short arm of the lever 3 pivoted at 4 to the machine frame. By depressing said lever, said shaft-end and consequently the pulley 5 fixed on the latter are elevated, and said pulley raised out of contact with its driving drum 6, between which surfaces run a loose belt 7 for supplying the needed friction.

As the depression of said lever moves the pulley 5 away from the drum 6, the pulley 8 is forced against the brake-shoe 9 and the measuring drum 1 brought immediately to rest.

To enable the variations in tension of the fabric F to actuate the lever 3 and thereby throw the measuring cylinder in and out of action, the transverse rod 10 is adapted to rest upon the section of fabric F stretching between the cylinder 1 and the roll 25, and to be so related to said lever that, when it either rises or falls from a normal position, said lever will move the pulley 5 away from its operating drum 6. Such normal position is the one given to said rod by the fabric under moderate strain. When, through any means, the roll fails to unwind and the fabric-section rises to substantially the condition illustrated in Fig. 1; or when the end of the roll is reached and all tension on the fabric ceases and the rod 10 falls, in either case the measuring cylinder is made to stop its motion. Intermediate of these extremes of tension, are the slight ones caused in numerous ways, as when the flat roll suddenly fails to unwind with its previous readiness and a slight increase in tension is put upon the fabric. Instead of thereby stretching the fabric and thence rendering its measurement inaccurate, the rod 10 is raised just enough to partially reduce the frictional-grip between the pulley 5 and its operating devices, and so slow down the measuring cylinder's rotation until the normal tension is restored.

The means by which the play of the rider rod 10 is made to control the lever 3 consists of the lever 11 pivotally supported at 12, and partially counterweighted by the weight 13 adjustably mounted on the opposite end of the lever. A connecting rod 14 joins said lever to the arm 15 pivotally held at 16 and carrying the friction rolls 17 arranged to contact with, and depress the lever 3 when their arm 15 is moved either up or down.

To enable the depression of the rider 10, when the end of the fabric is reached, to control such slack and cause the fabric to pass with uniform tension to the cylinder 1 until the latter stops, I provide the two parallel transverse rods 20 terminally held by the arms 21, between which the rider rod 10 falls when unsupported. As the rider thus falls, it carries with it a fold of the fabric between the two rods 20 and thereby applies a sufficient tension to the fabric to give the latter a proper feed to the measuring cylinder when turned by hand to withdraw the few feet of remaining fabric.

The unwinding mechanism consists of the

supporting drum 30, upon which the fabric-roll either flat or round is laid, and which rotates in the direction indicated by the arrow in Fig. 1; the back roll 40 turning in the same direction; the confining disks 50, and the guard roll 60.

The fabric roll being laid upon the supporting roll 30, with an unwound section extending therefrom over the roll 25 and thence beneath the rider rod 10 to the measuring cylinder 1, the rotation of the rolls 30 and 40 at the proper speed will cause the fabric-roll to turn at an equal superficial speed and unwind at a suitable rate to supply the fabric to the measuring cylinder with uniformity.

By having the roll 40 sufficiently higher than the roll 30 to constitute a back wall for the fabric-roll, the latter is made to remain steadily in place while unwinding, instead of bounding over and away from the roll 40 as would frequently be the case when the latter roll is located with its axis of rotation at the same level as is that of the roll 30. This is a very important feature, and aids very materially in solving the hitherto impossible task of mechanically unwinding a flat roll.

The guard roll 60 serves to keep the unwinding flat roll from any possibility of leaping forward and off from the supporting roll 30. This guard roll is not positively rotated, but only as it may be set in motion by the accidental contact with it of the unwinding fabric roll.

The rolls 30 and 40, are on the other hand continuously rotated at equal superficial speeds; the roll 30 by power received from any suitable source through a belt 32 passing about the pulley 31 normally loose upon the shaft 33 (see Fig. 2) but having a friction-clutch 34 by which to couple the same together. Sprocket wheels 36, 42 and a suitable chain connecting them, cause said rolls 30 and 40 to positively turn in unison. A pulley 35 on the shaft 33 provides the means for transmitting the power to the drum 6 through a suitable crossed belt indicated by a dotted line in Fig. 1. From the roll 40, power is transmitted to the roll 25 by means of pulleys 41, 26 and suitable belting.

The confining disks 50 are fixed upon the inner ends of the bars 51 longitudinally movable in bearings 52, and adjustably held therein by means of the collars 53, as shown in Fig. 2. Such adjustment is essential in order to fit the unwinding mechanism for different sized fabric-rolls,—that is, fabrics of different widths. Without such confining disks, an unwinding fabric-roll will bound from point to point along the supporting roll and so fail to feed the fabric evenly to the remainder of the mechanism. In other words, by permitting the fabric-roll to shift from side to side, first nearer one end of the rolls 30, 40, and then nearer the other, the fabric will pass to the roll 25 in an uneven and wrinkled manner and badly affect the results tallied by the measuring cylinder.

It sometimes happens that the tags which are affixed to the fabric-rolls, and which are secured thereto by wire inserted through the edges of the cloth, bind together two or more adjacent edges in a roll. The result is that the cloth fails to unwind, and the entire roll is jerked up and over the roll 25 and caught among the rods 10, 20. To prevent this, I provide a stop-board 70 hinged at one edge upon trunnions 71 and presenting its free edge toward the roll 25. By arranging this board so that when struck and thrown upward by such a non-winding roll, the clutch 34 will be unshipped, the entire machinery will immediately stop and all danger of damage be obviated. To thus arrange said board, it is resiliently supported at its free edge by the rod 72 loosely penetrating the apertured lug 74, as shown in Figs. 2 and 6, with springs 73, 75 located between such lug and the collars 76 fixed on the rod. The lower spring 75 permits the upward throw of the board, while the upper spring 73 constitutes a buffer for cushioning its descent to normal after such throw. As shown in Fig. 2, the clutch 34 is operated by the clutch-lever 80 pivoted at 81 and joined at its upper end to the transverse rod 82. A spring 83 on said rod serves to throw the clutch-lever and unship the clutch. Near the opposite end of the rod 82 is a notch 84 disposed to engage the plate 85 when the rod and lever are moved to operate the clutch, and to thereby retain the machinery in operation. See Figs. 2 4 and 5.

As shown in Fig. 4, a short distance below said rod 82 is pivoted an arm 86 at the point 87; said arm carrying a roll 88 disposed to engage and elevate the rod 82 when said arm is swung upward. The free end of this arm being joined, as by a chain 89, to the end of an arm 77 rigid with the board 70, whenever said board is thrown upward, the rod 82 is raised out of its engagement with the plate 85, and the spring 83 is permitted instantly to unship the clutch 34 and stop the machinery. The rod 82 is also provided with a knob or handle 90 for its convenient manipulation, in order that the machine may be stopped and started by the attendant at either side. When the attendant is at the left hand side of the machine, as viewed in Fig. 2, and the rod 82 is in engagement with its stop-plate 85, he stops the operation by simply giving an upward blow to the board 70.

As shown in Fig. 8, the brake-shoe 9 is substantially crescent-shaped, with a strip of leather or other friction material 95 fixed over its face. The eccentric spindle 96 upon which this brake-shoe is mounted, is formed in three sections, the central one 97 of which

is eccentric with respect to the spindle-section 96 and mounted in the split bearing 99 of its supporting standard. The other section 98 is knurled or roughened to constitute a turning-handle. By turning said spindle, the brake-shoe 9 can be brought to the desired point of adjustment with respect to the pulley 8, and then fixed thereat by tightening up the bolt 100.

During the unwinding of a flat roll or web upon the supporting cylinder or roll 30, when the machine is speeded up to its usual rate, the jarring produced by the blows of the flat roll is very pronounced, and will be felt throughout the building where it is in operation. To obviate this defect, I have provided the bearing-boxes 107 of the cylinder's shaft 33 with resilient supports by means of which the jar is practically wholly eliminated.

As shown in Fig. 10, each side-frame 105 is formed with a vertically extended opening 106; and in these openings are located the bearing-boxes 107, as shown in Figs. 11, 12 and 13. Each box is formed with a flange 108 held in place against the inner face of the frame by bolts 114 penetrating vertical slots in the flanges, to permit vertical play of the boxes. Formed as a part of the box and flange is a block 109, between which and a seat 111 is located a block of elastic material, as rubber 110. A flange 112 rising from said seat, and a plate 113 bolted to said block 109, serve to retain the rubber cushion in place. The bearing boxes being thus permitted a limited vertical play, and supported by the resiliently yielding cushions, the shocks given to the cylinder or roll 30 by the fabric-web in its unwinding are prevented from being communicated to the remainder of the machine, and thence to the building.

In the operation of this machine, the roll to be unwound is placed upon the supporting cylinder or drum 30, with the fabric rising therefrom at the side in contact with the roll 40. A sufficient length of the fabric is then unwound, and passed between the edge of the board 70 and the roller 25; thence beneath the rider rod 10, and a sufficient distance over the measuring cylinder 1 to insure the latter's frictional grip thereon. The clutch-lever 80 is now moved over until the notch 84 in the rod 82 is engaged by the plate 85, and the machinery being thus put into operative connection with the source of power, the various rolls, drums and cylinders begin to turn and the fabric to be unwound. Should, for any reason, the measuring cylinder 1 rotate slightly faster than the drum 30, and a strain be thereby put upon the fabric delivered to such cylinder, the rider 10 will be raised until, through the latter's action upon the lever 3, the frictional grip between the pulley 5 and its driving devices is reduced and said cylinder allowed to slow down enough to bring the tension on the fabric to its normal condition. When the fabric is wholly unwound and its end approaches the rider rod 10, the latter, being thus unsupported, sinks down between the parallel rods 20, and, through the action on the lever 3 similar to that above described, brings the measuring cylinder to rest. The further advantage of the rider and its rods 20 is that of putting sufficient tension upon the trailing end of the fabric to keep the frictional grip between the fabric and the measuring cylinder intact until the latter stops. Should the board upon which the fabric is wound fail to wholly release itself from the end of the unwound fabric, or should the roll itself cease unwinding for any cause, as by the binding together of two or more folds of the fabric through a carelessly located tag-fastening, then the said board, or the unwound portion of the roll, will ascend with the fabric until the board 70 is reached. This board 70 being thus struck and raised, will through its connections, release the rod 82 from the locking plate 85 and so permit the spring 83 to actuate the clutch-lever 80 to unship the clutch 34 and so stop the machine; thereby preventing the damage which might otherwise be caused.

What I claim as my invention and for which I desire Letters Patent is as follows, to wit;—

1. A machine for unwinding a flat roll of flexible material, comprising a rotating drum of a diameter approximating the major diameter of such flat roll before being unwound, and a second rotating drum of substantially equal diameter located behind the first-named drum and with its center at approximately the level of the upper surface of the same; the first named drum turning with its upper surface moving toward the second drum, and the second turning with its under surface moving toward the first.

2. A machine for unwinding a flat roll of flexible material, comprising a rotating drum of a diameter approximating the major diameter of such flat roll before being unwound, a second rotating drum of substantially equal diameter located behind the first-named drum and with its center at approximately the level of the upper surface of the same; the first-named drum turning with its upper surface moving toward the second drum, and the second turning with its under surface moving toward the first, and yielding bearings for the first-named drum for deadening the blows given thereto by the unwinding flat roll.

3. A machine for unwinding a roll of flexible material, comprising rotating members superficially contacting with and supporting such roll, and a pair of disks adjustably lo-

cated above the members, for longitudinally positioning such roll.

4. A machine for unwinding a roll of flexible material, comprising unwinding devices rotatably supporting such roll, a source of power for said devices, a member located substantially in the path of the material being unwound, and means operated by the deflection of said member for disconnecting said devices from the source of power.

5. A machine for unwinding a roll of flexible material, comprising unwinding devices rotatably supporting such roll, a source of power and a clutch connection between such source and devices, a member located in the path of the flexible material being unwound from such roll and connections between said member and clutch disposed to unship such clutch when said member is deflected.

6. A machine for unwinding a roll of flexible material, comprising unwinding devices rotatably supporting such roll, a source of power, a clutch connection between such source and devices, a hinged board presenting its free edge to the path of the fabric being unwound from said roll and connections between said board and clutch disposed to unship said clutch when said board is deflected.

7. A machine for unwinding a roll of flexible material, comprising unwinding devices rotatably supporting such roll, a source of power, a clutch connection between such source and devices, a shipping lever controlling said clutch, a rod slidably supported transversely across the machine and connected to said lever, a locking device holding said rod in a position to retain said clutch in actuation, yielding means tending to unship said clutch, a member located in the path of the flexible material being unwound from said roll and connections between said member and rod disposed when said member is deflected to release said rod from said locking devices.

8. A machine for unwinding a roll of flexible material, comprising unwinding devices rotatably supporting such roll, driving means therefor, a hinged board having its free edge located in the path of the flexible material being unwound from said roll, a vertical rod supporting said board, a fixed frame-member loosely penetrated by said rod, collars fixed to said rod above and below said frame-member, coiled springs on said rod between said frame-member and collars, and means operated by the deflection of said board for unclutching said driving means from said unwinding devices.

9. A machine for unwinding a roll of flexible material, comprising unwinding devices rotatably supporting such roll, driving means therefor, a clutch connection between said unwinding devices and driving means, a notched horizontal rod connected with said clutch, yielding means tending to release said clutch, a fixed member disposed for engagement in said notch, a swinging arm adapted when moved to disengage said rod from said fixed member, a hinged member located in the path of the flexible material being unwound from said roll, and connections between said hinged member and swinging arm.

10. The combination with a supporting frame having vertical openings therein, of a rotating member designed to receive downward shocks, bearing boxes for the shaft of said rotating member located in said vertical openings and having each a flange contacting with the face of the frame-section about one such opening, a rubber block beneath each bearing box, a fixed seat for each such rubber block, and means for retaining said rubber blocks in place; said flanges being each vertically slotted and having bolts penetrating such slots and fixed in the frame.

11. The combination of a roll receiving power and designed to support and unwind a roll of fabric, a second roll near to and slightly higher than the first named roll and rotated by the latter, a third roll located above and rotated by the second named roll, a measuring cylinder located parallel with but at a substantial distance from the third named roll, a driving means for the measuring cylinder receiving its power from the first named roll, means for disengaging the measuring cylinder from said driving means, a transverse rod designed to be supported by the fabric being unwound and stretching from the third named roll to the measuring cylinder, and a pair of fixed transverse rods located to receive the first named rod between them when not supported by such fabric; said supported rod being disposed to actuate said disengaging means by its changes in position.

12. The combination with a measuring cylinder and means for feeding fabric thereto, of a pair of fixed parallel slender rods, and a third slender rod vertically movable down into the space between the first named rods but normally supported upon the fabric being fed to the measuring cylinder and resting upon the first named rods, whereby any decrease in tension upon said fabric is taken up by the increased friction given thereto by its descent between the first named rods under the pressure of the movable rod.

13. The combination with a measuring cylinder and means for feeding fabric thereto, of a pair of bifurcated castings rigid with the framework of the machine, two rods supported by said bifurcated castings, a third rod parallel to the first named rods but longer

than the same, swinging arms terminally supporting the third rod exterior to said castings, means for rotating said measuring cylinder, and connections between the latter and said arms disposed to release said cylinder from its rotating means by the motions of said arms.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 2nd day of January, 1907.

JOHN E. WINDLE.

Witnesses:
E. T. TILTON,
A. B. UPHAM.