

No. 750,672.

PATENTED JAN. 26, 1904.

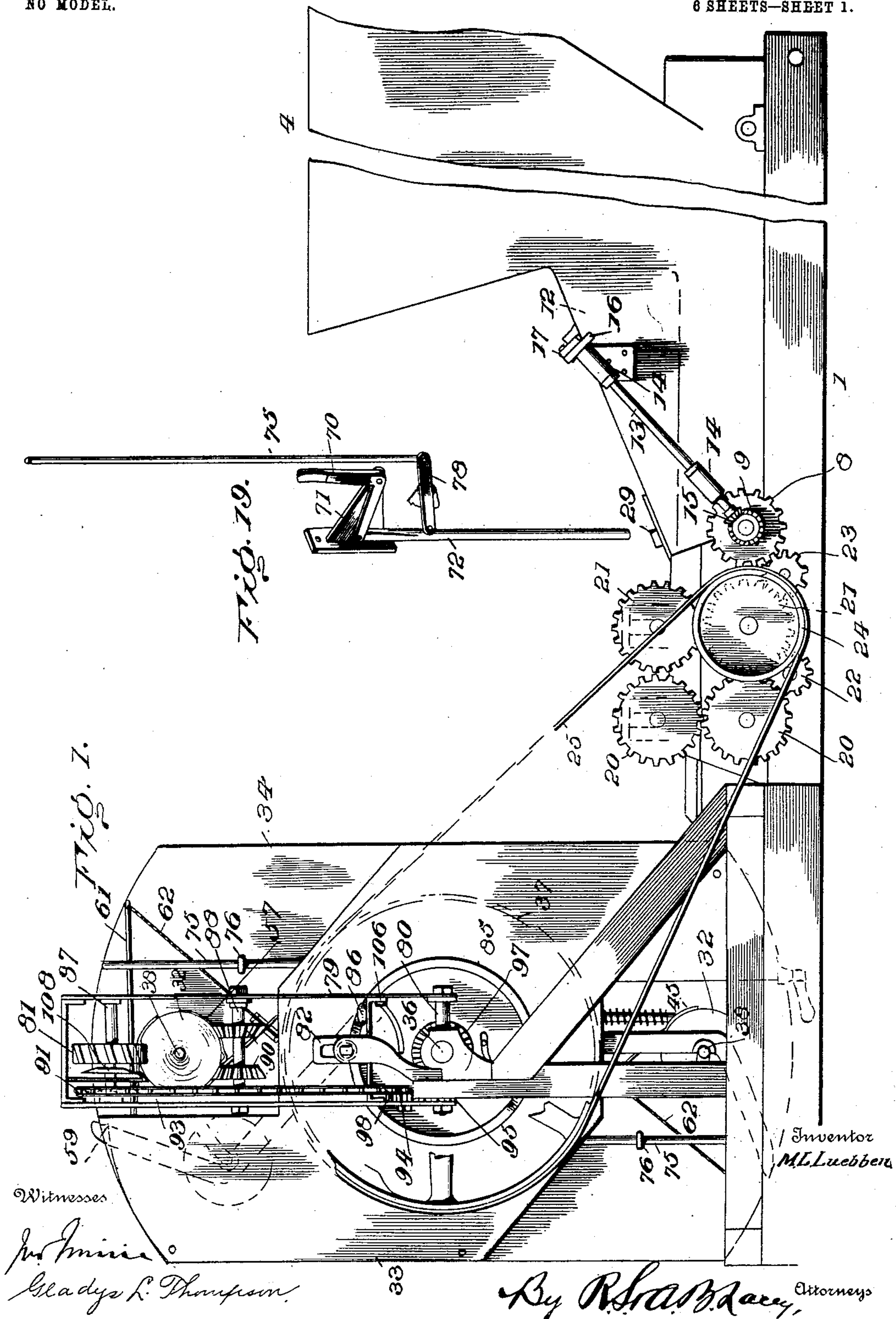
M. L. LUEBBEN.

MACHINE FOR COMPRESSING AND REELING FIBROUS MATERIAL.

APPLICATION FILED MAR. 10, 1903.

NO MODEL.

6 SHEETS—SHEET 1.



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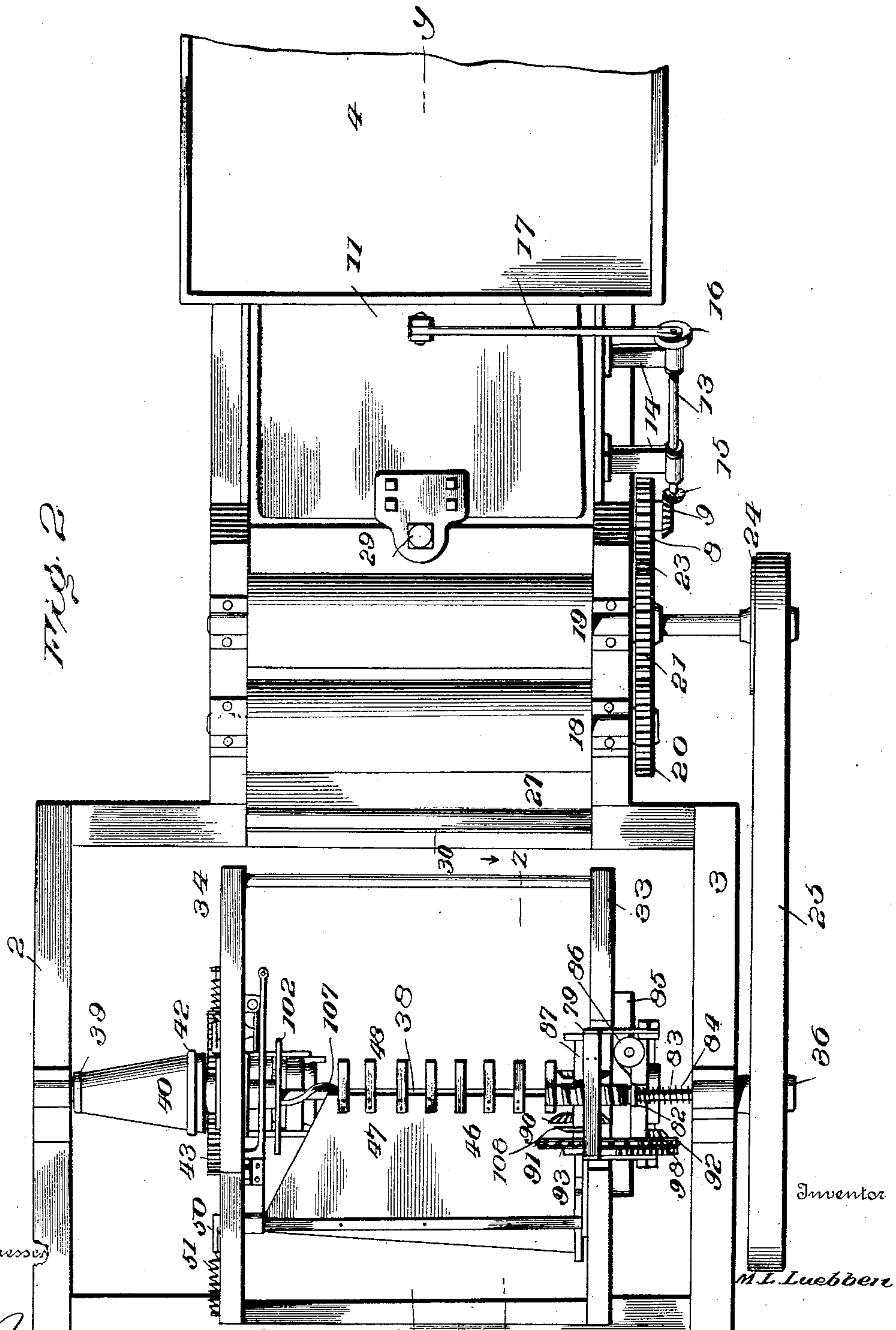
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6 SHEETS—SHEET 2.

Fig. 2



Inventor

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Witnesses

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By M. L. Luebben

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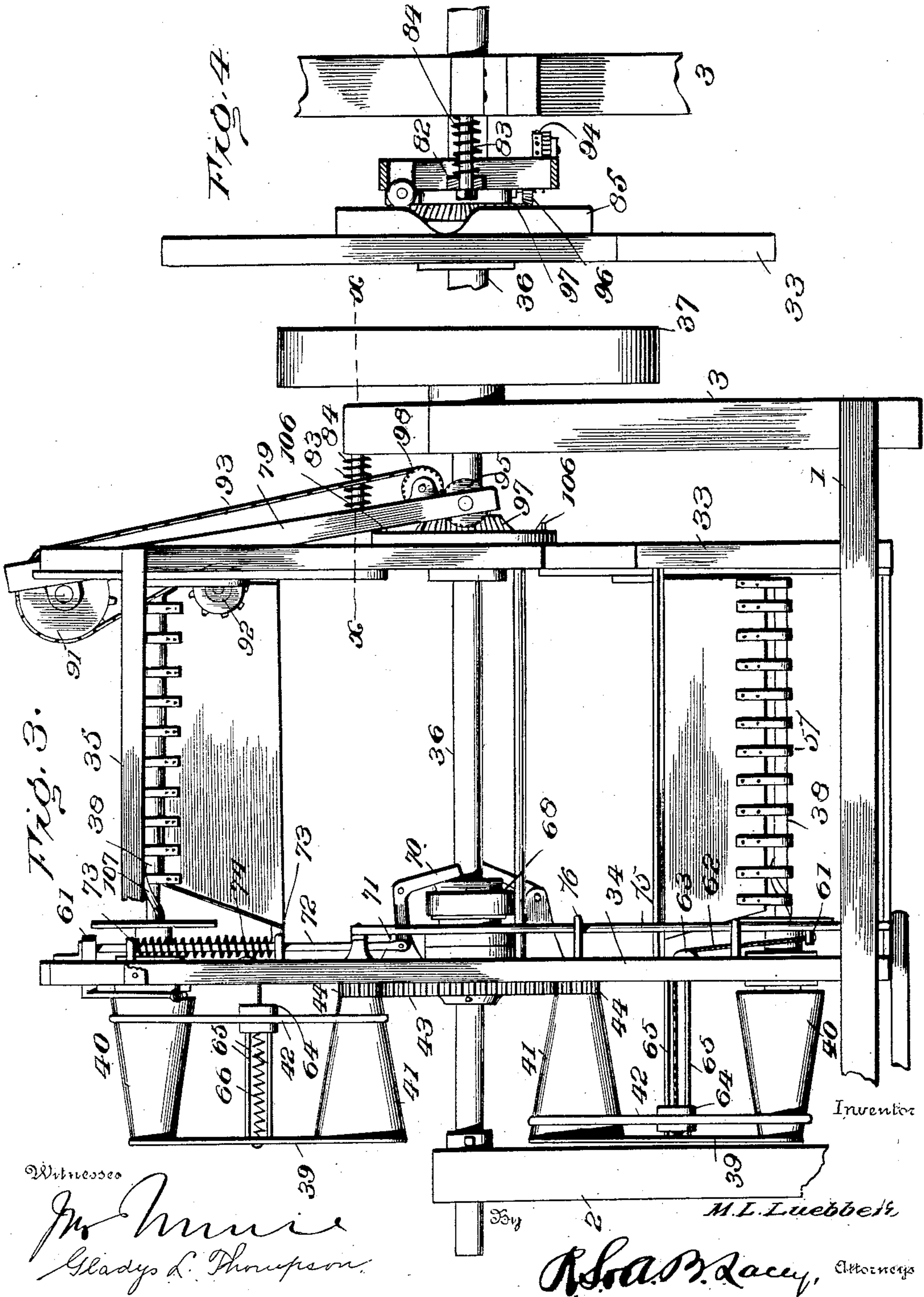
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6 SHEETS—SHEET 4.

FIG. 6

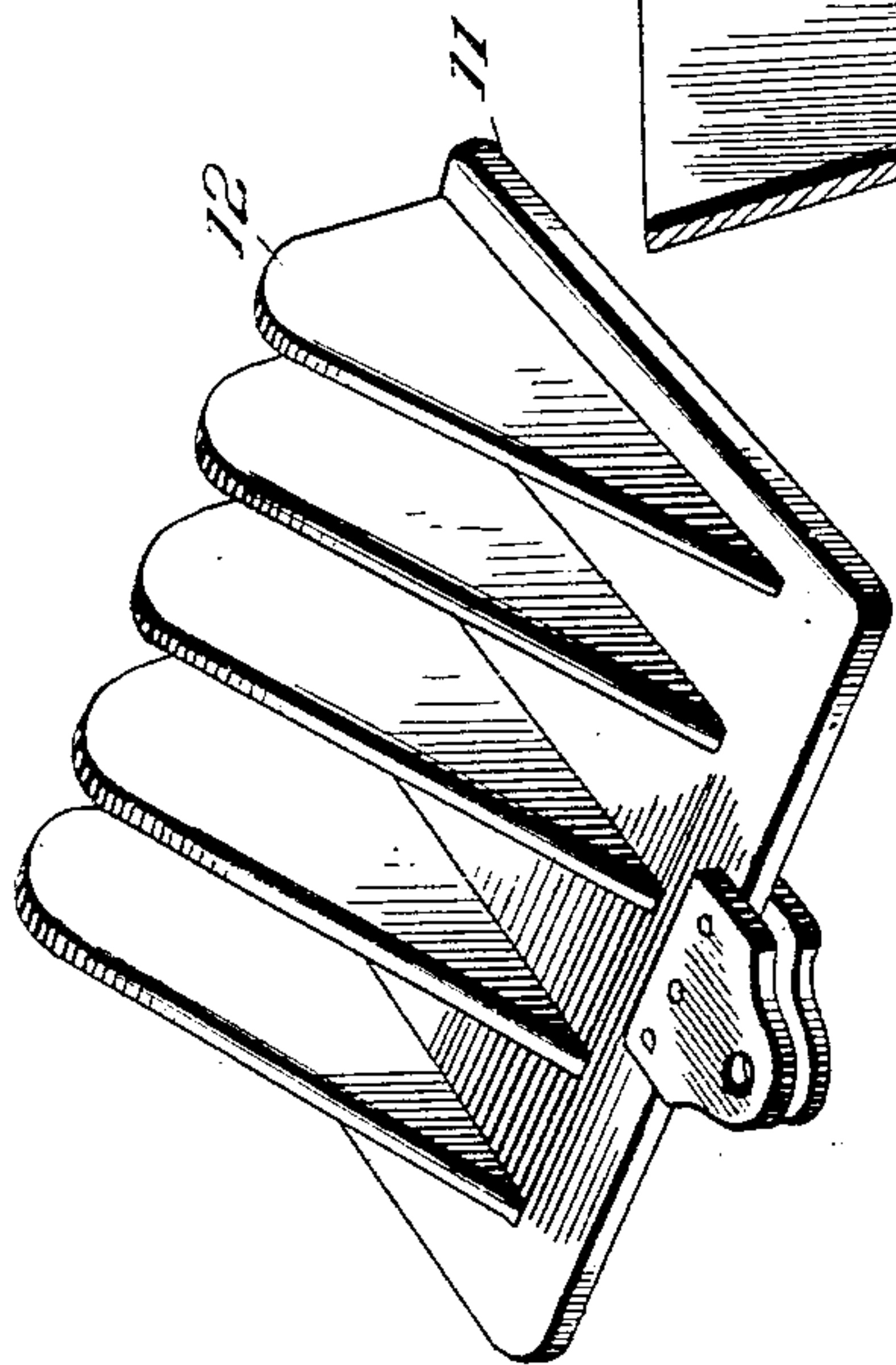
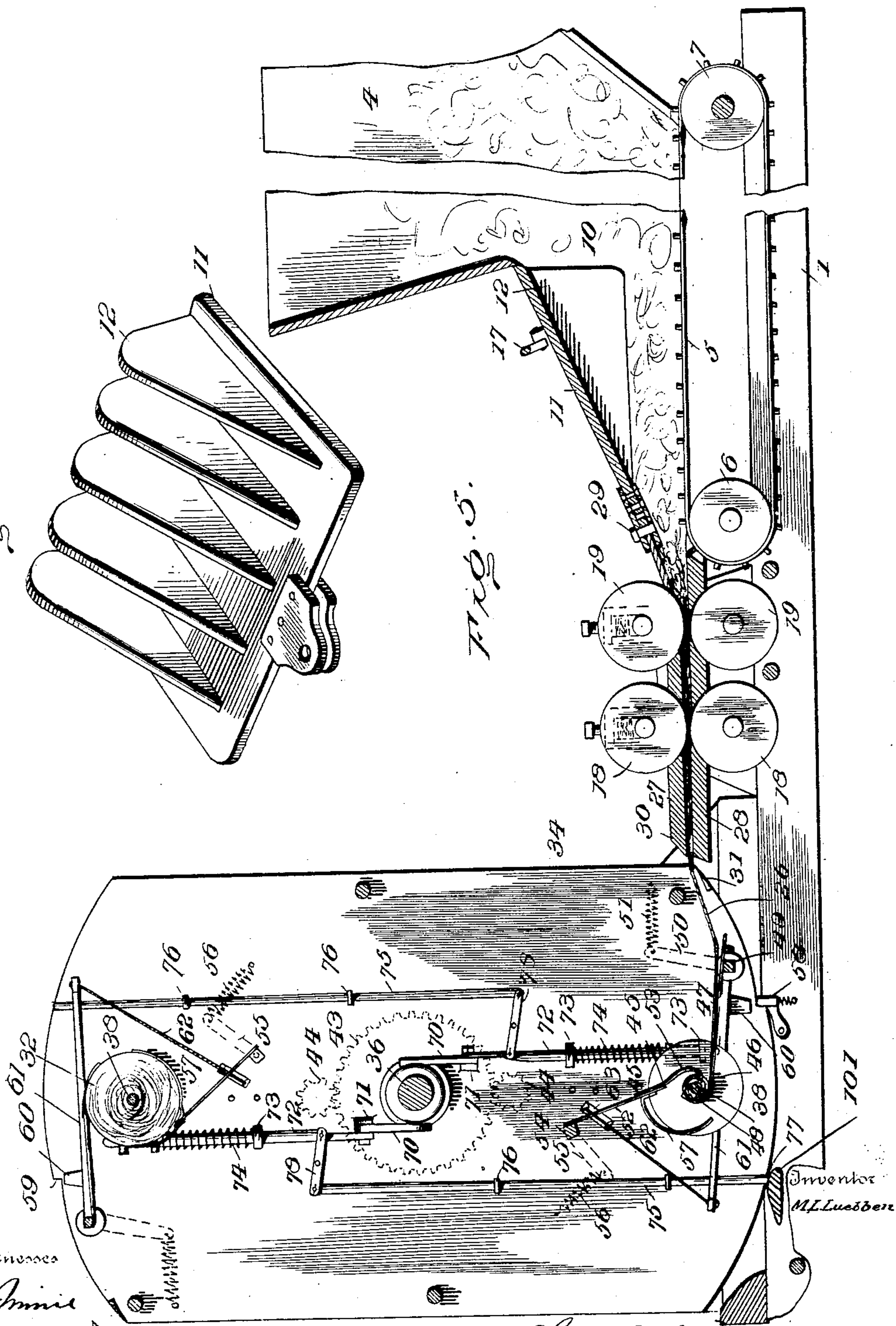


FIG. 5.



Witnesses

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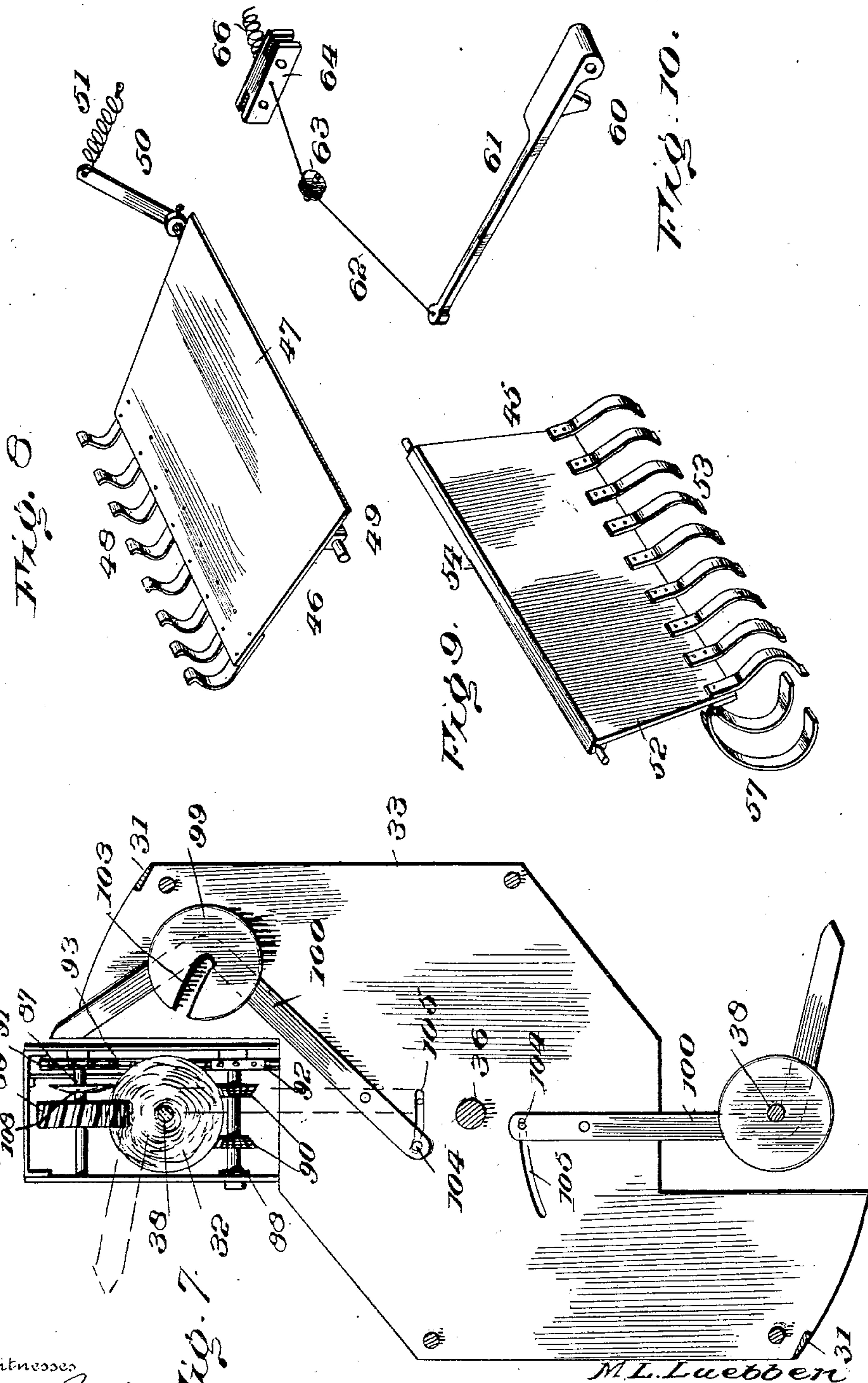
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6 SHEETS—SHEET 5.



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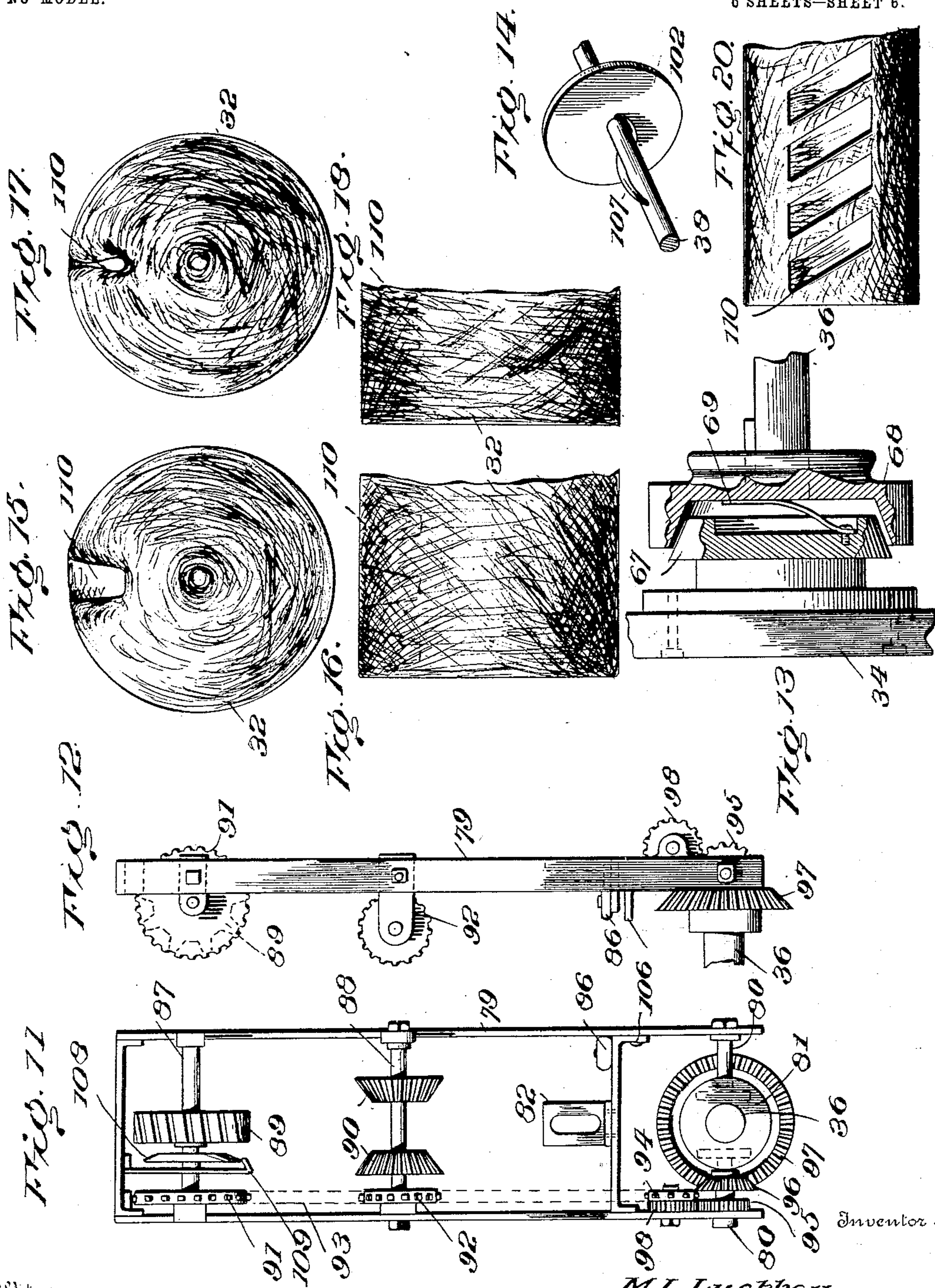
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NO MODEL.

6 SHEETS—SHEET 6.



Witnesses

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UNITED STATES PATENT OFFICE.

MELCHIOR L. LUEBBEN, OF SUTTON, NEBRASKA.

MACHINE FOR COMPRESSING AND REELING FIBROUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 750,672, dated January 26, 1904.

Application filed March 10, 1903. Serial No. 147,140. (No model.)

To all whom it may concern:

Be it known that I, MELCHIOR L. LUEBBEN, a citizen of the United States, residing at Sutton, in the county of Clay and State of Nebraska, have invented certain new and useful Improvements in Machines for Compressing and Reeling Fibrous Material, of which the following is a specification.

The primary purpose of this invention is to devise a novel machine for baling hay, straw, cotton, alfalfa, and other fibrous material and securing the same without the use of a binder, the bale being in the form of a roll and comprising a mat or web of the material rolled upon itself, the loose end portion of the mat being tucked or pressed into the body of the roll for securement.

The machine in its structural organization comprises means for forming the material into a web or mat, mechanism for reeling the mat, tucking mechanism for securing the loose end of the mat when the roll reaches the predetermined diameter, and an ejector for discharging the rolls after being completed. The mat or web forming mechanism comprises rolls, a guide, a feeder, a distributor for uniformly spreading the material upon the feeder, and a hopper for containing the material in bulk. The reel consists of a frame mounted for intermittent rotary motion, one or more spindles journaled to the frame for winding thereon of the mat or web, spring-compressors for closely compacting the turns or winds of the web, operating means for driving the spindles at a differential speed to allow for the increase in diameter of the rolls as the mat is wound, and actuating mechanism for the reel. The ejector comprises a pivoted frame normally held out of the path of the rolls, rotary grippers carried thereby for drawing the rolls from the spindles, and trip mechanism for throwing the ejector into position at the proper time to effect discharge of the rolls or bales.

For a full description of the invention and the merits thereof, and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a baling-machine constructed in accordance with and embodying the essential features of the invention. Fig. 2 is a top plan view thereof. Fig. 3 is a detail view of the reel and ejector, the latter being shown in position for removing the roll from the spindle. Fig. 4 is a sectional detail view about on the line X X of Fig. 3. Fig. 5 is a central longitudinal section about on the line Y Y of Fig. 2. Fig. 6 is a detail perspective view of the distributor or spreader inverted. Fig. 7 is a central detail of the reel about on the line Z Z of Fig. 2, looking in the direction of the arrows, showing the relation of the ejector and the movable support of the topmost spindle pushed aside. Fig. 8 is a perspective view of the outer compressor. Fig. 9 is a perspective view of the inner compressor and bale-holder. Fig. 10 is a detail perspective view of the belt-guide and cooperating parts. Fig. 11 is an elevation of the bale-ejector. Fig. 12 is an edge view of the part shown in Fig. 11. Fig. 13 is a detail view of the clutch between the reel and its supporting-shaft. Fig. 14 is a detail perspective view of the end portion of the spindle provided with the spiral rib. Fig. 15 is an end view of the roll as it appears when discharged from the baling-machine. Fig. 16 is a side view of a portion of the bale as it appears in Fig. 15. Fig. 17 is an end view of the bale after being compressed. Fig. 18 is a side view of a portion of the bale as it appears when compressed. Fig. 19 is a detail perspective view of the means for throwing the clutch of the reel into and out of action. Fig. 20 is a detail view showing the overlapping feature of the indentations securing the loose end portion of the mat.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The framework of the machine for support—

ing the operating parts may be of any design and substantial structure, and, as shown, comprises a base 1 and uprights 2 and 3. A hopper 4 is located at one end of the frame and contains the hay, straw, grass, or other material to be baled. An endless apron or carrier 5 is arranged horizontally beneath the hopper 4 and is adapted to carry the material to the compress mechanism. This apron 5 constitutes a feeder and is mounted at its ends upon rolls 6 and 7, suitably journaled to the side portions of the frame. The journal or shaft of the roll 6 is extended at one end and is provided with a gear-wheel 8 and miter-gear 9. The lower portion of the inner side of the hopper is cut away, as shown at 10, and a plate or board 11 extends from the upper end of the opening 10 at a downward inclination toward the compress mechanism and is provided upon its lower side with a series of wings 12 to make positive engagement with the material and insure equal distribution thereof over the feeder in the operation of the machine, whereby a mat or web of uniform thickness is assured. The plate 10, with the attached wings 12, constitutes a distributor or spreader and receives a lateral vibratory movement, the same being imparted thereto from the miter-gear 9 by means of a shaft 13, journaled in bearings 14 and provided at its lower end with a miter-gear 15 in mesh with the miter-gear 9 and having a crank 16 at its upper end connected by pitmen 17 with the plate 11. The distributor or spreader is located over the inner end portion of the feeder or apron 5 and by reason of its inward and downward inclination gradually compacts the material preliminary to the action of the compress mechanism.

The mechanism for compressing the material consists of two sets of compress-rolls 18 and 19, geared together for positive rotation in the same direction. The upper compress-rolls 18 and 19 of each pair are mounted in yielding bearings and are adjustable to admit of varying the thickness of the mat or web. The journals of the compress-rolls are extended at the same end and are provided with gear-wheels, the gear-wheels 20 of the compress-rolls 18 being in mesh, and the gear-wheels 21 of the compress-rolls 19 being likewise in engagement, and motion being transmitted from the gear-wheels 21 to the gear-wheels 20 by means of the idler 22 and from the gear-wheel 8 to the gear-wheels 21 by means of the idler 23. A band-pulley 24 is applied to an extended journal or shaft of one of the compress-rolls, and motion is taken therefrom to the shaft of the reel by means of the drive-belt 25. The mat or web 26 in its passage to the wheel is caused to travel between the upper and lower plates 27 and 28, constituting a guide which is cut away to admit of the compress-rolls acting upon the material. The distributor or spreader is pivoted

to the receiving end of the guide by means of the bolt 29, and said end of the guide flares, so as to admit of the ready entrance of the material forced into the guide by the combined action of the feeder 5 and compress-rolls. The discharge end of the guide is provided with a stationary cutter 30, which coöperates with a cutter 31 of the reel to sever the mat or web 26 after the roll or bale 32 has reached the predetermined diameter or size.

The reel comprises the heads 33 and 34, transverse connecting-bars 35, and the shaft 36, the latter being mounted in bearings applied to the uprights or standards 2 and 3 of the frame. A band-pulley 37 is secured to one end of the shaft 36, and motion is imparted thereto by means of the drive-belt 25 in the accustomed way. The reel will carry one or more spindles, according to the capacity of the machine, and in the preferable construction two spindles 38 are provided and located at diametrically opposite points, thereby admitting of the discharge of a roll or bale simultaneously with the formation of a bale without loss of time. Each spindle is similarly mounted and provided with coöperating parts. Hence a detailed description of one is sufficient for a clear understanding of both. Each spindle is firmly journaled near one end to the head 34 and is extended and journaled at its outer end in a plate or support 39 and provided with a cone-pulley 40. A companion cone-pulley 41 is journaled to the head 34 and support 39 and reversely arranged with reference to the cone-pulley 40, a drive-belt 42 serving to transmit motion from the pulley 41 to the pulley 40. A gear-wheel 43 is keyed to the shaft 36 of the reel, so as to rotate therewith, and is in mesh with pinions 44, secured to the inner ends of the cone-pulley 41, so as to transmit motion thereto in the operation of the machine. The drive-belts 42 are movable along the cone-pulleys 40 and 41 to admit of driving the spindles 38 at a differential speed proportionate to the increase in the diameter of the rolls in the formation of the bale, whereby the mat or web is wound upon the spindles about at the same rate of speed as delivered from the compress mechanism. The instrumentalities for controlling the movements of the drive-belts will be described more fully hereinafter.

Spring-compressors 45 and 46 coöperate with each of the spindles 38 and are arranged to embrace opposite sides and serve to insure compact winding of the mat or web. The compressor 46 comprises a plate 47 and a series of fingers 48, the latter being curved and the plate being preferably flat. The plate 47 is arranged near the outer portion of the reel tangential to the spindle and is rigidly attached to a bar 49, journaled at its ends in the heads 33 and 34 of the reel. An arm 50 is secured to an end of the bar 49, and a spring 51 connects the outer end of said arm with the head

34 and normally serves to hold the compressor 46 in contact with the spindle or bale being formed thereon. The compressor 45 consists of a plate 52 and a series of curved spring-fingers 53 and is attached to a bar 54, journaled at its ends to the heads of the reel and provided at one end with an arm 55, which is connected by a tension-spring 56 with the head 34. A bale-holder 57 is applied to the compressor 45 and serves, in conjunction with the fingers 53, to support the bale or roll 32 when in position to be discharged, as shown most clearly at the upper left-hand end of Fig. 5.

A catch 58 is provided upon the frame for holding the reel in proper position for forming and discharging the bale and is adapted to engage with a shoulder 59, provided at the edge of the head 34. The catch 58, which is of the spring-actuated variety, is adapted to be tripped at the proper time by means of a projection 60, extended outward from an arm 61, secured to the bar 49, so as to move therewith. As the roll or bale increases in diameter the compressor 47 is moved outward at its inner or free end and causes the bar 49 to turn in its bearings, and the arm 61, being firmly attached to said bar, is correspondingly moved outward at its free end and causes the projection 60 to bear against the catch 58 and disconnect the same from the reel, thereby permitting the latter to make a partial turn, so as to bring the empty spindle in position for winding the web or mat thereon and the full spindle in position for discharging the roll or bale. Simultaneously with the partial rotation of the reel the knife 31 coöperates with the knife 30 and cuts the web or mat, as indicated most clearly in Fig. 5.

The drive-belt 42 is shifted upon the cone-pulleys 40 and 41 by the following means: A cord or like connection 62 is attached at one end to the arm 61 and passes over a guide-pulley 63, journaled in an opening of the head 34, and is attached at its opposite end to a belt-shipper 64, slidably mounted upon the guide-rods 65, extended between the head 34 and support 39 about parallel with the axis of the cone-pulleys. Opposite end portions of the belt-shipper are slotted to receive the runs of the drive-belt 42, which is caused to move with said belt-shipper. A spring 66 connects the belt-shipper 64 with the support 39 or may be otherwise disposed so as to normally hold the belt-shipper at the outer ends of the guide-rods 65. As the inner end of the compressor 46 moves outward under the increasing diameter of the bale or roll the free end of the arm 61 receives a corresponding movement, and pulling upon the cord or flexible connection 62 causes the belt-shipper 64 to move inward toward the head 34, thereby driving the spindle 38 at a gradually slowing speed proportionate to the increase in the diameter of the roll, whereby the mat or web is wound

approximately at a uniform speed and about as fast as delivered from the compressor mat forming mechanism. When the compressor 46 is released from pressure of the bale or roll 32, it moves inward under the action of the spring 51, thereby permitting the cord or flexible connection 62 to become slack, and the spring 66 regaining itself moves the belt-shipper 64 outward and moves the drive-belt to a normal position.

From the foregoing it is obvious that the reel is intermittently operated. The following means have been devised for driving the reel and comprises clutch members 67 and 68, the member 67 being secured to the head 34 of the reel and the member 68 being keyed to the shaft 36 by a feather-and-spline connection and movable thereon toward and from the clutch member 67. A spring 69 is interposed between the clutch members 67 and 68 to normally hold them separated. The reel is loosely mounted upon the shaft 36. Hence the latter normally rotates without imparting movement thereto; but when the clutch member 68 is thrown into contact with the member 67 the reel is caused to turn. The clutch is thrown into action the instant the bale or roll reaches the predetermined diameter and the catch 58 is disengaged from the reel. This result is effected by the following means: A bell-crank lever 70 is journaled to a bracket 71, projected from the inner side of the head 34, and one arm is arranged to bear against the clutch member 68, and the other arm is connected to a bar 72, slidably mounted in bearings 73, applied to the head 34. A spring 74 is mounted upon the bar 72 and exerts an outward pressure thereon and is of greater tension than the spring 69, so as to overcome the same when released and bring the parts of the clutch into engagement. The outer end of the bar 72 is in contact with the arm 61 and is held repressed thereby. When the arm 61 moves outward at its free end, the bar 72 correspondingly moves under the tension of the spring 74 and throws the clutch into engagement, the latter operation being so timed as to take place about at the same instant the catch 58 is disengaged from the reel and the bale reaches the predetermined size. A trip-bar 75 extends in a diametrically opposite direction to the bar 72 and is slidably mounted in guides 76 and projects at its outer end beyond the reel, so as to be engaged by means of a trip 77 and move the bar 75 inward and release the clutch from the action of the spring 74. A lever 78 connects the inner end portions of the bars 72 and 75, whereby they are caused to move simultaneously in opposite directions.

The means for securing the loose end of the web or mat and trimming the same are mounted upon a pivoted frame 79, mounted upon journals 80, extended outward from a collar 81, loosely mounted upon the shaft 36. The frame 79 is provided with a slotted stud 82,

through which passes a pin 83, supporting a coil-spring 84, normally exerting a lateral pressure against the frame 79 to move it inward at its upper or free end. The pressure of the spring 84 is overcome by means of a circular track 85, applied to the outer side of the head 33, a roller 86 being provided on the frame 79 to bear against the track 85 and minimize the frictional contact between the frame and track. The track 85 is cut away or depressed at diametrically opposite points to admit of the roller 86 dropping therein when the spindle carrying the bale or roll reaches the point of discharge, thereby permitting the ejector mechanism coming into play, so as to remove the bale from the spindle and discharge it from the machine. Shafts 87 and 88 are journaled to the frame 79 and are provided with rotary grippers 89 and 90 and sprocket-wheels 91 and 92. A sprocket-chain 93 connects the sprocket-wheel 91 with a sprocket-wheel 94, located near the inner end of the frame and adapted to receive motion from the shaft 36 by means of the gearing 95, 96, and 97, a run or portion of the sprocket-chain being in contact with the sprocket-wheel 92, so as to impart motion to the shaft 88. The gear-wheel 97 is secured to the shaft 36, so as to rotate therewith, and is in mesh with the gear-wheel 96, secured to the gear-wheel 95, so as to rotate therewith, and mounted in line with the pivotal support of the frame 79. A gear-wheel 98, rotatable with the sprocket-gear 94, is in mesh with the gear-wheel 95, so as to receive motion therefrom.

The outer end of the spindle is supported by means of a bearing 99 of disk form applied to an arm 100 of approximately elbow form and pivoted near its inner end to the head 33. The outer member of the pivoted arm 100 projects beyond the edge of the head 33, so as to be struck by a portion of the frame, as indicated at 101, whereby said arm is thrown into normal position during the partial rotation of the reel. The bearing 99 is of disk form and constitutes a head at one end of the spindle and forming therewith a spool, said spindle being provided near its inner end with a companion head 102. The parts 99 and 102 serve to even the end of the roll or bale during the winding of the web or mat. The bearing 99 is formed with a slot 103, which receives the end portion of the spindle. The inner end of the arm 100 is provided with a lateral extension 104, which projects through a curved slot 105 in the head 33 and is adapted to be struck by a projection 106, applied to the frame 79, so as to trip the arm 100 and disengage the bearings 99 from the outer end of the spindle, as indicated most clearly in Fig. 7, thereby permitting the withdrawal of the bale or roll from the spindle. A spiral rib 107 is provided near the inner end of the spindle adjacent to the head 102 and serves the dual purpose of making positive engage-

ment with the end of the mat or web 26 to cause the same to wind upon the spindle and also to assist the ejector in removing the completed roll or bale when discharging the same.

The gripper-rolls 90 are preferably beveled, so as to accommodate, centralize, and prevent lateral displacement of the roll or bale, and are toothed to insure positive withdrawal of the bale from the spindle. The gripper-roll 89 is located opposite the space formed between the gripper-rolls 90 and is toothed for a twofold object—namely, to indent or tuck the loose end portion of the web or mat into the body of the roll or bale and to assist in positive withdrawal of said roll from the spindle. The teeth of the roll 89 are of a shape and length to insure tucking in and positive securing of the outer end of the web.

A cutting mechanism is arranged adjacent to the roll 89 and consists of a rotary cutter 108 and a stationary cutter 109, the purpose being to trim the end portion of the mat or web close to the indentations or tucked-in portions formed by the teeth of the roll 89 in securing the outer end of the web. The trimming operation is simultaneous with the discharge and binding of the bale.

The operation of the machine is as follows: The material to be baled is placed upon the floor and is advanced to the compress mechanism by means of the feeder 5, being spread by the distributor 11. The mat or web 26 is directed to the reel by the guide 27 28 and to the spindle by the outer compressor 46 and is wound thereon to form a bale or roll of predetermined size. As the bale increases in diameter the spring-fingers 48 and 53 of the compressors 46 and 45 yield and accommodate themselves to the circumference of the roll, as indicated most clearly at the upper left-hand end of Fig. 5. When the bale reaches a given size, the catch 58 is tripped to release the reel, and at the same time the clutch 67 68 is thrown into engagement and motion imparted to the reel to carry the completed roll or bale to the uppermost position or point of discharge. As the reel starts to turn the mat or web 26 is cut by the blades 30 31. After the reel has made a half-revolution the bar 75, connected with the bar 72, holding the clutch in engagement, is tripped by coming in contact with the projection 77, thereby throwing the reel out of gear, and at the same instant the catch 58 engages with the other shoulder 59 of the reel and holds the same stationary. Just prior to the stoppage of the reel the projection 106 strikes the extension or pin 104 and trips the arm 100, so as to disengage the bearing 99 from the outer end of the spindle, and an instant thereafter the roller 86 registers with the depression in the track 85 and permits the frame 79 to move at its upper end toward the reel under the action of the spring 34, whereby the gripper-rolls 89 and 90 take hold the bale and strip it from the spindle, the

discharge being assisted by the spiral rib 107, this being due to the fact that the bundle or bale is held stationary by the gripper-rolls, whereas the spindle continues to rotate. As the bale or roll is withdrawn from the spindle it is bound by the loose end portion of the web being tucked into the bale by the teeth of the roll 89, the projecting portion being trimmed by the cutting mechanism. After the roll has been discharged from the machine it will be provided upon one side with a series of indentations 110, as shown most clearly in Figs. 15 and 16. The roll or bale is further compressed longitudinally, so as to close up the indentations and make the bale more dense and compact, as indicated in Figs. 17 and 18. The teeth 89 are diagonally arranged. Hence the indentations 110 overlap at their ends, as shown most clearly in Fig. 20, and insure securance of the loose end of the mat or web throughout the length of the roll or bale. The fingers 57 in addition to forming a support for the bale also serve to guide any broken ends of the mat resulting from imperfect feeding or otherwise to the bale, so as to wind thereon.

Having thus described the invention, what is claimed as new is—

1. A baling-machine comprising a compress mechanism, a feeder for supplying the material thereto, a reel for winding the mat or web formed by the compress mechanism, and a cutting mechanism actuated by the reel to sever the mat or web when the bale or roll reaches a predetermined size, substantially as set forth.

2. In a baling-machine, a compress mechanism for forming the material into a mat or web, a feeder for supplying the material thereto, a reel, a spindle journaled to the frame of the reel and adapted to wind the mat or web thereon, and actuating means for intermittently operating the reel to carry the completed roll or bale to the point of discharge, substantially as described.

3. In a baling-machine, a compress mechanism for forming the material into a web or mat, a feeder for supplying the material thereto, a distributor arranged above the feeder for spreading the material thereon, and means for imparting a lateral vibratory movement to the distributor, substantially as specified.

4. In a baling-machine, a compress mechanism for forming the material into a web or mat, a feeder for supplying the material thereto, and a distributor arranged above the feeder for spreading the material thereon and inclined thereto for gradually compressing the material during its travel to the compress mechanism, substantially as described.

5. In a baling-machine, a compress mechanism for forming the material into a web or mat, a feeder for supplying the material thereto, and a distributor arranged above the feeder for spreading the material thereon and provided with pendent portions upon its lower face, and means for imparting a lateral vibra-

tory movement to said distributor, substantially as specified.

6. In a baling-machine, the combination of compress mechanism for forming the material into a mat or web, a feeder for supplying the material thereto, a distributor located above the feeder and arranged at an upward and forward inclination, wings pendent from the lower side of the distributor, and operating mechanism for imparting a lateral vibratory movement to the distributor, substantially as set forth.

7. In a baling-machine, the combination of a compress mechanism for forming the material into a web or mat, a hopper for receiving the material and having its bottom and inner lower side open, a feeder arranged beneath the hopper for supporting the material and supplying the same to the compress mechanism, and a distributor located above the feeder intermediate of the hopper and compress mechanism and inclined from the upper end of the opening in the inner side of the hopper downwardly toward the compress mechanism, and means for imparting vibratory movement to the distributor, substantially as specified.

8. In a baling-machine, the combination of a compress mechanism for forming the material into a web or mat, a guide for receiving and directing said mat having portions cut away to admit of operation of the compress mechanism therethrough, and a feeder for supplying the material to the guide, substantially as set forth.

9. In a baling-machine, a compress mechanism for forming the material into a mat or web, a guide for receiving and directing the mat and having portions cut away to admit of operation of the compress mechanism, an endless apron having its upper portion about in the plane of the lower side of the guide, and a distributor extended from the upper portion of said guide and inclined away from said apron to form a flaring space therewith for reception of the material and gradually compressing the same on its way to the compress mechanism, substantially as specified.

10. In a baling-machine, and in combination with a compress mechanism for forming the material into a mat or web, a reel, a plurality of spindles applied to the frame of the reel and adapted to wind the web or mat thereon, actuating means for the reel thrown into operation by the bale or roll when it reaches a predetermined size, means for automatically throwing the reel out of gear when an empty spindle is brought into position to receive the web or mat, a catch for holding the reel in proper position, and a trip mechanism for releasing the catch when the roll or bale has reached the given size, substantially as set forth.

11. In a baling-machine, and in combination with the compress mechanism for forming the material into a web or mat, a reel, a series of

spindles applied to the frame of the reel and adapted to wind the mat thereon, actuating means for the reel adapted to be controlled by the roll to automatically throw the reel into gear when said roll reaches a predetermined size, a catch for holding the reel in a given position, a trip controlled by the said roll for automatically releasing the catch, a cutter mechanism actuated by the reel to sever the mat or web, and means for automatically throwing the reel out of gear when the empty spindle next in order reaches a position to receive the mat, substantially as set forth.

12. In a baling-machine, and in combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon into a roll, and actuating means for rotating the spindle at a differential speed and controlled by the increase in diameter of the size of the roll, whereby the mat is wound approximately at a uniform speed corresponding to the speed of production of the mat by the compress mechanism, substantially as set forth.

13. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, actuating means for said spindle comprising a pair of oppositely-disposed cone-pulleys and a connecting-belt, a belt-shipper, and means for moving the belt upon the cone-pulleys and controlled by the increase in the diameter of the roll, whereby the spindle is driven at a gradually-slowng speed to admit of an approximately uniform winding of the mat, substantially as set forth.

14. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, actuating means for said spindle comprising a pair of oppositely-disposed cone-pulleys and a connecting-belt, a belt-shipper, a spring for normally holding the belt-shipper in a given position, and means for moving the belt-shipper against the tension of said spring and controlled by the increase in diameter of the roll for driving the spindle at a gradually-slowng speed, substantially as set forth.

15. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, a spring-actuated bar and a compressor attached to and carried by said spring-actuated bar and cooperating with the spindle to insure compact winding of the mat thereon, substantially as set forth.

16. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, and a compressor cooperating with the spindle to insure compact winding of the mat thereon and comprising a plurality of spring-fingers arranged for direct

contact with the roll, substantially as described.

17. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, a compressor cooperating with the spindle to insure compact winding of the mat thereon and comprising a plate for directing the mat to the spindle, and a plurality of spring-fingers for direct engagement with the roll, substantially as set forth.

18. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, spring-actuated bars arranged upon opposite sides of the spindle, a compressor attached to and carried by each of said spring-actuated bars and arranged to operate upon opposite sides of the spindle to insure compact winding of the mat thereon, substantially as set forth.

19. In a baling-machine, the combination with the compress mechanism for forming the material into a web or mat, a spindle for winding said mat thereon, a compressor arranged for cooperation with the spindle to insure compact winding of the mat thereon, and a holder carried by said compressor for cooperation therewith to support the roll, substantially as described.

20. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat, a reel, a spindle applied to the frame of the reel and adapted to wind the mat thereon, a cutting mechanism operated by the reel for severing the mat after the bale has reached the required size, a catch for holding the reel in proper position, a compressor applied to the reel and cooperating with the spindle and actuated by the increasing size of the roll, and an arm connected with said compressor and adapted to trip the catch and release the reel, substantially as set forth.

21. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, a reel, a spindle applied to the frame of the reel and adapted to wind the mat thereon, a cutting mechanism operated by the reel for severing the mat after the bale has reached the required size, a catch for holding the reel in proper position, a compressor applied to the reel and cooperating with the spindle and actuated by the increasing size of the roll, an arm connected with said compressor and adapted to trip the catch and release the reel, operating mechanism for the spindle and comprising a movable element for varying the speed, and a connection between said movable element and the arm connected with the compressor, substantially as set forth.

22. In a baling-machine, and in combination with the compress mechanism for forming the

material into a mat or web, a reel, a spindle applied to the frame of the reel and adapted to wind the mat thereon, a cutting mechanism operated by the reel for severing the mat
 5 after the bale has reached the required size, a catch for holding the reel in proper position, a compressor applied to the reel and coöperating with the spindle and actuated by the increasing size of the roll, an arm connected with
 10 said compressor and adapted to trip the catch and release the reel, actuating mechanism for the reel embodying a clutch normally unshipped, and means for throwing said clutch into engagement and held in restraint by the
 15 arm connected with said compressor and movable therewith to admit of shipping of the clutch the instant the reel is tripped, substantially as set forth.

23. In a baling-machine, and in combination
 20 with the compress mechanism for forming the material into a mat or web, a reel, a spindle applied to the frame of the reel and adapted to wind the mat thereon, a cutting mechanism operated by the reel for severing the mat
 25 after the bale has reached the required size, a catch for holding the reel in proper position, a compressor applied to the reel and coöperating with the spindle and actuated by the increasing size of the roll, an arm connected
 30 with said compressor and adapted to trip the catch and release the reel, operating mechanism for the spindle and comprising a movable element for varying the speed, a connection between said movable element and the arm
 35 connected with the compressor, actuating mechanism for the reel embodying a clutch normally unshipped, and means for throwing said clutch into engagement and held in restraint by the arm connected with said compressor and movable therewith to admit of
 40 shipping of the clutch the instant the reel is tripped, substantially as set forth.

24. In a baling-machine, and in combination
 45 with the compress mechanism for forming the material into a mat or web, a reel, a spindle applied to the frame of the reel and adapted to wind the mat thereon, a cutting mechanism operated by the reel for severing the mat
 50 after the bale has reached the required size, a catch for holding the reel in proper position, a compressor applied to the reel and coöperating with the spindle and actuated by the increasing size of the roll, an arm connected with
 55 said compressor and adapted to trip the catch and release the reel, actuating mechanism for the reel embodying a clutch normally unshipped, means for throwing said clutch into engagement and held in restraint by the arm connected with said compressor and movable
 60 therewith to admit of shipping of the clutch the instant the reel is tripped, a bar carried by the reel, and a trip for operating said bar to throw the clutch-operating mechanism out of action, thereby permitting the automatic

unshipping of the reel, substantially as specified. 65

25. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, a reel comprising
 70 a frame, a shaft having said frame loosely mounted thereon, means for imparting continuous rotary movement to said shaft, a clutch between the frame of the reel and said shaft and normally held out of action, spindles journaled to the frame of the reel, gearing
 75 between said spindles and shaft for imparting continuous movement thereto, a catch for holding the reel in a given position, a trip mechanism coöperating with each spindle for releasing the catch when the roll reaches a
 80 predetermined size, and a second trip mechanism controlled by the first-mentioned trip mechanism to throw the reel in gear, substantially as set forth.

26. In a baling-machine, and in combination
 85 with the compress mechanism for forming the material into a mat or web, a reel comprising a frame, a shaft having said frame loosely mounted thereon, means for imparting continuous rotary movement to said shaft, a
 90 clutch between the frame of the reel and said shaft and normally held out of action, spindles journaled to the frame of the reel, gearing between said spindles and shaft for imparting continuous movement thereto, a catch
 95 for holding the reel in a given position, a trip mechanism coöperating with each spindle for releasing the catch when the roll reaches a predetermined size, a spring-actuated bar normally tending to throw the reel in gear and
 100 held in restraint by the said trip mechanism, and a bar extended in an opposite direction to the trip-bar and connected therewith for throwing it out of operative position when the reel has completed the movement necessary to
 105 bring the empty spindle next in order in position for reception of the web, substantially as set forth.

27. In a baling-machine, and in combination
 110 with the compress mechanism for forming the material into a mat or web, a reel comprising oppositely-disposed heads, spindles journaled between said heads and adapted to have the mat wind thereon, a movable bearing for the
 115 outer end of each of the spindles normally supporting the same, and means for pushing said movable bearing aside to admit of stripping the roll from the spindles, substantially as set forth.

28. In a baling-machine, and in combination
 120 with the compress mechanism for forming the material into a mat or web, a reel comprising oppositely-disposed heads, spindles journaled between said heads and adapted to have the mat wind thereon and provided at one end with
 125 heads, a bearing for the opposite end of each of the spindles and constituting a head to assist in evening the winds of the mat, and means

for pushing the movable bearing aside to admit of removal of the rolls from the spindle, substantially as set forth.

29. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, a reel comprising oppositely-disposed heads, spindles journaled between said heads and adapted to have the mat wind thereon, arms pivoted to the head of the reel adjacent to the free ends of the spindles, slotted bearings applied to said arms to normally receive an end of the spindles, an extension projected laterally from each of the pivoted arms for coöperation with a trip to move said arms and bearings out of the path of the bales, and means for throwing the bearings into position after the bales have been discharged, substantially as specified.

30. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, and an ejector normally held out of the path of the reel to admit of its turning and adapted to automatically take hold of the bales and discharge the same, substantially as set forth.

31. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, an ejector for discharging the bales from the reel, means for normally tending to throw the ejector into working position, and a track applied to the reel for holding the ejector out of the path of the reel when in motion and provided with depressions positioned with reference to the spindles to admit of the ejector automatically coming into play for discharging the bales, substantially as set forth.

32. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, an ejector for automatically discharging the bales, the same comprising coöperating gripper-rolls, substantially as set forth.

33. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted

to have the mat wind thereon, an ejector for automatically discharging the bales, the same comprising sets of gripper-rolls, one set comprising a pair beveled to centralize and properly position the bales, substantially as described.

34. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, an ejector for automatically discharging the bales, the same comprising toothed gripper-rolls to make positive engagement with the bales, substantially as specified.

35. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, an ejector for effecting an automatic discharge of the bales, and comprising a toothed wheel for tucking in the loose end portion of the mat to confine and secure the same, substantially as described.

36. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, an ejector for automatically effecting a discharge of the bales, and a cutting mechanism for trimming the end portion of the mat simultaneously with the operation of the ejector, substantially as specified.

37. In a baling-machine, and in combination with the compress mechanism for forming the material into a mat or web, an intermittently-operated reel provided with spindles adapted to have the mat wind thereon, an ejector for effecting an automatic discharge of the bales and comprising a toothed wheel for tucking in the loose end portion of the mat for confining or securing the same, and a cutting mechanism for trimming the loose end of the mat simultaneously with the operation of said toothed wheel, substantially as set forth.

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

MELCHIOR L. LUEBBEN. [L. s.]

Witnesses:

E. E. CULVER,
THEO. MILLER.