F. L. TAYLOR.

WINDING AND MEASURING MACHINE.

APPLICATION FILED DEC. 19, 1910.

1,013,461.

Patented Jan. 2, 1912.

4 SHEETS—SHEET 1.

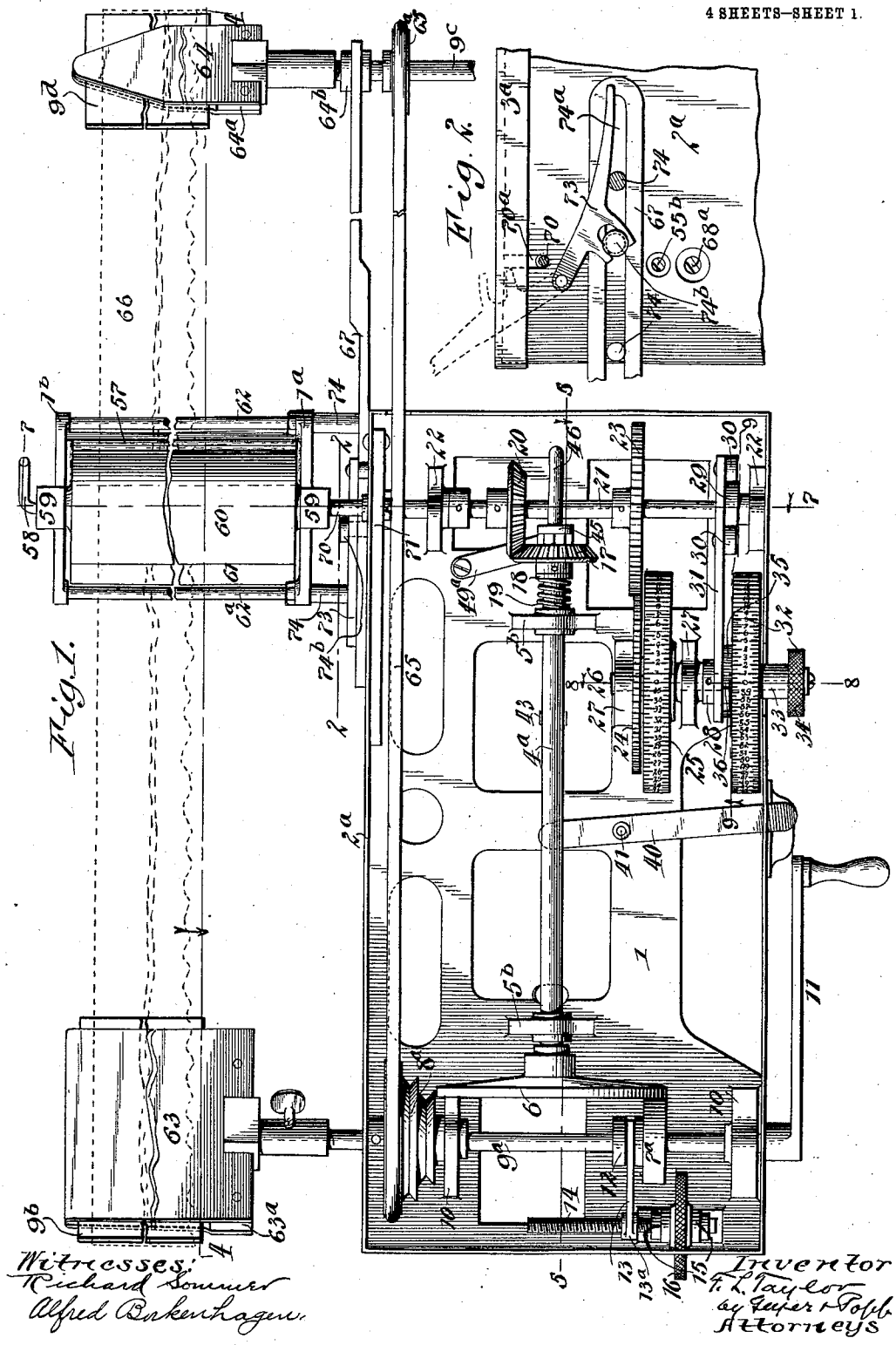

Fig. 1.

Fig. 2.

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4 SHEETS—SHEET 2.

Fig. 3.

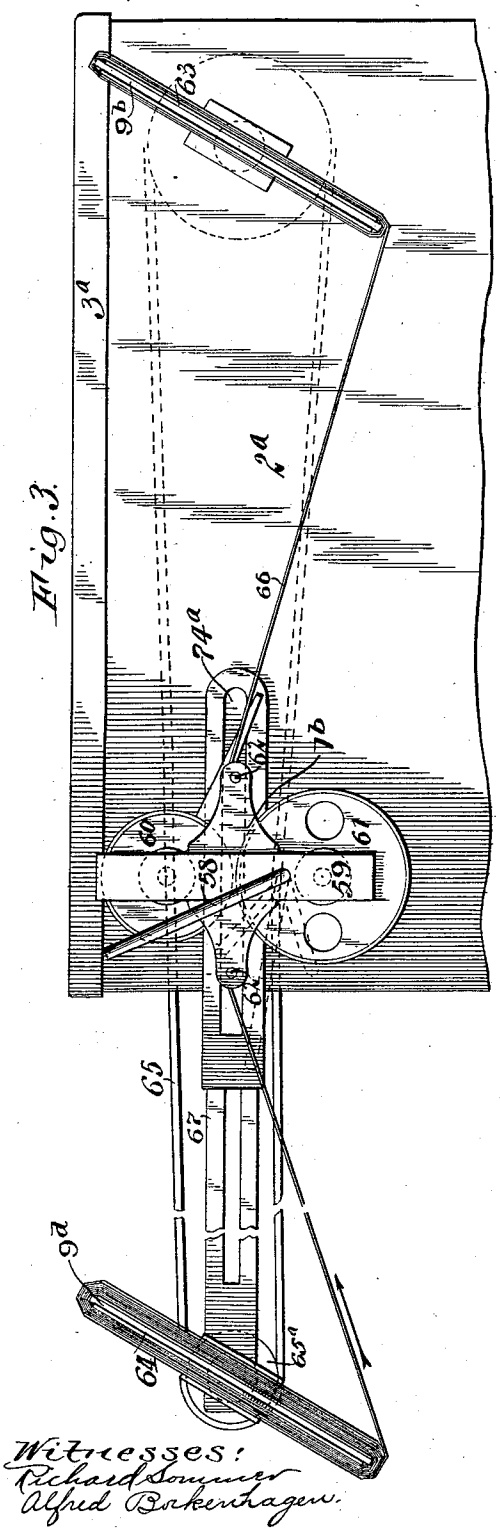
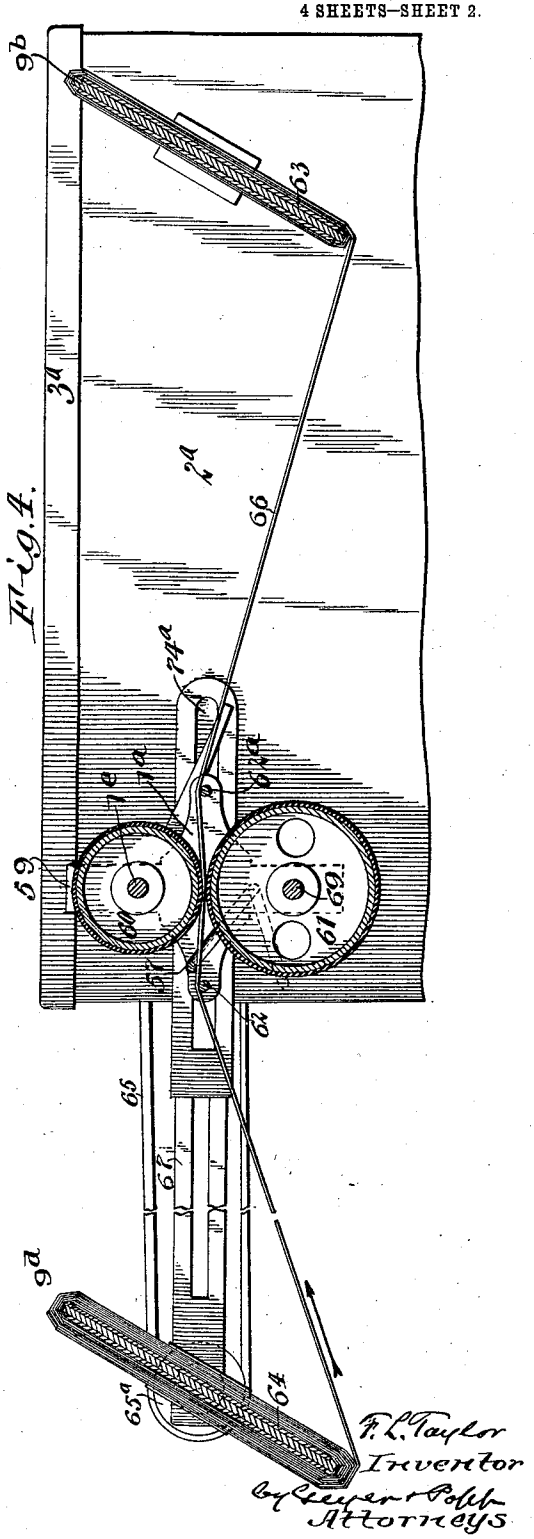


Fig. 4.



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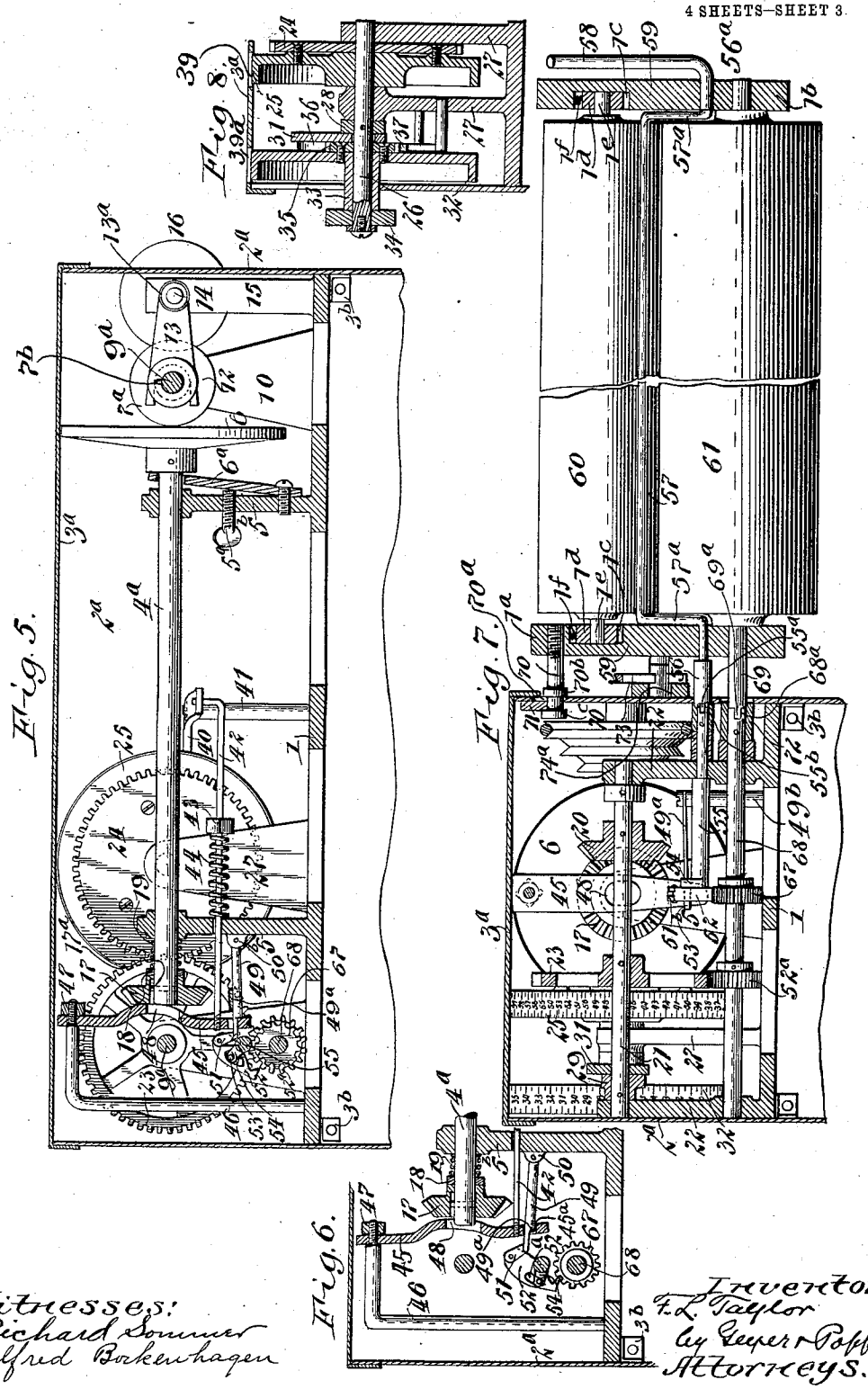

Fig. 5.

Fig. 7.

Fig. 8.

Fig. 6.

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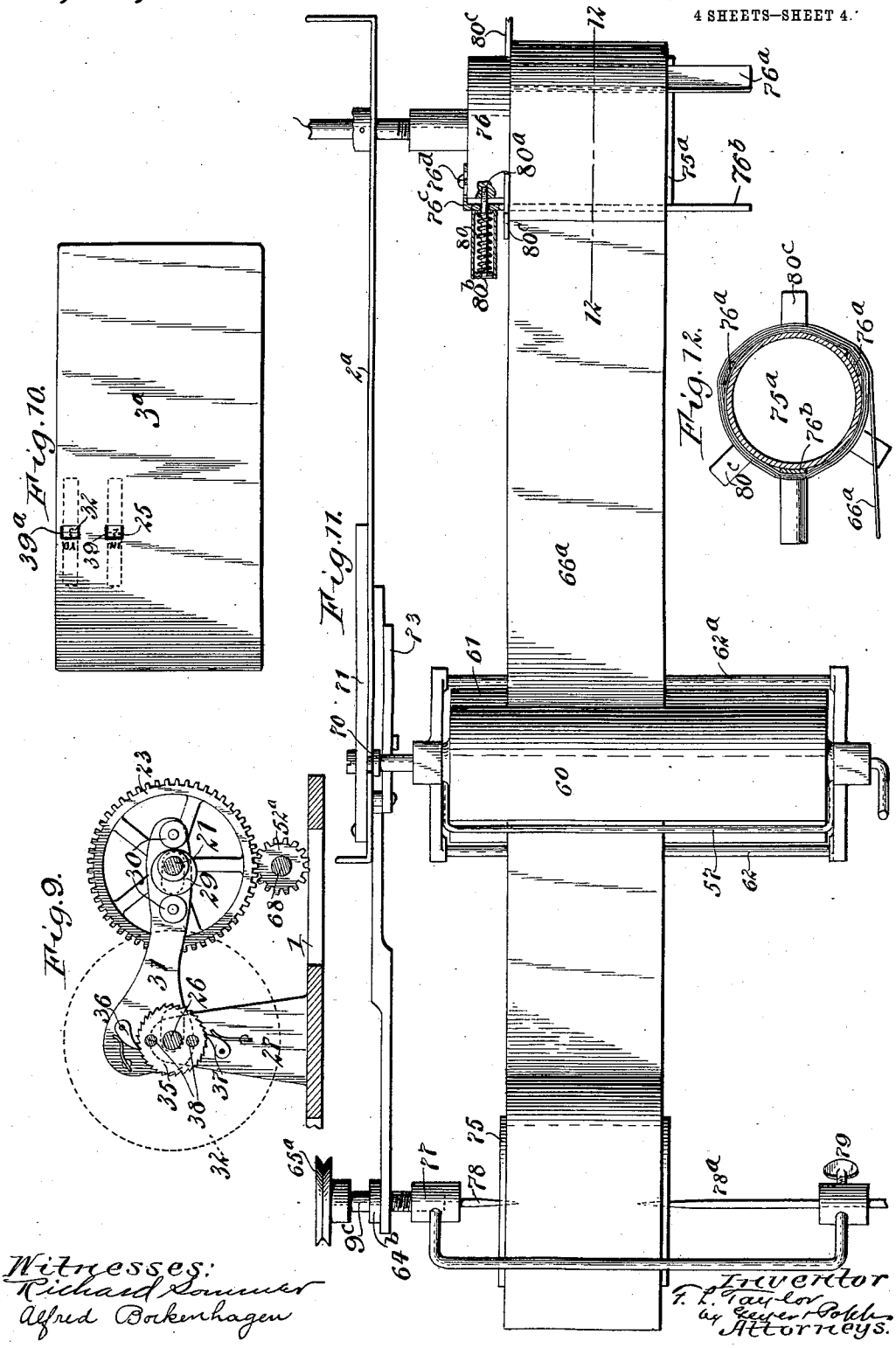
4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

FRANK L. TAYLOR, OF RUSHFORD, NEW YORK.

WINDING AND MEASURING MACHINE.

1,013,461. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed December 19, 1910. Serial No. 598,203.

To all whom it may concern:

Be it known that I, FRANK L. TAYLOR, a citizen of the United States, residing at Rushford, in the county of Allegany and State of New York, have invented new and useful Improvements in Winding and Measuring Machines, of which the following is a specification.

This invention relates to a machine for measuring and winding lace, ribbon, cloth and other like material which is usually sold by the yard, and is designed more particularly to lessen the labor and reduce the time usually required for taking an inventory of such materials and for improving the appearance of the stock in a store.

It is the object of this invention to provide a machine of this character which will effect accurate measurement of the materials operated upon and register the number of yards and inches in each piece of goods, which can be readily operated without any special experience, which occupies comparatively little space, which will expeditiously unwind, measure and rewind yard goods which vary considerably in width, which will not strain or injure delicate fabrics, which will readily transfer materials from one card, core or spool to another card, core or spool when measurement is not required and also transfer goods from a flat fold to a board or card, which will measure ribbons wound on a core or spool with a separating web or strip of paper between the convolutions thereof and neatly replace the same on another core, which is strong and durable and not liable to get out of order when subjected to ordinary usage, and which can be produced at comparatively low cost.

In the accompanying drawings consisting of 4 sheets: Figure 1 is a top plan view of my improved winding and measuring machine, the cover of the same being removed for the purpose of exposing the mechanism which is concealed within the inclosing casing thereof. Fig. 2 is a fragmentary rear elevation of the machine, partly in section, and showing the means for adjusting the two reels or holders with reference to each other. Fig. 3 is a rear elevation of the machine. Figs. 4 and 5 are vertical longitudinal sections in lines 4—4 and 5—5, Fig. 1, respectively. Fig. 6 is a fragmentary vertical longitudinal section corresponding to part of Fig. 5 but showing the parts in a different position. Figs. 7 and 8 are vertical cross sections in the correspondingly numbered lines in Fig. 1. Fig. 9 is a vertical longitudinal section in the correspondingly numbered lines in Fig. 1. Fig. 10 is a top plan view, on a reduced scale, of the casing which incloses part of the mechanism and showing the location of the observation openings of the indicator wheels. Fig. 11 is a fragmentary top plan view, partly in section, showing the means which are employed in the machine when measuring ribbon or similar material which is wound upon cylindrical cores or spools. Fig. 12 is a fragmentary vertical longitudinal section in line 12—12, Fig. 11.

Similar letters of reference indicate corresponding parts throughout the several views.

Referring to Figs. 1–10, 1 represents the bed plate of the main frame of the machine which is preferably provided with an inclosing casing the body walls 2^a which are permanently attached to the bed plate while the cover 3^a is removably applied to the top of the body to permit of easy access to those parts of the machine which are arranged within the casing for convenience of inspection, adjustment or repairing. At one end of the frame, preferably the left hand end the same is provided with bearings 10 in which is journaled the main driving or winding up shaft 9^a which is arranged transversely and horizontally and extends through the adjacent parts of the front and rear walls of the casing body. This driving shaft may be rotated by a prime motor of any suitable construction but it is preferable to operate the same manually and for that reason the front end of the same is provided with a hand crank 11.

At its rear end the main driving shaft is provided with a receiving holder or reel which is adapted to receive a card or board 9^b upon which the ribbon, lace or like material 66 is to be wound. In its preferred form and as shown in Figs. 1, 3 and 4, this holder comprises a head 63^a secured to the rear end of the driving shaft and two parallel spring plates or jaws 63 which project rearwardly from the head and are adapted to receive the winding up card or board 9^b between the same. The relative arrangement of these jaws is such that the same are sprung apart slightly as the winding up card is slipped between the same whereby

the card is held in place by friction. Any other suitable form of holder may, however, be employed if desired.

Adjacent to the right hand end of the frame is arranged a horizontal transverse unwinding shaft 9^c which is provided at its rear end with a holder or reel similar to that on the driving or winding up shaft for the purpose of supporting the card or board 9^d from which the lace or other yard goods are to be unwound preparatory to measuring or rewinding the same. This unwinding holder comprises a head 64^a secured to the rear end of the unwinding shaft and two spring plates or jaws 64 projecting rearwardly from the head 64^a and adapted to clamp frictionally against opposite sides of the card or board which is slipped between them. The rear or outer ends of the jaws of the unwinding holder are preferably tapered rearwardly or outwardly so as to facilitate the insertion of these jaws between opposite sides of the supporting card and the goods wound thereon. The unwinding shaft is journaled in a bearing 64^b which is preferably mounted adjustably with reference to the bearings of the driving shaft so that the distance between these two shafts can be varied to suit the dimensions of the cards upon which the goods are mounted and to the driving mechanism associated therewith. The means for effecting this adjustment of the driving shaft and unwinding shaft relatively to each other preferably comprise a horizontally movable slide 67 carrying the bearing 64^b and mounted on the rear wall of the casing by means of pins 74 arranged on this wall and working in a horizontal longitudinal slot 74^a in the slide, and a clamping lever 73 pivoted on the rear wall to swing vertically toward and from the rear side of said slide. Upon raising the clamping lever 73 to the position shown by dotted lines in Fig. 2 the slide 67 may be freely moved horizontally lengthwise of the machine for bringing the unwinding shaft to the desired position. After such adjustment has been effected the clamping lever 73 is swung downwardly and a wedge shaped fork 73^a thereon passes between the rear or outer side of the slide 67 and the head 74^b of a pin secured to the casing and projecting through the slot 74^a of the slide.

Any suitable means may be provided for causing the unwinding shaft and the winding-up shaft to be turned in the proper direction for causing the material on the holder or reel of the unwinding shaft to be unwound therefrom and the material to be wound up on the holder of the winding-up shaft. The means, however, which are shown in the drawings are preferred and the same are so constructed that a differential in the rotary movement of the unwinding shaft and winding-up shaft may be produced for the purpose of adapting the movement of these shafts to bolts of material or cards varying in size. For this purpose a belt 65 is employed which passes at one of its turns around a cone pulley 8^a on the winding up shaft and at its other turn around a plain pulley 65^a on the unwinding shaft. By shifting the belt from one part or section of the cone pulley to another the speed of the unwinding shaft may be varied relatively to the winding up shaft. When such an adjustment is made the bearing 64^b of the unwinding shaft is adjusted lengthwise on the frame of the machine accordingly. By this means lace or other materials can be transferred from small cards to larger ones for the purpose of securing uniformity in stock keeping.

As the material passes from the unwinding reel or holder to the winding-up reel or holder the same is measured as to length by a measuring device which is preferably constructed as follows: 61 represents a lower measuring roller which is arranged horizontally and transversely in rear of the main frame between the delivery and receiving reels and over the upper sides of which the stretch of material to be measured passes on its way from the delivery reel to receiving reel. The material is held frictionally in engagement with the upper side of the measuring roller by means of an upper presser roller 60 arranged above the measuring roller and parallel therewith and resting against the upper side of the material. The peripheries of the measuring and presser rollers are preferably provided with a facing or coating of rubber or similar material, as shown in Fig. 4, so as to provide an elastic bearing or engagement of these rollers with the material, thereby avoiding injury to the material and also preventing the same from slipping between these rollers, whereby absolute accuracy in the measurement of the same is insured. The measuring roller is driven by a mechanism which comprises a sectional driven shaft the front section 68 of which is journaled in bearings 22 on the main frame and is operatively connected with the driving shaft 9^a while the rear section 69 which carries the measuring roller is mounted on a rearward extension of the main frame and is detachably connected with the front shaft section by means of a flat side coupling shank 69^a arranged at the front end of the rear shaft section and engaging with a transverse slot 68^a in the rear end of the front shaft section, as shown in Fig. 7. This frame extension is detachably connected with the main part of the frame and supports the measuring and presser rollers and other parts to be hereinafter described for the purpose of enabling the machine to be compacted or folded for storage or transporta-

tion. The preferred form of this detachable frame extension which is shown in the drawings comprises a front end piece 1^a resting against the guide pins 74, a rear end piece 1^b, and two rods or bars 62, 62^a arranged parallel on opposite sides of the measuring and pressing rollers in line with the bite of the same and connected at their corresponding ends to the front and rear end pieces. The lower parts of the end pieces are provided with bearings in which the rear section 69 of the sectional or driven shaft is journaled and the upper parts of these end pieces are provided with upright grooves or guideways 1^c which receive vertically movable bearing blocks or slides 1^d in which opposite ends of the shaft 1^e of the presser roller 60 are journaled. This presser roller may rest upon the material solely by gravity to enable the same to adapt itself to any variation in the thickness of the material but if desired the weight of this roller and connecting parts may be supplemented by the action of the springs 1^f interposed between the upper ends of the bearing blocks and the upper ends of the guideways, as shown in Fig. 7 or the springs may be otherwise applied for accomplishing this purpose. The material to be measured is preferably passed over the connecting bars 62, 62^a on the receiving and delivery sides of the measuring and presser rollers, as shown in Fig. 4.

The detachable connection between the frame extension and the main frame which is shown in the drawings in Figs. 1 and 7 preferably comprises a connecting or locking shank or rod 70 projecting forwardly from the upper part of the front end piece through a vertical slot 70^a in the upper edge of the rear wall of the casing, a rear collar 70^b arranged on the coupling rod 70 and forming a shoulder which bears against the rear side of the rear wall, a front collar 70^c arranged on the rod 70 in front of the inner side of the rear wall, and a locking lever or catch 71 pivoted on the inner side of the rear wall to swing vertically and adapted to engage with the shoulder on the rear side of the front collar 70^c for the purpose of locking the rod 70 on the rear wall of the casing. When it is desired to detach the frame extension together with the parts carried thereby from the main frame and associated parts the cover 3^a is removed, the locking lever 71 is swung upwardly out of engagement from the front collar 70^c, then the lower part of the frame extension is moved rearwardly for disengaging the rear shaft section 69 from the front shaft section 68, and then the coupling rod 70 is lifted from the slot 70^a in the rear wall of the casing, thereby effecting this disconnection. The parts when detached, together with other loose parts of the machine, may be placed in the lower part of the case below the bed plate.

The mechanism shown in the drawings for transmitting motion from the driving shaft 9^a to the driven shaft 68, 69 of the measuring roller comprises a longitudinal intermediate shaft 4^a journaled in suitable bearings 5^b on the bed plate of the main frame and provided at its front end with a friction wheel 6 which is engaged on its face by a friction pinion 7^a on the driving shaft, and a transverse intermediate shaft 21 journaled on the bearings 22 of the main frame and provided with a bevel gear wheel 20 which meshes with a bevel gear wheel 17 on the rear end of the longitudinal intermediate shaft and also provided with a gear wheel 23 which meshes with a gear pinion 52^a on the front section of the driven shaft 68, 69. The friction pinion 7^a is capable of adjustment lengthwise on its shaft and radially with reference to the friction wheel so as to permit of varying the speed at which the measuring roller is driven relatively to the speed of the delivery and receiving reels, thereby enabling the required slack to be produced in the material between the measuring roller and the delivery and receiving wheels to avoid any strain on the material. This is particularly desirable when measuring laces or other delicate materials which must be operated upon without subjecting them to strains, otherwise they are liable to be torn or distorted and thus involve either loss of the goods or a reduction in their value. This adjustment of the friction pinion relatively to the friction wheel may be effected by various means but those means which are shown in Figs. 1 and 5 of the drawings have been found satisfactory and comprise a spline or feather 7^b which compels the friction pinion to turn with the driving shaft but permits the same to slide lengthwise thereon, a screw nut 13^a provided with a fork 13 which embraces a peripheral groove in the hub 12 of the friction pinion 7^a, and an adjusting screw 14 engaging with the screw nut 13^a and journaled in bearings 15 on the main frame so as to be capable of turning but incapable of lengthwise movement, and a finger piece or thumb wheel 16 secured to the adjusting screw and projecting through an opening in the adjacent wall of the casing so as to be accessible from the exterior of the machine and permit of adjusting the friction pinion without removing the cover from the casing. The friction wheel is constantly pressed against the friction pinion so as to maintain a good driving contact between the same by means of a presser spring 6^a bearing at one end against the hub of the friction wheel and secured at its other end against the adjacent bearing 5^b and adjusting screw 5^a arranged on the last mentioned

bearing and engaging with the central part of the presser spring 6^a, as shown in Fig. 5. While a piece of material is being fed or moved forwardly in engagement with the measuring roller the latter remains in operative connection with the driving mechanism and continues to rotate and this movement of the measuring roller is registered but when the rear end of the piece of goods being measured reaches the measuring and pressure rollers during its forward movement from the delivery to the receiving reel a disconnection between the driving mechanism and the measuring roller is effected automatically so that the registering operation is arrested and an accurate measurement of the piece of material may be obtained.

Although various registering devices may be associated with the measuring roller that shown in the drawings is preferred and constructed as follows: 25 represents an inch indicating wheel which is mounted loosely on a transverse shaft 26 which is journaled in bearings 27 on the main frame. On its periphery this indicating wheel is provided with a circumferential scale representing inches which is visible through an opening 39 in the top of the inclosing casing. This indicating wheel is driven by means of the gear wheel 24 formed on or secured thereto and meshing with the gear 23 on the transverse intermediate shaft. The graduations on the periphery of the inch indicating wheel are preferably so arranged that one complete rotation of this wheel 25 represents one yard in length and the gearing whereby motion is transmitted to the same is so proportioned that when one yard of material has passed between the measuring roller and pressing roller the inch indicating wheel will have made one complete rotation. For this purpose the measuring roller is preferably made nine inches in circumference so that it makes four complete rotations for each yard of material passing over the same and the pinion 52^a makes four turns for every complete rotation of the gear wheels 23 and 24, these last two wheels being of the same diameter.

32 represents a yard indicating wheel which is mounted loosely on the shaft 26 and which is provided on its periphery with a circumferential scale or row of graduations indicating yards. This yard indicating wheel is so graduated and operated relatively to the measuring roller that when a yard of the material passes the measuring roller the periphery of the yard indicating wheel will be advanced one space and when sixty yards have passed the measuring roller the yard indicating wheel will have made one complete rotation. The preferred means for thus actuating the yard indicating wheel are shown in Figs. 1, 5, 7, 8 and 9 and comprise a ratchet wheel 35 secured to the yard indicating wheel and provided with 60 teeth on its periphery, a ratchet bar 31 slidably mounted on the shafts 21 and 26 so as to be capable of transverse movement thereon and provided with a spring pressed actuating pawl 36 which engages the teeth of the ratchet wheel 35, an eccentric cam 29 secured to the shaft 21 and engaging on opposite sides with rollers or projections 30 on the ratchet bar, and a spring pressed detent pawl 37 mounted on the adjacent bearing 27 and engaging with the ratchet wheel 35 so as to prevent backward motion thereof. The top or cover 3^3 of the casing is provided with a sight or observation opening 39^a adjacent to the other opening 39 so that the scale or graduations on the yard indicating wheel may be read. When the measurement of a piece of goods is completed this measurement is indicated in yards and inches on the wheels 32 and 25, respectively. The inch indicating wheel is turned to the starting point or zero of its scale by turning the crank 11 and the yard indicating wheel is turned to zero by means of a thumb piece or handle 34 secured to the hub 33 of the yard indicating wheel and arranged outside of the front wall of the casing where it is conveniently accessible for this purpose.

When the rear end of the piece of goods which is being measured reaches the measuring roller the latter and the registering mechanism are automatically disconnected from the driving mechanism so that the measuring operation is arrested until again restored for measuring the next following piece of material. The preferred mechanism for this purpose which is shown in the drawings is constructed as follows: In addition to serving as the means for transmitting motion from the longitudinal intermediate shaft 4^a to the transverse intermediate shaft 21, the bevel wheels 17 and 20 also perform the function of a clutch for connecting and disconnecting the driving mechanism and the measuring mechanism, this being effected by rigidly securing the bevel wheel 20 to the transverse intermediate shaft and mounting the bevel wheel 17 on the longitudinal intermediate shaft by means of a spline or feather 17^a so that the bevel wheel 17 is compelled to turn with the longitudinal intermediate shaft but can be moved lengthwise on the same into engagement with and out of engagement from the bevel wheel 20. The bevel wheel 17 is normally held in engagement with its companion bevel wheel 20 by a spring 19 surrounding the longitudinal intermediate shaft and bearing at one end against the adjacent bearing 5^b and at its opposite end against a washer 18 engaging with the hub of the bevel wheel 17, as shown in Figs. 1, 5 and 6.

45 represents a shifting lever whereby the

bevel wheel 17 is moved backwardly against the pressure of the spring 19 and out of engagement from the bevel wheel 20. This lever is loosely mounted at its upper end on the upper end of a standard 46 by means of a screw nut 47 while its central part bears against the front side of the bevel wheel 17 and is held yieldingly in engagement therewith by means of a longitudinal shifting rod 42 connected at one end with the lower part of the shifting lever 45 and a spring 44 bearing at one end against the adjacent bearing 5^b and at its other end against a collar 43 on the shifting rod 42. The shifting lever 45 is provided with an opening 48 to permit it to clear the adjacent end of the shaft 4^a and the same is held in its retracted position in which it permits the bevel wheel 17 to engage with the bevel wheel 20 by means of a vertically swinging latch 49 pivoted by a pin 50 to the adjacent standard 5^b and engaging by means of a shoulder 49^a at its free end against a shoulder 45^a on the lower part of the shifting lever 45.

67 represents an actuating gear pinion secured to the front section 68 of the driven shaft and adapted to be engaged by the bill or jaw 54 at one end of a coupling dog 52 which is pivoted at its opposite end on a lug 51 at the free end of the latch 49. While the coupling dog 52 is raised with its bill or jaw 54 out of engagement from the actuating gear wheel 57 the latter turns idly and the latch 49 is permitted to remain in engagement with the shifting lever 45, as shown in Fig. 5, whereby the bevel wheels 17 and 20 are permitted to remain in mesh and thereby transmit movement from the driving mechanism to the measuring device. When, however, the dog 52 is lowered so that its bill or jaw 54 engages with one of the teeth of the actuating gear wheel 67 the rotation of the latter causes the dog 52 to be shifted upward bodily and the latter in turn raises the free end of the latch 49 so as to disengage the shoulder thereof from the shoulder of the shifting lever 45, thereby permitting this lever to be drawn forwardly into its operative position by the spring 44, as shown in Fig. 6, and move the splined bevel wheel 17 out of engagement from the companion bevel wheel 20. The spring 44 is able to thus disengage the bevel wheels 17 and 20 owing to the fact that this spring is stronger than the spring 19 and overcomes the latter. The movement of the coupling dog 52 is controlled by a detector or controlling device which preferably comprises a sectional rock shaft 55, 56 and 56^a, the inner section 55 of which is journaled on the main frame while the intermediate and outer sections 56 and 56^a are journaled in bearings in the end pieces 1^a 1^b of the frame extension, a detector or feeding bar 57 connected by rock arms 57^a with the shaft sections 56, 56^a and adapted to rest upon the material which is being measured between the front guide bar 62 and the presser and measuring rollers, and a crank arm 54 arranged on the front section 55 and provided with a pin 53 which works in a slot 52^a in the coupling dog 52. While the detector bar 57 is resting upon the material which is being measured, as shown in Fig. 4, the same is held in its elevated position and the rock shaft 55, 56, 56^a is so turned that the rock arm 54 holds the coupling dog 52 with its jaw 54 out of engagement from the actuating gear wheel 57, as shown in Fig. 5, thereby retaining the parts in a condition for effecting measurement of the material which is passing from the delivery reel to the receiving reel. But when the rear end of the material approaches close to the measuring roller and is no longer sufficiently taut between the front bar 62 and the measuring roller to support the weight of the detector bar 57 then the latter drops by gravity which movement causes the rock shaft 55, 56, 56^a to turn in the direction for engaging the jaw of the coupling dog 52 with the adjacent teeth of the actuating gear wheels 67, as shown in Fig. 6, whereby the disconnection of the measuring device from the driving mechanism is effected and the measuring operation ceases in the manner heretofore described. It will thus be noted that by this means the registering mechanism is automatically arrested the instant the rear end of the material being measured reaches the measuring roller, thus avoiding the necessity of stopping the driving mechanism in order to read the result and also avoiding the possibility of error by a careless clerk who may continue to operate the driving mechanism after the rear end of the material has passed the measuring roller. By the use of this device the entire piece may be wound, the end fastened and removed from the receiving reel before reading the registered result.

In preparing the machine for winding and measuring the next piece of material this piece is first mounted on the delivery reel and its front end is passed over the bar 62, under detector bar 57, between the presser and measuring roller, over the rear frame bar 62^a and then connected with the receiving reel whereby the detector bar is elevated and the coupling dog is held out of engagement from the actuating wheel 67. Thereafter the shifting lever 45 is retracted against the resistance of its spring 44 by means of a restoring lever 40 which is pivoted on a post 41 of the main frame and connected at its inner end with the front end of the rod 42 while its other end projects through an opening in the side of the frame where it can be manipulated. The instant the shifting lever 45 has been retracted sufficiently to bring its shoulder in

front of the shoulder of the latch 49 the latter is depressed by its weight aided by a spring 49ª so as to reëngage the shoulders of these parts and permit the bevel wheel 17 to be engaged with the bevel wheel 20 by the spring 19.

The sections 55 and 56 of the detector shaft are connected by means of a flat sided shank 55ª arranged at the front end of the shaft section 56 and engaging with a transverse slot 55ᵇ in the rear end of the shaft section 55, as shown in Fig. 7. This permits of conveniently detaching the frame extension and the parts mounted thereon from the other parts of the machine and reconnecting the same. The rearmost section 56ª of the detector shaft is preferably provided with a handle 58 projecting laterally therefrom which handle permits not only of conveniently turning the detector shaft and the parts connected therewith preparatory to threading the material through the machine but its weight also assists in depressing the detector bar or rod 57 and engaging the coupling dog 52 with the gear wheel 67 when the end of the material which is being measured approaches close to the measuring roller and thus render the automatic stop mechanism more sensitive. By varying the length of the measuring and pressing rollers and associated parts,—the machine can be adapted for measuring materials of various widths.

Figs. 11 and 12 show the means which are employed in connection with this machine for unwinding strip like material such as a bolt of ribbon 66ª from its core 75 and rewinding the same upon another core or spool 75ª after having been measured. In this construction the spool 75, from which the ribbon 66ª is unwound, is pivotally supported by means of two centering pins 78, 78ª, which pierce opposite ends of the spool or core 75 so that the latter is impaled on the pins. The latter are mounted on a yoke 77 which is secured to the shaft 9ᶜ in place of the delivery reel, the front point 78 being fixed on the yoke and the rear point adjustably connected therewith by a set screw 79. By adjusting the rear centering point 78ª on the yoke 77 by means of the set screw 79 these points may be adapted to cores of different lengths. While using the yoke 77 and pins 78, 78ª the belt 65 is thrown off so as not to rotate the yoke in which case the delivery spool 75 only is rotated by the pull of the measuring and pressing rollers on the ribbon, the latter being sufficiently strong to permit of such pull. The receiving spool or core 75ª upon which the front end of the ribbon is wound is held frictionally in place between a plurality of parallel clamping jaws, fingers or prongs 76ª, 76ᵇ which are arranged in a circular row and mounted at their front ends on a head 76 secured to the winding up or driving shaft 9ª. As shown in Figs. 11 and 12, three of such jaws 76ª are employed and two of them are rigidly connected with the supporting head 76 while the third jaw 76ᵇ is capable of radial movement on the head 76 by means of a slotted lug 76ᶜ on the front end of the last-mentioned jaw receiving a pin or screw 76ᵈ on the head 76 and a spring 80 surrounding a guide rod 80ª which is secured radially to the head 76 and bearing at one end against the outer side of the clamping jaw 76ᵇ and at its other end against a shoulder 80ᵇ formed on the guide rod. By this means the spool 75ª is frictionally held in position and compelled to turn with the head 76 so that the ribbon is wound around the spool and owing to the yielding relation of the jaws 76ª and 76ᵇ it permits the same to grasp spools which vary slightly in diameter. The ribbon is caused to wind evenly on the receiving spool or core 75ª by means of a plurality of guide lugs 80ᶜ projecting radially from the head 76. By means of the construction shown in Figs. 11 and 12 either the ribbon alone or the ribbon and the paper strip which usually separates adjacent turns or convolutions of a bolt of ribbon may be unwound together from one spool or core, measured and then rewound on another spool or core with equal facility. After the ribbon has been thus rewound on another spool or core the same can be easily stripped lengthwise from the receiving reel.

Although the construction of the machine shown in the drawings is the preferred embodiment of this invention it is to be understood that the same is capable of modification and that such variations which are constructed and operate substantially like that here shown and described are considered as coming within the scope of this invention.

I claim as my invention:

1. A machine of the character described comprising two rotary bolt holders from one of which the material is unwound and upon the other of which the material is wound, a measuring roller which is engaged by the material passing from the delivery to the receiving holder, a driving mechanism, a register operatively connected with the measuring roller and means for rotating the measuring roller comprising a shaft composed of front and rear sections which are detachably connected, the rear section being connected with the measuring roller and the front section being connected with the driving mechanism, and a frame having a fixed section on which the front shaft section is journaled and a detachable section on which the rear shaft section is journaled.

2. A machine of the character described comprising two rotary bolt holders from one of which the material is unwound and upon

the other of which the material is wound, a measuring roller which is engaged by the material passing from the delivery to the receiving holder, a driving mechanism, a register operatively connected with the measuring roller and means for rotating the measuring roller comprising a shaft composed of front and rear sections which are detachably connected, the rear section being connected with the measuring roller and the front section being connected with the driving mechanism, a frame having a fixed section on which the front shaft section is journaled and a detachable section on which the rear shaft section is journaled, and means for detachably connecting said frame sections comprising a shouldered shank arranged on the detachable frame section and a catch arranged on the fixed frame section and engaging with said shoulder shank.

3. A machine of the character described comprising a measuring roller, a transverse driven shaft connected with the measuring roller and provided with a pinion, a transverse driving shaft provided with a friction pinion, a longitudinal intermediate shaft provided with a friction wheel engaging with said pinion and also provided with a driving bevel wheel, and a transverse intermediate shaft provided with a driven bevel wheel meshing with said bevel driving wheel and also provided with a driving gear wheel which meshes with said pinion on the driven transverse shaft.

4. A machine of the character described comprising a measuring roller, a transverse driven shaft connected with the measuring roller and provided with a pinion, a transverse driving shaft provided with a friction pinion, a longitudinal intermediate shaft provided with a friction wheel engaging with said pinion and also provided with a driving bevel wheel, a transverse intermediate shaft provided with a driven bevel wheel meshing with said bevel driving wheel and also provided with a driving gear wheel which meshes with said pinion on the driven transverse shaft, and means for adjusting the friction pinion radially relatively to the friction wheel.

5. A machine of the character described comprising a measuring roller, a transverse driven shaft connected with the measuring roller and provided with a pinion, a transverse driving shaft provided with a friction pinion, a longitudinal intermediate shaft provided with a friction wheel engaging with said pinion and also provided with a driving bevel wheel, a transverse intermediate shaft provided with a driven bevel wheel meshing with said bevel driving wheel and also provided with a driving gear wheel which meshes on said pinion on the driven transverse shaft, and means for adjusting the friction pinion radially relatively to the friction wheel comprising a screw nut provided with a yoke which embraces the hub of said friction pinion, and an adjusting screw working in said nut and journaled in a bearing so as to be free to turn but held against lengthwise movement.

6. A machine of the character described comprising a measuring roller, inch and yard indicating wheels, means for operatively connecting said inch indicating wheel with said roller comprising a pinion turning with said roller and a gear wheel meshing with said pinion and connected with said inch indicating wheel, and means for operatively connecting said yard indicating wheel with said roller comprising a cam turning with said roller, a ratchet wheel turning with said yard indicating wheel, and a reciprocating ratchet bar engaged at one end by said cam and provided at its opposite end with a pawl which engages with said ratchet wheel.

7. A machine of the character described comprising a measuring roller adapted to engage the material to be measured, a driving mechanism having a clutch for rendering said measuring roller operative or inoperative, and a detector member adapted to engage said material adjacent to said roller and operatively connected with said clutch to permit the same to remain coupled while the detector engages said material and to cause said clutch to be uncoupled when the material clears said detector.

8. A machine of the character described comprising a measuring roller adapted to engage with the material to be measured, a driving mechanism for said roller comprising a driven shaft operatively connected with said roller, a driven bevel wheel, a driving shaft, a driving bevel wheel which is splined on said driving shaft and which meshes with said driven bevel wheel, a spring operating to hold said bevel wheels yieldingly in engagement, and means operatively associated with said roller and adapted to disengage said bevel wheels.

9. A machine of the character described comprising a measuring roller adapted to engage with the material to be measured, a driving mechanism for said roller comprising a driven shaft operatively connected with said roller, a driven bevel wheel, a driving shaft, a driving bevel wheel which is splined on said driving shaft and which meshes with said driven bevel wheel, a spring operating to hold said bevel wheels yieldingly in engagement, and means operatively associated with said roller and adapted to disengage said bevel wheels and comprising a trip lever arranged adjacent to said splined bevel wheel, a latch for holding said lever out of operative engagement with said splined bevel wheel, a trip pinion turning with said roller, a trip dog connected with

said latch and adapted to be shifted by engagement with said trip pinion, and an oscillating detector adapted to engage with the material to be measured adjacent to said roller and operatively connected with said trip dog.

10. A machine of the character described comprising a measuring roller adapted to engage with the material to be measured, a driving mechanism for said roller comprising a driven shaft operatively connected with said roller, a driven bevel wheel, a driving shaft, a driving bevel wheel which is splined on said driving shaft and which meshes with said driven bevel wheel, a spring operating to hold said bevel wheels yieldingly in engagement, and means operatively associated with said roller and adapted to disengage said bevel wheels and comprising a trip lever arranged adjacent to said splined bevel wheel, a latch for holding said lever out of operative engagement with said splined bevel wheel, a trip pinion turning with said roller, a trip dog connected with said latch and adapted to be shifted by engagement with said trip pinion, and an oscillating detector adapted to engage with the material to be measured adjacent to said roller and operatively connected with said trip dog by means of a crank turning with said detector and engaging with a slot in said trip dog.

11. A machine of the character described comprising a measuring roller adapted to engage with the material to be measured, a driving mechanism for said roller comprising a driven shaft operatively connected with said roller, a driven bevel wheel, a driving shaft, a driving bevel wheel which is splined on said driving shaft and which meshes with said driven bevel wheel, a spring operating to hold said bevel wheels yieldingly in engagement, and means operatively associated with said roller and adapted to disengage said bevel wheels and comprising a trip lever arranged adjacent to said splined bevel wheel, a latch for holding said lever out of operative engagement with said splined bevel wheel, a trip pinion turning with said roller, a trip dog connected with said latch and adapted to be shifted by engagement with said trip pinion, an oscillating detector adapted to engage with the material to be measured adjacent to said roller and operatively connected with said trip dog, and means for restoring said trip lever.

12. A machine of the character described comprising a measuring roller adapted to engage with the material to be measured, a driving mechanism for said roller comprising a driven shaft operatively connected with said roller, a driven bevel wheel, a driving shaft, a driving bevel wheel which is splined on said driving shaft and which meshes with said driven bevel wheel, a spring operating to hold said bevel wheels yieldingly in engagement, and means operatively associated with said roller and adapted to disengage said bevel wheels and comprising a trip lever arranged adjacent to said splined bevel wheel, a latch for holding said lever out of operative engagement with said splined bevel wheel, a trip pinion turning with said roller, a trip dog connected with said latch and adapted to be shifted by engagement with said trip pinion, an oscillating detector adapted to engage with the material to be measured adjacent to said roller and operatively connected with said trip dog, and means for restoring said trip lever comprising a rod connected at one end with said trip lever, and a shifting lever connected with the other end of said rod.

Witness my hand this 14th day of December, 1910.

FRANK L. TAYLOR.

Witnesses:
BERT. H. LANE,
R. N. MCFARLAND.