May 26, 1925. 1,539,698

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APPARATUS FOR CHECKING OR TALLYING UP LUMBER

Filed Oct. 10, 1921 8 Sheets-Sheet 1

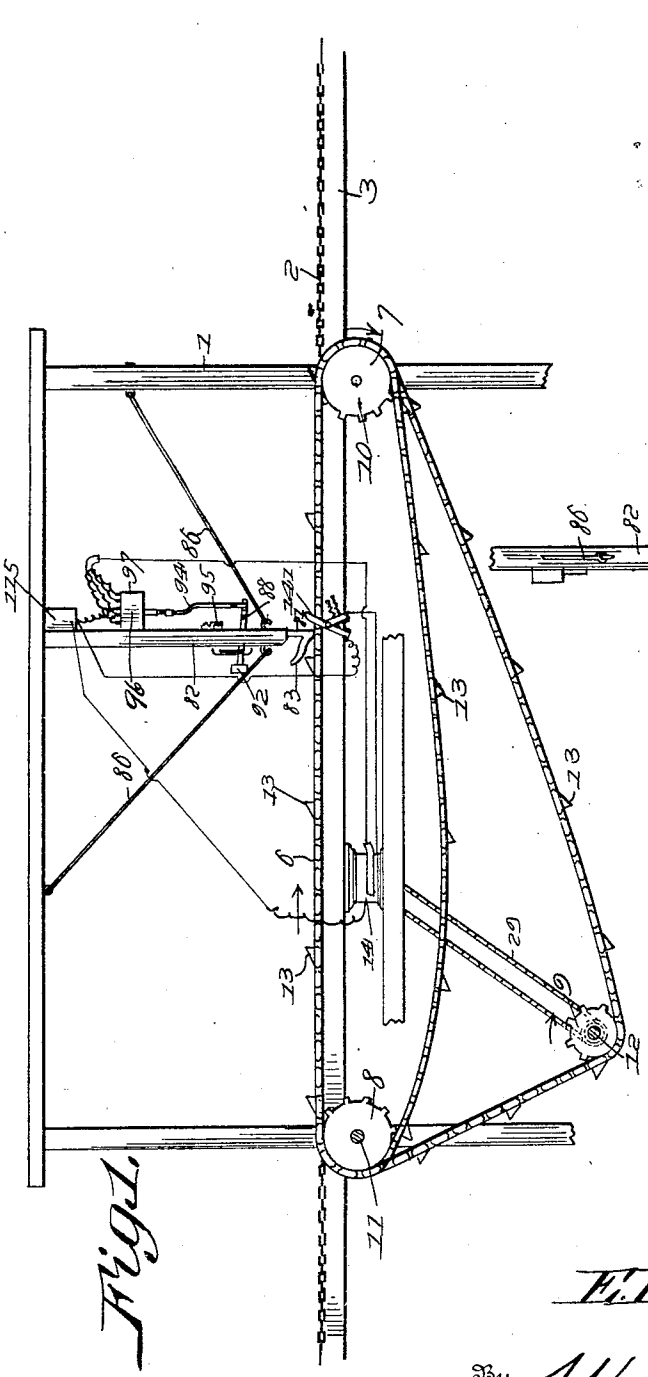

Fig. 1.

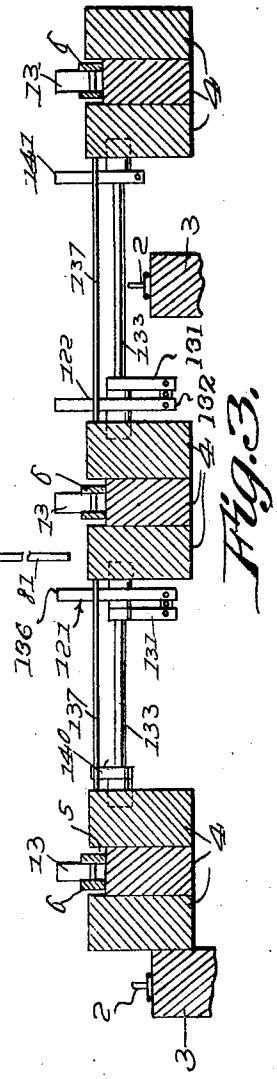

Fig. 3.

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Filed Oct. 10, 1921 8 Sheets-Sheet 2

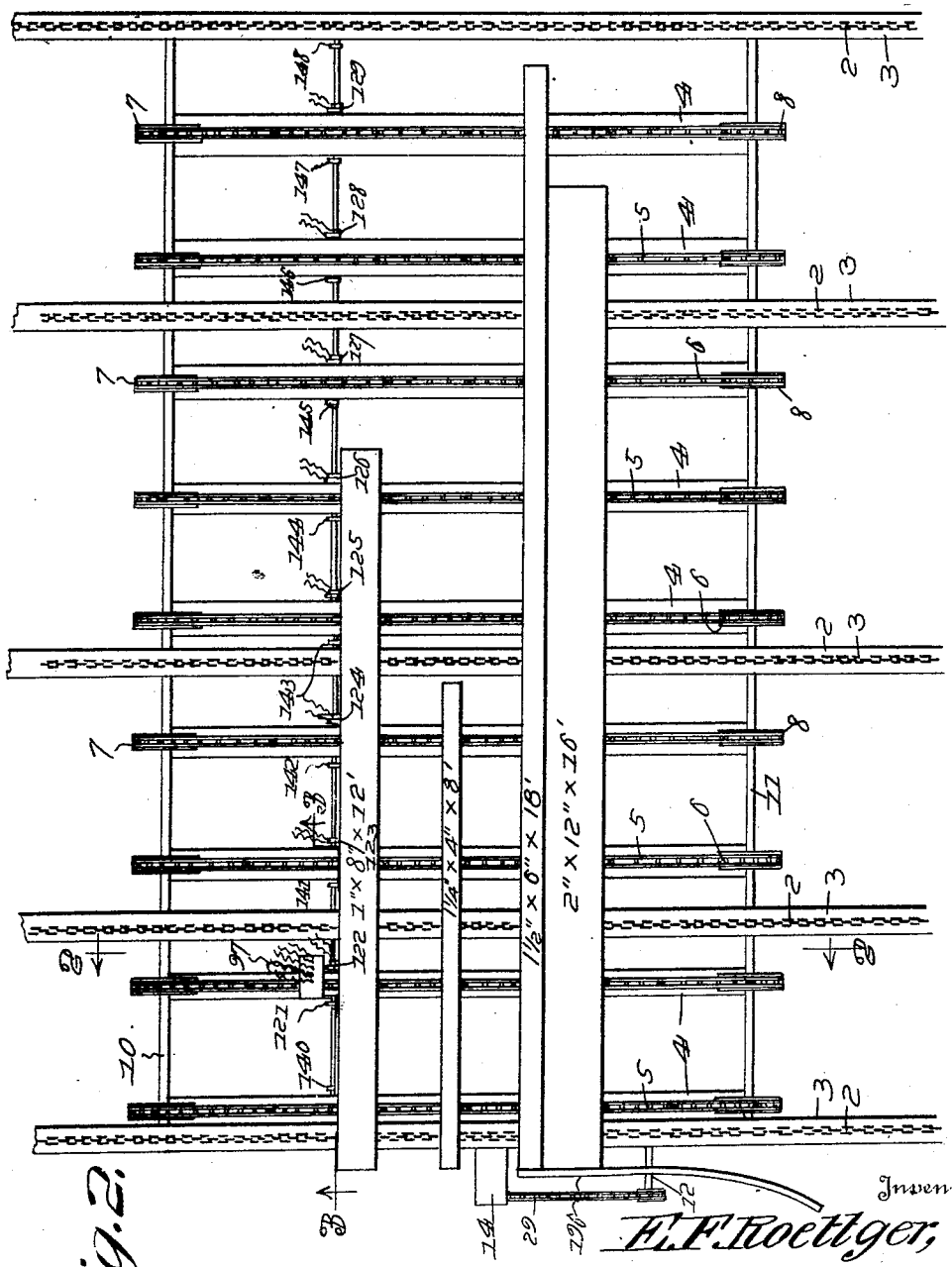

Fig. 2.

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Filed Oct. 10, 1921 8 Sheets-Sheet 3

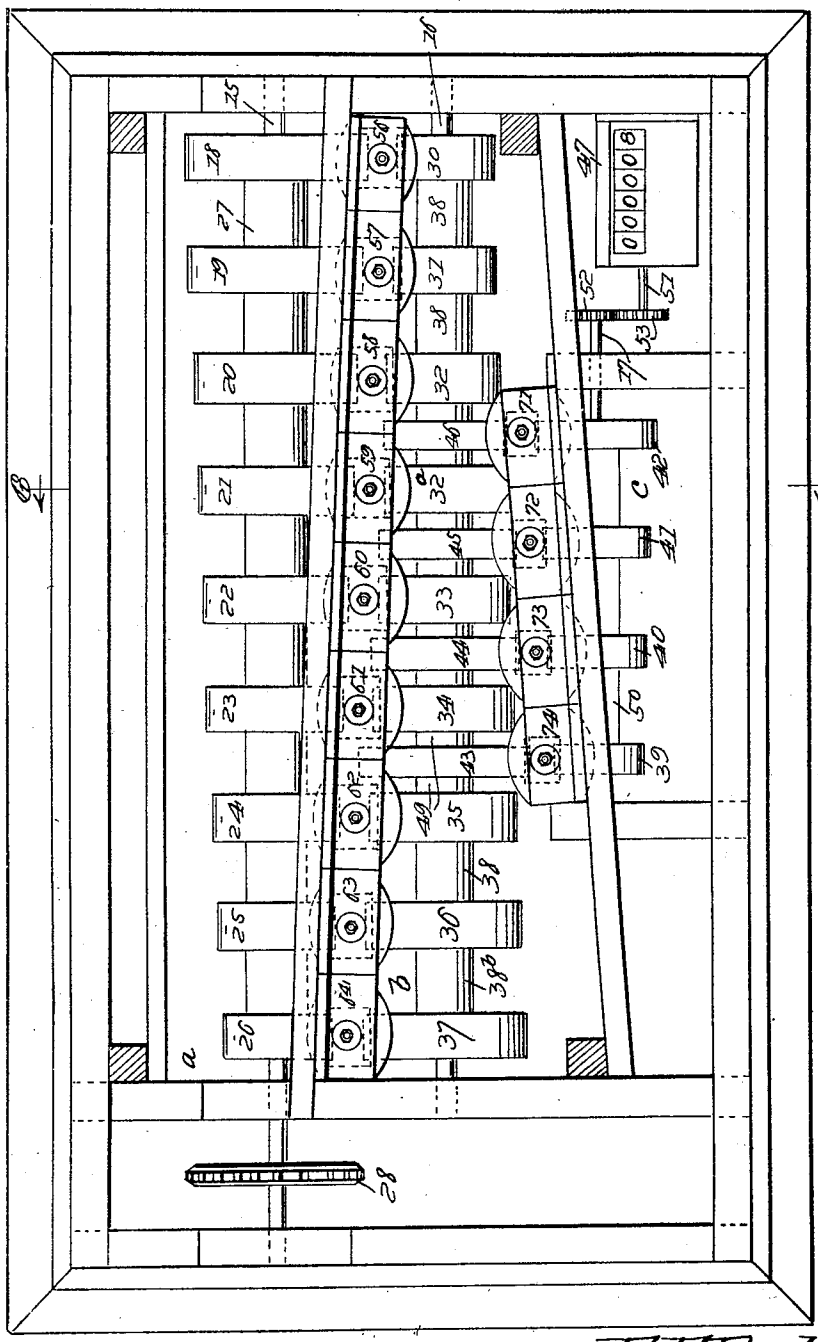

Fig. 4.

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APPARATUS FOR CHECKING OR TALLYING UP LUMBER

Filed Oct. 10, 1921 8 Sheets-Sheet 4

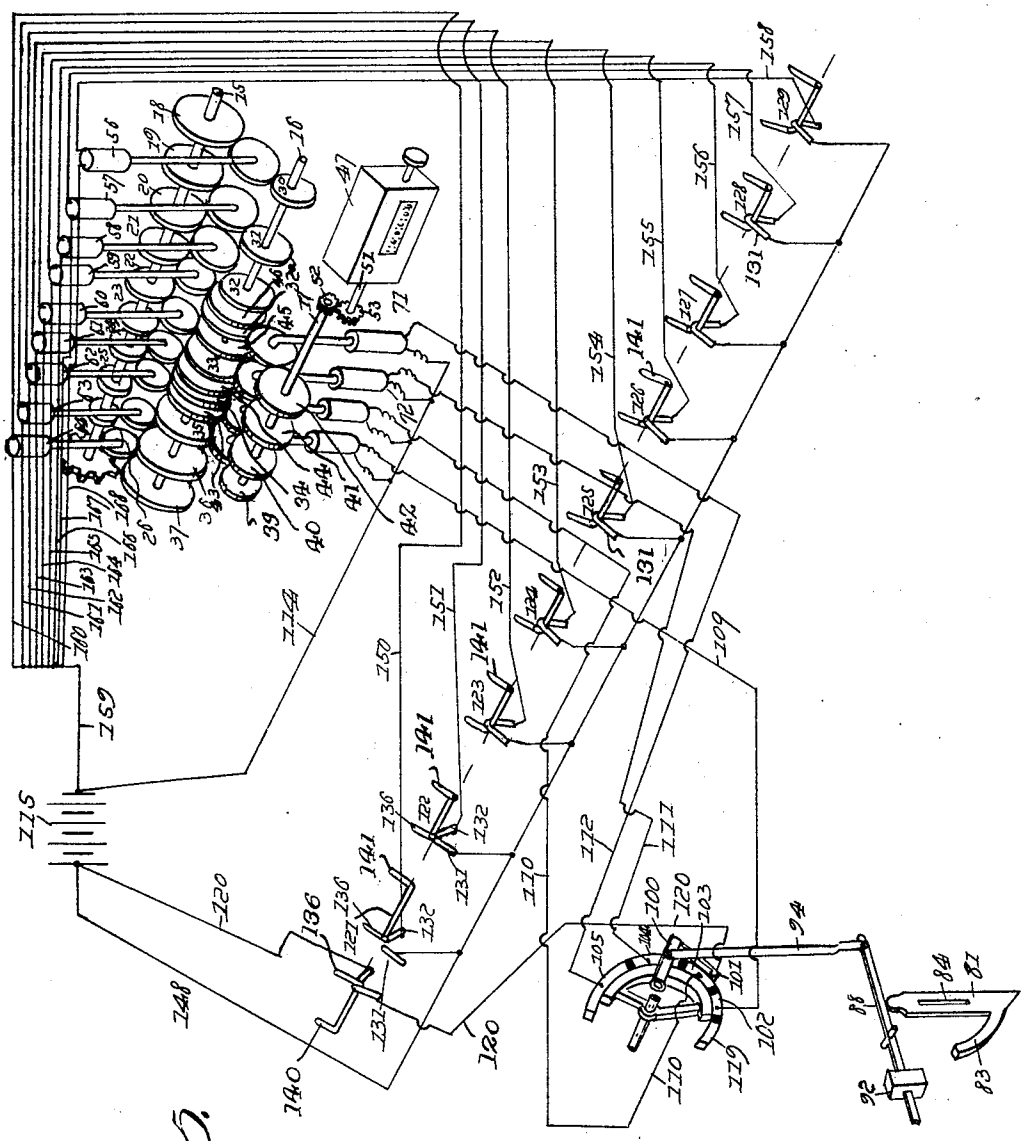

Fig. 5.

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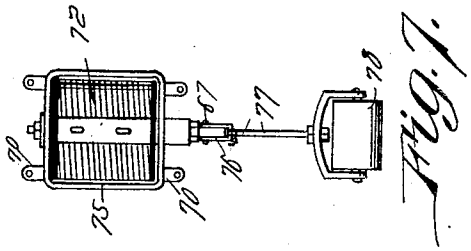

Fig. 7.

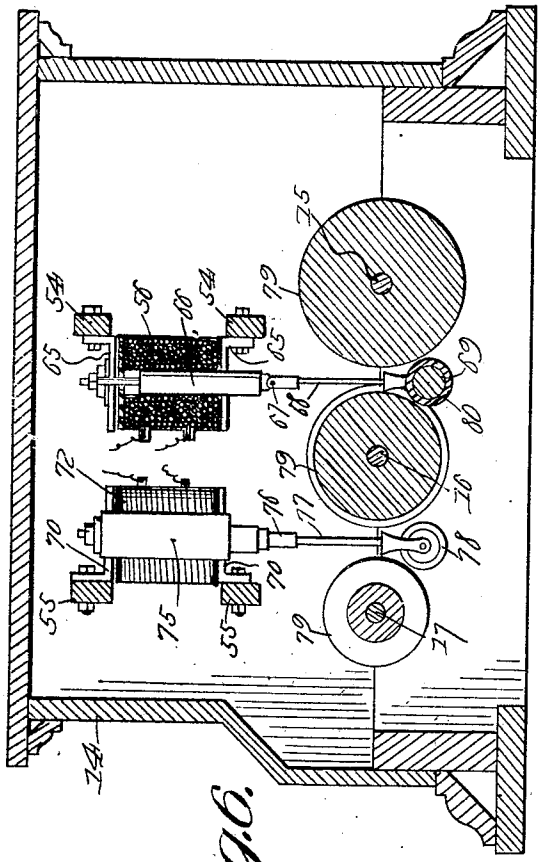

Fig. 6.

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APPARATUS FOR CHECKING OR TALLYING UP LUMBER

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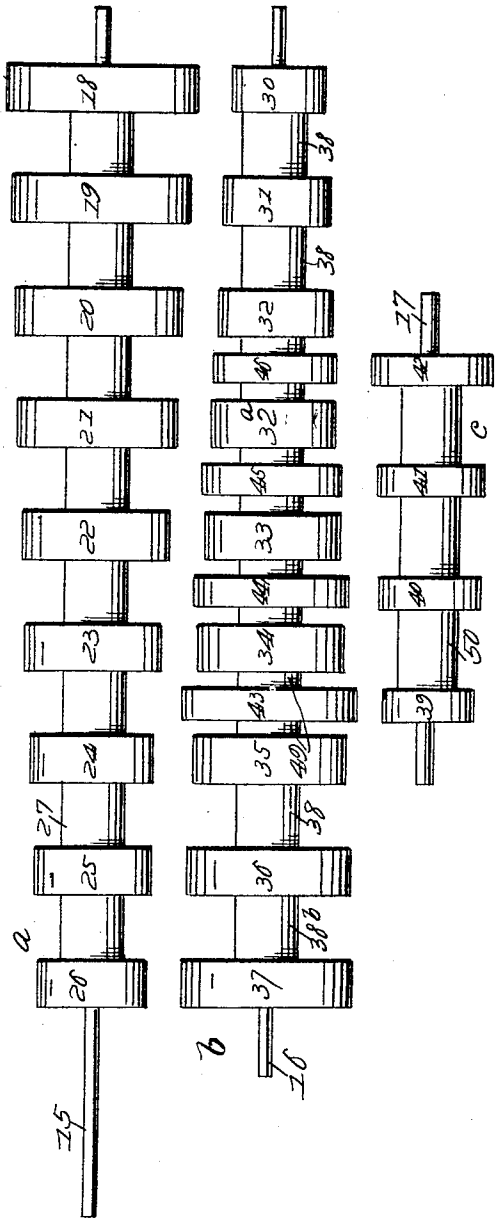
Fig. 8.



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APPARATUS FOR CHECKING OR TALLYING UP LUMBER

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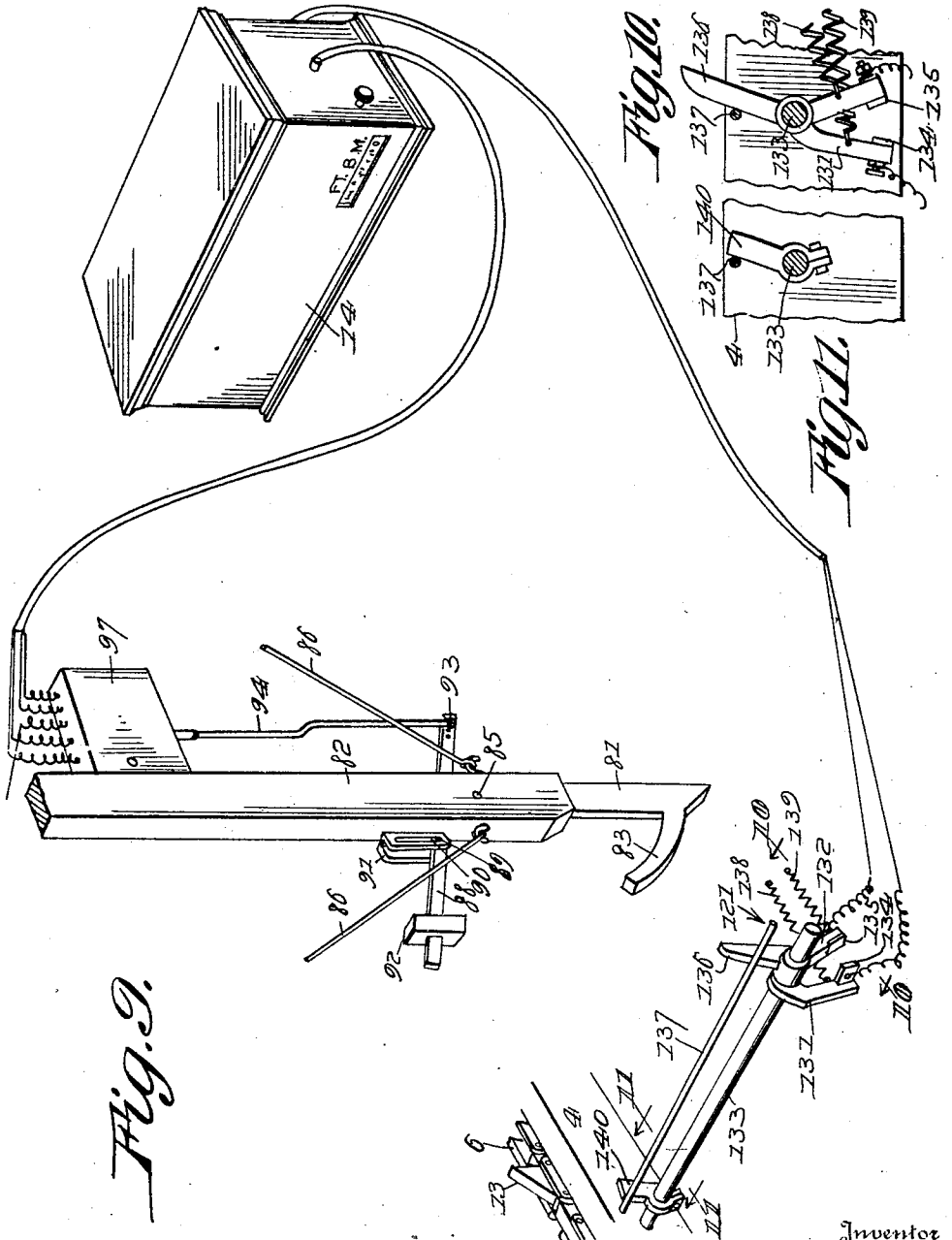

Fig. 9.

Fig. 10.

Fig. 11.

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APPARATUS FOR CHECKING OR TALLYING UP LUMBER

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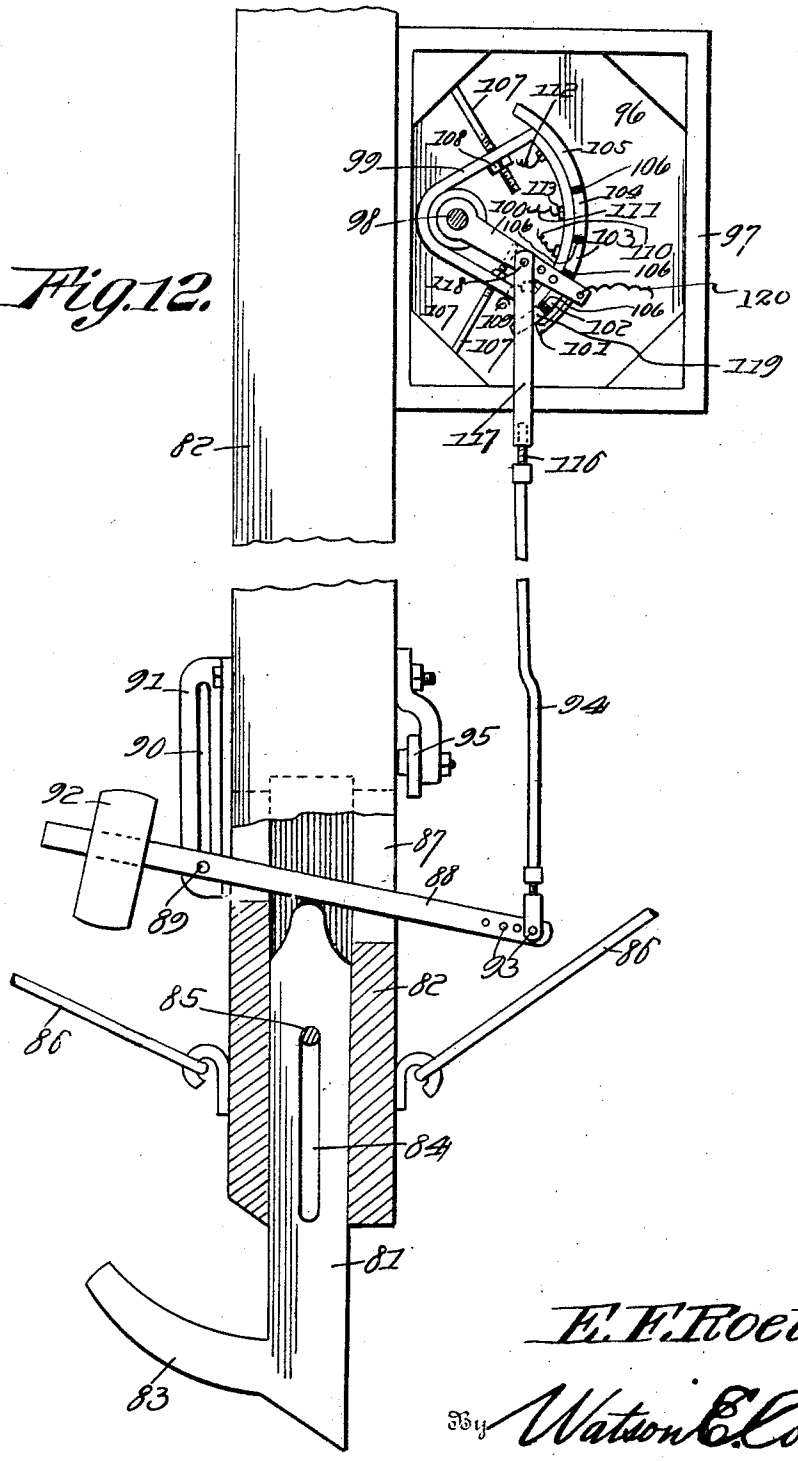
Fig. 12.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CHECKING OR TALLYING UP LUMBER.

Application filed October 10, 1921. Serial No. 506,589.

To all whom it may concern:

Be it known that I, EDMUND F. ROETTGER, a citizen of the United States, residing at Thornton, in the county of Calhoun and State of Arkansas, have invented certain new and useful Improvements in Apparatus for Checking or Tallying Up Lumber, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to tallying devices, and particularly to a tallying device for checking or tallying up lumber and giving the result of said tally in feet board measure.

One of the objects of the invention is to provide a mechanism of this character which is not limited in its use to lumber having a certain definite length, breadth or thickness, but which will tally lumber within certain ranges of length and thickness and which will operate properly with lumber of any width.

A further object is to provide a machine of this character including three drums or sets of computing wheels, each set being composed of wheels of different diameters, with means actuated by the piece of lumber being measured for operatively connecting any one wheel of one set with other wheels of the other sets, whereby to cause the counting mechanism associated with these computing wheels to have a certain definite movement which will indicate the board measure or in other words the total length, breadth and thickness of the piece of lumber being measured.

Other objects will appear in the course of the following description.

In the drawings:—

Figure 1 is an elevation of my mechanism;

Figure 2 is a plan view of Figure 1, the upper part of the frame being removed;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a plan view of the three sets of computing wheels;

Figure 5 is a diagrammatic perspective view showing the electrical connection between the lumber trips and the computing wheels and also showing the connection between the computing wheels and the counter;

Figure 6 is a sectional view on the line 6—6 of Figure 4;

Figure 7 is a detail view of one of the solenoids and its corresponding roller;

Figure 8 is a plan view of the three sets of computing wheels shown in Figure 4;

Figure 9 is a perspective view of one of the lumber actuated trips showing the electrical connections between the trip mechanism and the counter;

Figure 10 is a detailed section of one of the lumber trips taken on the line 10—10 of Figure 9;

Figure 11 is a like section on the line 11—11 of Figure 9;

Referring to these drawings, 1 designates a frame for supporting the tallying apparatus and 2 conveyor chains which carry the lumber or timber to be measured, which chains travel on the frame 3. The chains 2 act to convey the pieces of timber along a predetermined route and in the path of movement of the pieces of timber and extending parallel to this path of movement are disposed the longitudinally extending base beams 4 which act as guides 5 for the conveyor chains 6 which operate over sprockets 7, 8 and 9, as shown most clearly in Figure 1. The sprocket wheels 7, 8 and 9 are carried upon shafts 10, 11 and 12, the shaft 10 being considered as the driving shaft. The chains 6 are provided with dogs 13 to engage the lumber, thus holding the lumber properly positioned on the skid frame when passing over and under the trips which act to operate the tallying apparatus. The lumber is disposed to move in the direction of the arrow in Figure 1.

Mounted in any suitable position on the mill floor or at any other suitable place is a cabinet 14 and within the cabinet I have disposed the shafts 15, 16 and 17, shown in Figures 4, 5 and 8. Mounted upon the shaft 15 and rotating therewith is a series of disks or wheels 18 to 26, the disks being spaced apart by sleeves 27. These disks constitute friction wheels and the disks are of differing diameters, as clearly shown in Figure 8. The shaft 15 is driven by a sprocket 28 connected by a chain 29 to the sprocket 9 of the shaft 12 of the conveyor. The

sprocket 9 should have such a diameter as to rotate precisely one revolution to each two feet of chain travel, and the shaft 15 is driven continuously at one definite speed at all times. The shaft 15 with its disks 18 to 25 constitutes a driving shaft.

Disposed parallel to the shaft 15 is the shaft 16 carrying upon it a plurality of friction wheels or disks 30 to 37 inclusive and separated by spacing sleeves 38. The shaft 17 extends parallel to shafts 15 and 16 and carries thereon a plurality of disks 39 to 42. The disks or wheels 30 to 37, it will be seen, are of different diameters and the disks 39 to 42 are of different diameters. It will be seen that the shaft 16 carries upon it disks or wheels equal in number to the total of the disks and wheels on shaft 15 and on shaft 17. The friction wheels on shaft 15 are designed to be selectively engaged with any one of the friction wheels 30 to 37 on shaft 16, while the wheels 39 to 42 are adapted to have selective driving engagement with any one of certain wheels 43, 44, 45 and 46 mounted upon the shaft 16 and which differ in diameter. The shaft 17, as shown in Figure 5, carries upon it a gear wheel 52 which engages a gear wheel 53, in turn mounted upon a shaft 51 engaging a counter 47 so that the shaft 17 constitutes the final driving shaft for the counter 47. For the purpose of distinguishing the three series or sets of driving wheels or disks, I have applied to them the letters *a*, *b* and *c*.

Arranged longitudinally of the cabinet 14 are supports 54 and 55 (see Figure 6), the supports 54 supporting a series of solenoids 56 to 64 by means of brackets 65. Each solenoid has the usual core 66, to which rods 68 are pivotally connected at 67. Each rod at its lower end carries a roller 69, the roller being preferably covered with rubber, as at 80. It will be seen from Figure 4, where in dotted lines the rollers 69 are indicated, that the rollers 69 are disposed between the disks or friction wheels 18 to 26 and 30 to 37. Normally these rollers 69 are out of engagement between the wheels 18 to 26 and the friction wheels 30 to 37 but when any one solenoid is energized the corresponding roller 69 rises and forms a driving connection between the selected friction wheel on the shaft 15 and the corresponding friction wheel on shaft 16.

Mounted upon the supports 55 by means of brackets 70 are solenoids 71 to 74 which are similar to the solenoids 56 to 64 having cores 75 and depending rods 77 which are disposed between the driving disks or friction wheels 43 to 46 and 39 to 42, the lower ends of the rods 77 carrying rollers 78. Preferably the disks of the drums *a*, *b* and *c* are heavily shellacked or varnished on their peripheral faces, as indicated at 79, and the rollers 69 and 18 have rubber rims 80 in order to secure driving friction between these disks and the rollers when in contact.

Disposed in the path of movement of the lumber carried by the chains 6 and chains 3 is a vertically movable trip 81 (see Figures 9 and 12) which is mounted in a guide 82. The trip 81 has on the side facing the direction from which the lumber is coming an upwardly and rearwardly extending arm 83 with which the lumber has contact. This trip is provided with a guide slot 84 through which a pin 85 passes, this guide slot 84 and pin 85 acting to limit the upward movement of the trip. The guide 82 depends from the upper part of the frame 1 and is reinforced by tie rods 86. The guide 82 is slotted at 87 and through this slot passes the lever 88 which has a transverse pin 89 guided in a vertical slot 90 of a bracket 91. A weight 92 is mounted upon one end of the lever 88, the other end being adjustably connected at 93 to the lower end of an upwardly extending connecting rod 94. A stop 95 is carried on one side of the guide 82 limiting the lever 88 in its upward movement.

Mounted upon the guide 82 and disposed above the lever 88 is a combined circuit closer and selector 96 which includes a casing 97. Extending through the casing is a shaft 98 carrying a sector 99. An arm 100 is swingingly mounted on the shaft 98 and carries a contact 101 which is adapted to wipe over a series of stationary contacts 102 to 105 which are mounted upon the sector. These contacts 102 to 105 are insulated from each other at 106. Bolts 107 carrying nuts 108 support the sector 99 so as to permit the adjustment of the segment. Conductors 109 to 112, one for each of the sectors 102 to 105, are connected to binding posts 113 and are in turn connected to solenoids 74, 73, 72 and 71 respectively, as shown in Figure 5, these solenoids being in turn connected by a conductor 114 to a battery 115. The rod 94 is adjustably connected at 116 to a link section 117 which is adjustably pivoted at 118 to the switch arm 100. It will be seen that this arm 100 with the contacts 102 to 105 constitutes in effect a switch and that as the arm 100 is shifted upward it will successively connect the solenoids 74, 73, 72 and 71 in circuit with the battery. The contact 101 on the arm 100 normally engages a dead segment 119.

It is to be noted that the contact 101 moves over the segments 102 to 105 according to the extent to which the trip 81 is raised. Thus when a board one inch thick is passing under the trip 81 the arm 100 is lifted so that the movable contact 101 will ride upon the seg-

ment 102. When a board an inch and a quarter thick passes under the trip 81 the movable contact 101 will engage the segment 103, and when a board an inch and a half passes under the trip the movable contact 101 will engage the sector 104, and when a board two inches in thickness passes beneath the trip 81 it will raise it until the contact 101 is shifted into engagement with the contact 105. Thus when a one-inch board raises the trip 81 the solenoid 71 will be energized, causing its core to be lifted until the roller thereof engages with the disks 36 and 47. When a board an inch and a quarter passes under the trip 81 the solenoid 72 will be energized. When timber an inch and a half thick passes under the trip 81 then the solenoid 73 will be energized, and solenoid 74 will be energized when a piece of timber two inches in thickness passes under the trip. When solenoid 71 is energized, the disks or friction wheels 46 and 32 will be engaged. When solenoid 72 is actuated friction wheels 45 and 41 will be engaged causing the contact to register one and a quarter inch lumber. When solenoid 73 is energized the friction wheels 44 and 40 will be engaged and one and a half inch lumber will be registered, and when solenoid 74 is energized the friction wheels 43 and 39 will be engaged and lumber two inches thick will be registered. The coaction of wheels 40 and 42, 45 and 41, 41 and 45, and 42 and 46 will cause the registration of one-inch, one and a quarter inch, one and a half inch, and two-inch lumber, as will appear more fully hereafter.

The return circuit from the battery 115 to the solenoids is secured by a conductor 120 which has in its length a switch whose nature will be later described, and from this switch the conductor 120 extends to the contact 101 on arm 100. Thus a circuit is completed through any one of the solenoids 71 to 74 through the battery 115. Of course, when the contact 101 is resting upon the dead contact 119 no current passes through any one of the solenoids.

For actuating the counter 47 in accordance with the length of a board or timber carried upon the conveyor chains 6, I provide a plurality of trips which are designated 121 to 129. The number of these trips will depend upon the maximum or minimum length of a piece of timber likely to be measured and upon the boards or timbers coming in lengths varying from each other by a foot or varying by less or more than a foot. I have illustrated nine trips which are adapted to tally lumber which varies by half feet. Obviously any number of trips may be employed and these may be placed closer to or further from each other. All of these trips are illustrated diagrammatically in Figure 5 and one of the trips is illustrated in detail in Figures 10 and 11. Each of these trips includes an arm 131 which is fixed upon a shaft 133 and an arm 132 which is loose upon the shaft but which is disposed adjacent the arm 131. The arms 131 and 132 carry coacting electrical contacts 134 and 135 respectively. Projecting from the sleeve or head of arm 132 is an arm 136 and on the opposite end of each shaft 133 from the arms 131 and 132 is an arm 140, these arms being designated 141 to 148 respectively. There is a separate shaft 133 for each group of arms 131, 132, 136 and 140, as shown clearly in the diagrammatic view in Figure 5. The springs 138 and 139 are connected to the arms 131 and 132 respectively, the other ends of the springs being connected to the base of the frame. The arms 141 to 147 are held in engagement with an abutment rod 137 by the springs 138. The arms 136 are held in engagement with the abutment rod 137 by means of the springs 139.

As shown in Figure 5, a wire 148 extends from one pole of the battery 115 and is connected to the several contact members 134 of the arms 131 of the respective trips 121 to 129 inclusive. Connected to the contacts 135 of the loose arms 132 are wires or leads 150 to 158 inclusive which are respectively connected to the solenoids 64 to 56 inclusive. A wire 159 extends from the battery and connects to conductors 160 to 168 inclusive which are respectively connected to the solenoids 54 to 66 inclusive. Thus each solenoid of the series 56 to 64 is connected in a normally interrupted circuit with the battery 115. Thus when a board strikes and presses the arm 136, the two contacts 135 and 134 will be electrically engaged with each other and the circuit will be completed through the battery and the corresponding solenoid. If, however, a board strikes an arm 136 and the associated arm 141, the shaft 133 will rock simultaneously with the movement of the arm 136 and contact 132 so that notwithstanding the arm 136 is oscillated the two contacts 134 and 135 will not come in engagement with each other and a circuit will not be closed through that particular solenoid. The shaft 133 at the extreme left of Figure 5 does not carry an arm 141 but it carries a relatively short arm 140 which simply acts as a stop and this arm 140 is, therefore, not engaged by the boards, as all the boards or timbers to be measured are arranged with their left ends in alignment without regard to the length of the boards or timbers. In the trip devices 121 to 129, however, the arms 141 are disposed on the right hand ends of the shafts 133 instead of having them disposed in the same position as the arm 140 in Figure 9.

The operation of this mechanism is as follows: The trip device 121 which is illustrated in Figure 9 is located between the first two base beams, as shown in Figure 2,

and at this end of the machine all of the boards or timbers without regard to length are disposed with their butt ends in alignment. This aligning of the boards is secured by the guide 196. A board engaged by the conveyor chains 5 will strike the arm 136 of the trip 121 and will rock this arm over, bringing the contacts 134 and 135 in electrical engagement with each other, completing a circuit through the wire 120 to the contact 101. If the contact 101 is on the dead contact 119, the circuit is not completed. If the board is of minimum length it will also strike the arm 136 of the next following trip 122 but it will be too short to strike the arm 141 thereof. Thus this arm 136 of tripper 131 will be operated and this will close a circuit through wire 150, solenoid 64 will cause the depression of the transmission wheel 26, causing the engagement of this wheel with the disk or friction wheel 37 on shaft 16. At the same time that the board operates the arm 136 of trip 121, the board will raise the trip 81 a distance equal to the thickness of the board. Thus, for instance, if it is one-inch board it will lift the trip 81 a distance sufficient to carry the arm 101 into engagement with the contact 102 in Figure 12 and this will cause the energizing of solenoid 74, causing the friction wheel 78 associated therewith to move upward between the friction wheel 43 on shaft 16 and the friction wheel 39 on shaft 17. Inasmuch as friction wheel 26 will transmit the power of the driving shaft 15 to 37 at a certain ratio of speed, which in turn, of course, is transmitted to shaft 16, and inasmuch as the rotation of shaft 16 is transmitted to shaft 17 at another speed, depending upon the ratio between the wheels 39 and 43, it is obvious that the shaft 17 will be given a speed of rotation compounded of the peripheral speeds of wheels 36, 37, 43 and 49 and that thus the tallying shown on the counting mechanism 47 will be a function of the length, breadth and thickness of the board. The thickness of the board, of course controls the segment contact 102, 103, 104 and 105 with which the contact 101 engages and the length of engagement between these contacts will depend upon the width of the board. If, therefore, the board is very wide, it will be obvious that the arm 136 will be depressed for a longer time than if the board is narrow, and if the board is very wide it is obvious that the trip 81 will be raised for a greater length of time so that the three sets of gears are in engagement with each other for a longer time than for a narrow board and thus a greater amount will be registered upon the counting mechanism.

In Figure 2, I have illustrated four boards being measured, that board nearest the top of the sheet being supposed to be twelve feet long. A board of this length will actuate both of the arms 141 and 136 of all of the trips 121, 122, 123, 124 and 125 but will actuate only the arm 136 of the trip 126 and, therefore, the contact 32 attached to the arm 136 of trip 126 will be shifted to close a circuit through the solenoid 59, which is the solenoid designed to tally a board twelve feet long. The board, however, will contact with both of the arms 136 and 141 for the trips 121 to 125 and, therefore, the board will not close any circuit through these trips for the reason that the arm 141 and the arm 136 will be tilted at the same speed and the contacts 134 and 135 will never come in engagement with each other.

The second board is eight feet long and, therefore, will only actuate the trip mechanism 124 and its corresponding solenoid, while the board eighteen feet long, which is the maximum length of board which may be accommodated on the apparatus illustrated, will actuate the trip mechanism 129 and close the contacts 131 and 132 of this trip mechanism but will not affect the closing of the contacts of any of the trip mechanisms from 121 to 128. Of course, it will be obvious that the number of trips may be greater than that shown so as to accommodate board longer than eighteen feet, or that fewer trip mechanisms may be provided with a maximum range less than eighteen feet. Also it is obvious that the arms 136 of the several trip mechanisms may be placed closer together so that differences in width of half a foot or even less might be measured or allowed for in the calculations. I do not wish to be limited to any particular form of counting mechanism. It is sufficient that the counting mechanism be actuated by the revolutions of the shaft 51. This counting mechanism, however, is preferably of that character which will register two units and which includes a fixed or stationary cipher so that it will proceed by increments of ten and reading 10, 20, 30, etc. Obviously, however, it need not proceed by increments of ten but the increments may be larger or smaller.

The invention having been set forth, what is claimed as being useful is:

1. In a lumber tallying mechanism, a lumber conveyor driven at a definite rate of speed and having means whereby boards may be placed thereon at right angles to the path of movement of the conveyor, a counter, means for operatively connecting the conveyor with the counter to drive the latter from the former which includes board actuated means keeping the connecting means in operation while the board is passing a predetermined point, and means adapted to engage a board on said conveyor and to vary the relative speed of the counter

and conveyor according to the length of the board.

2. In a lumber tallying mechanism, a lumber conveyor driven at a definite rate of speed and having means whereby boards may be placed thereon at right angles to the path of movement of the conveyor, a counter, means for operatively connecting the conveyor with the counter to drive the latter from the former, and board actuated means adapted to engage a board on said conveyor and to vary the relative speed of the counter and conveyor in accordance with the thickness of the board.

3. In a lumber tallying mechanism, a lumber conveyor driven at a definite speed, means for causing boards to pass onto the conveyor at right angles to the path of movement of the conveyor, connecting means for operatively connecting the conveyor with the counter to drive the latter from the former, said means being shiftable into or out of operative engagement between the conveyor and the counter, and board actuated means for shifting said shiftable means into engagement with the counter.

4. A lumber tallying mechanism including a lumber conveyor driven at a predetermined speed, a counter and operatively driven from the conveyor, a driving mechanism therefor operating at a predetermined speed, and board engaging means for operatively connecting the driving means with the counter so long as the board is passing a predetermined point.

5. In a lumber tallying mechanism, a lumber conveyor, a counter, driving means for the counter normally disconnected therefrom and operating at a definite speed and operatively driven from the conveyor, board engaged means for operatively connecting the counter with its driving means, and means controlled by the length of the board for varying the relative speed of the counter and its driving means in accordance with the length of the board.

6. In a lumber tallying mechanism, a lumber conveyor, a counter, driving means for the counter normally disconnected therefrom and operating at a definite speed and operatively driven from the conveyor, board engaged means for operatively connecting the counter with its driving means, and means controlled by the length and thickness of the board for varying the relative speed of the counter and its driving means according to the length and thickness of the board.

7. In a lumber tallying mechanism, a lumber conveyor, a counter, driving means for the counter normally disconnected therefrom and operating at a definite speed, board engaged means for operatively connecting the counter with its driving means, means controlled by the length of the board for varying the relative speeds of the counter and its driving means in accordance with the length of the board, and means controlled by the thickness of the board for additionally varying the relative speeds of the counter and its driving means in accordance with the thickness of the board.

8. In a lumber tallying mechanism, a lumber conveyor driven at a definite speed, means for guiding boards thereon with the length of the boards at right angles to the direction of travel of the conveyor, a counter, board engaged means operatively connecting the conveyor with the counter to drive the latter from the former during the time when the board is passing said board engaged means and disconnecting the driving engagement between the conveyor and the counter when the board has passed said means, and board engaged means for varying the relative speeds of the counter and conveyor in accordance with the length and thickness of the boards.

9. In a lumber tallying mechanism, a lumber conveyor driven at a definite speed, a counter, normally disconnected driving means between the counter and the conveyor whereby the counter may be driven from the conveyor, and means for securing an operative driving connection between the conveyor and the counter and including a member disposed in the path of movement of the boards and elevated thereby.

10. In a lumber tallying mechanism, a lumber conveyor driven at a definite speed, a counter, normally disconnected driving means between the counter and the conveyor, means securing an operative driving connection between the conveyor and the counter and including a member disposed in the path of movement of the boards and elevated thereby, and a series of board engaged members disposed in a line transverse to the path of movement of the board, each of which is adapted when actuated by the board to vary the ratio between the conveyor and the counting mechanism in accordance with the length of the board.

11. A board counting mechanism including a board carrier having means whereby boards may be carried, with the length of the board extending at right angles to the path of movement of the carrier, a counter, a shaft driven constantly by the carrier and having thereon a series of wheels of different diameters, a second shaft parallel to the first named shaft and having thereon a series of wheels of different diameters rotating with the shaft, a third shaft parallel to the first two shafts and having thereon a series of wheels of different diameters and rotating with the shaft, a series of power transmitting wheels disposed between the first and second named series of wheels and normally out of engagement therewith and

adapted to operatively connect a wheel of one series with the wheel of the adjacent series but normally out of engagement therewith, a second series of power transmitting wheels adapted to engage wheels on the second named shaft and operatively engage them with the wheels on the third named shaft but normally out of engagement therewith, means controlled by the length of the board for shifting a corresponding wheel of the first named series of power transmitting wheels into engagement between corresponding wheels on the first and second named shafts, means controlled by the thickness of the board for shifting one of the second named transmission wheels into operative engagement with the second and third series of wheels, and a counter operatively connected to the third named shaft.

12. In a board measuring device, two series of coacting wheels of different diameters, a series of intermediate power transmitting wheels adapted to frictionally engage between and with the two series of wheels to thereby operatively engage them with each other and drive one from the other, a counter connected to the driven series of wheels, means for operating the transmission wheels comprising a series of solenoids, cores upon which the solenoids are mounted and engaged with said wheels, an arcuate series of contacts, each contact being electrically connected with one of said solenoids, an arm movable over the rack and having a contact electrically connected with a source of electrical energy, the solenoids being thereby connected in interrupted circuit with said source of electrical energy, and board actuated means for shifting said arm over said series of contacts comprising a vertically movable member disposed in the path of movement of a board and normally urged to a lowered position.

13. In board measuring means, a constantly driven shaft having thereon a series of wheels of different diameters, a parallel shaft having thereon a coacting series of wheels of different diameters, the second named shaft being adapted to be operatively connected to a counting mechanism, means for operatively connecting any one of said first named wheels with a corresponding wheel on the second named shaft comprising a series of solenoids, cores disposed therein and carrying friction wheels adapted, when the solenoid is energized, to be shifted to carry the corresponding wheel into engagement between the corresponding driving and driven wheels, means for selectively energizing said solenoids comprising a series of trips mounted in the path of movement of the boards, each trip having an upwardly extending finger and carrying a contact, a second contact associated with the contact of each trip, and electrical connections between said contacts, a source of current, and one of said solenoids whereby when said contacts are engaged with each other the corresponding solenoid will be actuated to shift the corresponding transmission wheel into operative position between the driving and driven wheels.

14. In a board measuring machine, a conveyor upon which the boards are adapted to move, means for causing the boards to be disposed upon said conveyor at right angles to the path of travel thereof, a shaft driven from the conveyor and having thereon a series of friction wheels differing in diameter from each other and differing from the wheels of the first named shaft, a third shaft having a series of friction wheels thereon of different diameters and operatively connected to a counter, a series of power transmission wheels normally disposed in spaced relation to but associated with the wheels on the first and second named shafts, a series of solenoids for said wheels and having cores carrying the wheels, a series of trips mounted in connection with said conveyor and disposed transversely of the path of movement of the boards, each one of said trips including a short shaft, an upwardly extending arm loose on the shaft and carrying a contact, an arm fast on the shaft and carrying a contact, an upwardly extending arm on the opposite end of the shaft, the two contacts each being electrically connected to the source of current and to one of said solenoids, a second series of power transmitting wheels disposed between but separated from the wheels on the second named shaft and the wheels on the third named shaft but adapted to be shifted into frictional engagement between said wheels to thereby trip and transmit power from the second named shaft to the third named shaft, solenoids associated with said wheels, cores carrying said wheels, means for energizing said solenoids including a series of contacts, a vertically movable member disposed in the path of movement of the boards and raised thereby, and a contact carried by said vertically movable member and coacting with said first named contacts, the last named contact and each of the first named contacts being connected in a normally interrupted electrical circuit with one of said solenoids and a source of current, said last named contact being shifted over the first named contact by the lifting of the vertically movable member due to engagement with the board.

In testimony whereof I hereunto affix my signature.

EDMUND F. ROETTGER.