Feb. 6, 1951 E. J. LE BLANC 2,540,624

MECHANISM FOR TALLYING LUMBER

Filed April 4, 1949 3 Sheets-Sheet 1

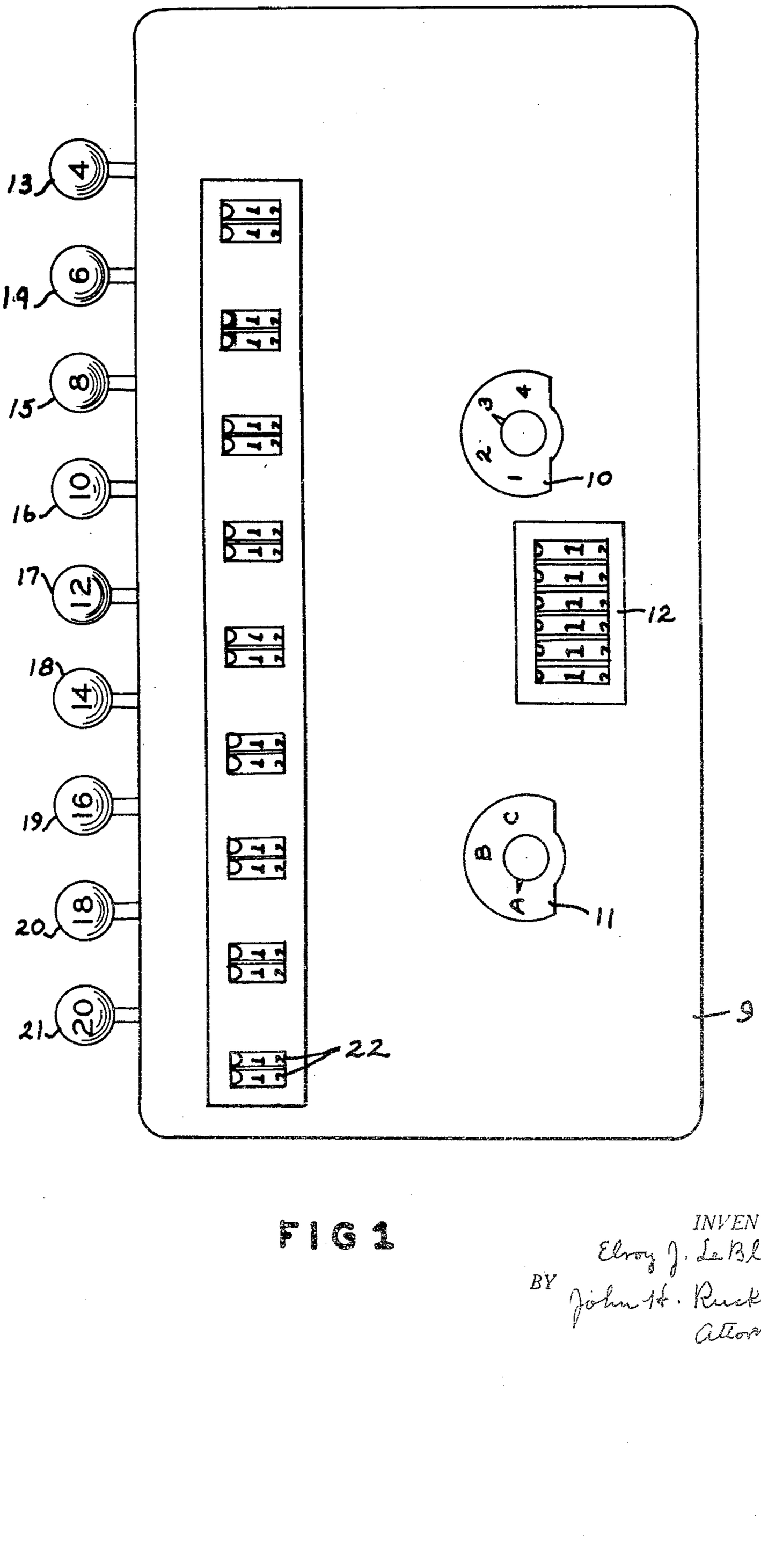

FIG 1

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MECHANISM FOR TALLYING LUMBER

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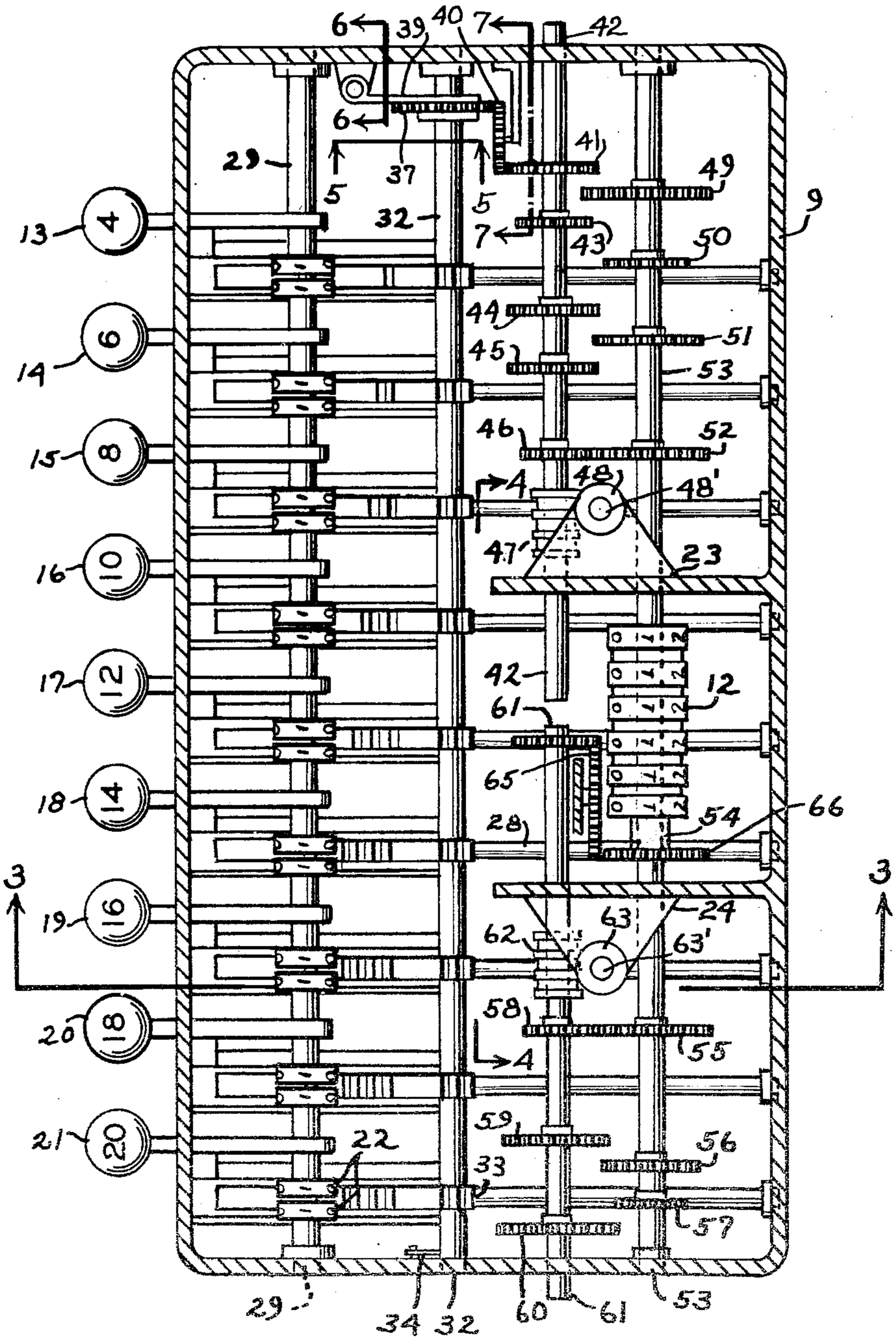

FIG 2

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MECHANISM FOR TALLYING LUMBER

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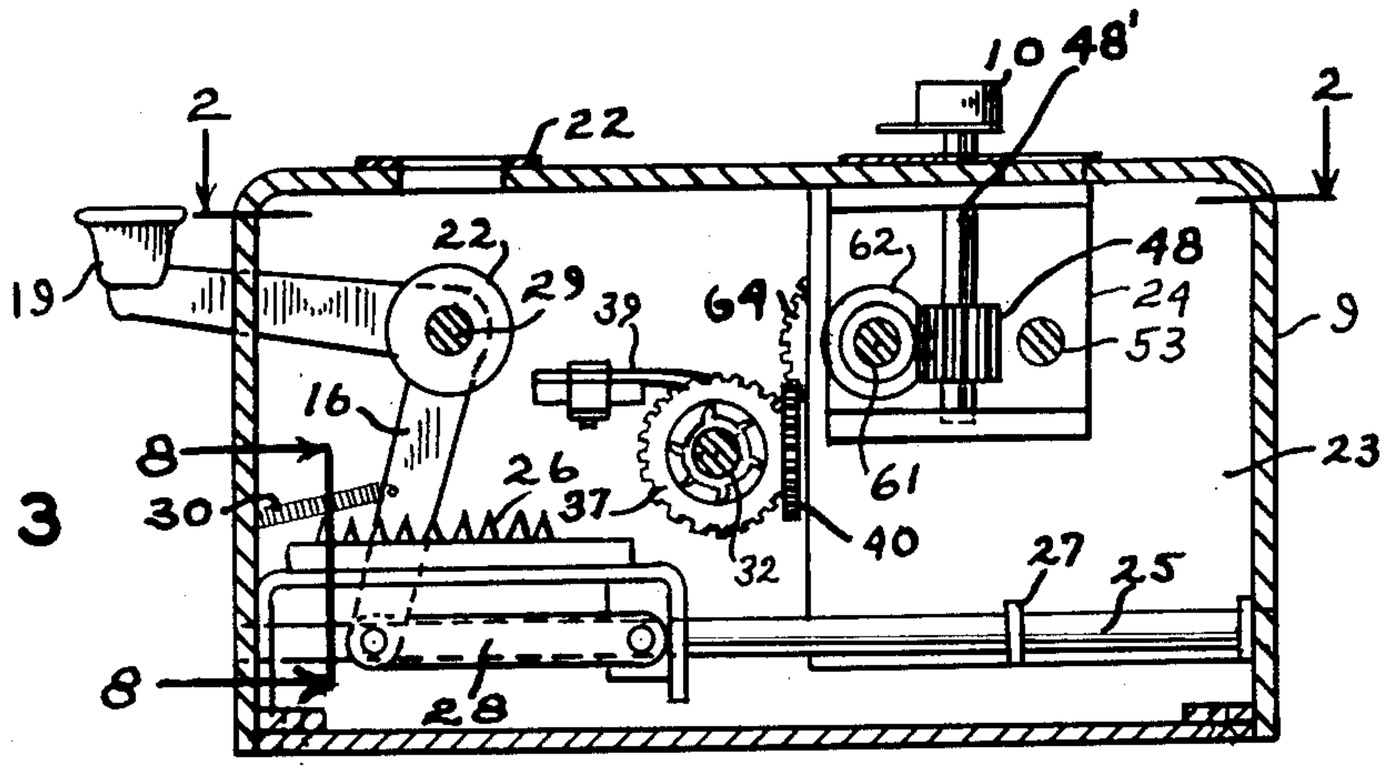

FIG 3

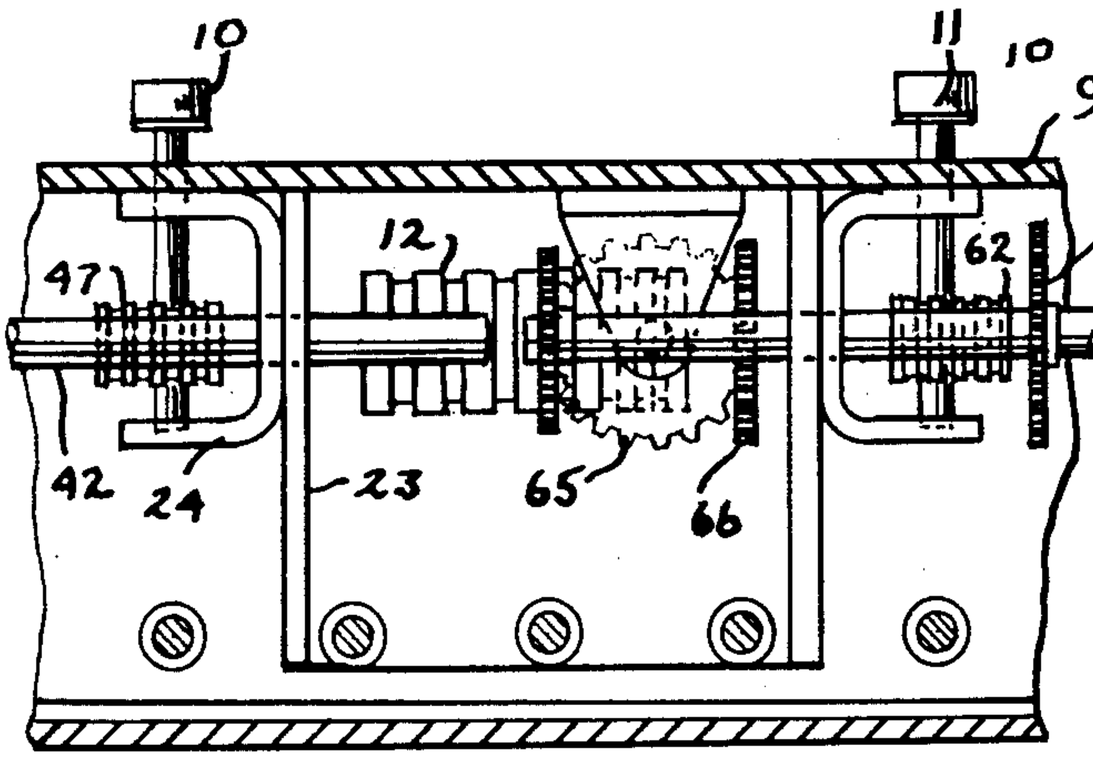

FIG 4

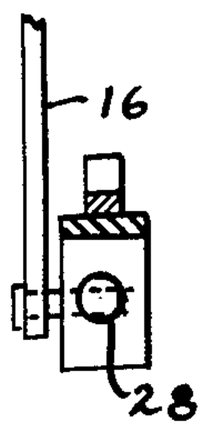

FIG 8

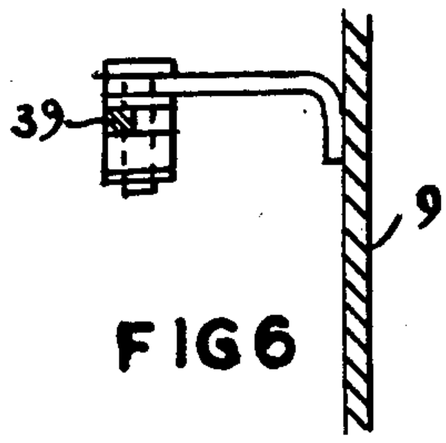

FIG 6

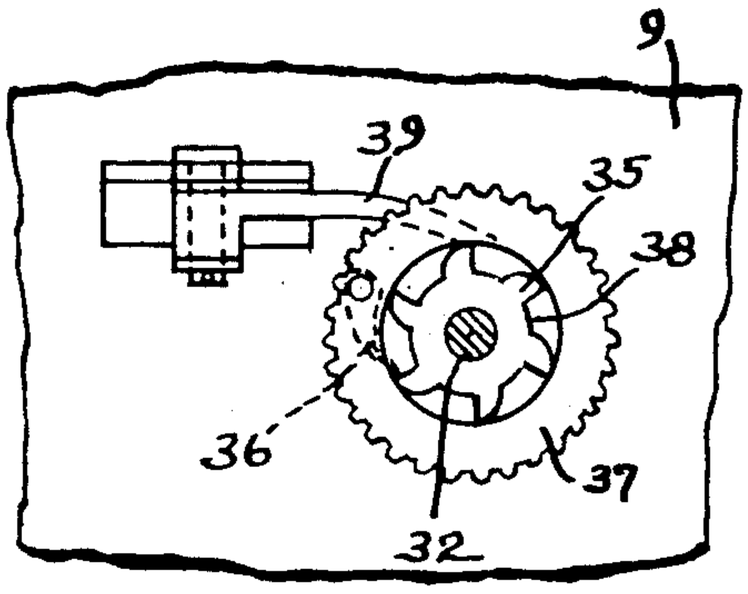

FIG 5

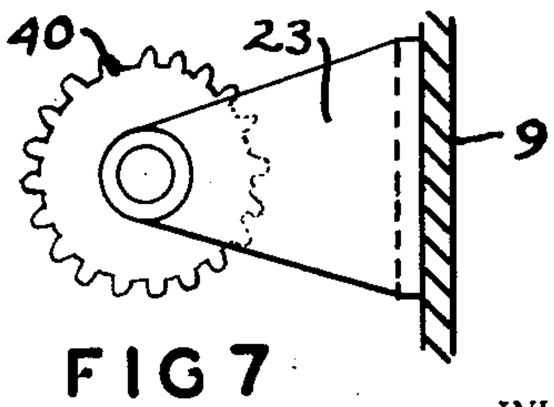

FIG 7

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UNITED STATES PATENT OFFICE

2,540,624

MECHANISM FOR TALLYING LUMBER

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Application April 4, 1949, Serial No. 85,345

2 Claims. (Cl. 235—82)

1

My invention relates to mechanism for tallying lumber, and the purpose is to calculate lumber in terms of board feet, by means of tabulating the respective pieces which make up the amount, according to their length. The size of the material to be tallied is compensated for in thickness and in width by separate sets of gears representing each, and having ratios comparable to that size which it is to represent. The mechanism is so designed that any particular size, according to its thickness and width may be tallied by means of a respective piece tally according to the length of each piece, and the calculation given is in board feet; this is shown on a counting device on the face of the machine. The machine will also show a total of the number of pieces of each length which has been tallied; this will enable the user to check back mathematically and prove the correctness of the board feet shown.

The principle used in this system is that of representing mathematical figures with sets of gears; my application of this principle here is to represent the particular sizes of lumber which may be desired to be incorporated in this system by sets of gears which are calculated by comparison of the desired sizes (thickness and width) with those parts of a board foot. This method of calculation will be fully described in succeeding paragraphs. To my knowledge, this principle has not been applied to this particular purpose, or incorporated in any other system designed to carry out this particular work.

The only method known to me, which is in use today, is the method in use for many years which is to tally lumber by means of dots or dashes, representing pieces of the length, and to compile the total of each respective piece, and mathematically figure the board feet contained therein. That method is quite slow and proves about eighty per cent (80%) inaccurate. The inaccuracy incurred has been the cause of much trouble in the lumber business, and the slow method has been the cause of much loss in labor, as the tallyman must hold his crew in idleness while he calculates the amount of lumber which he has tallied. Therefore, it will be seen that the absolute accuracy, the time saved, and the simplicity of the use of this system would be very beneficial to any business where the tallying of lumber is necessitated.

The method of calculating the gears which are to represent the various sizes to be incorporated into a system of this type may be explained as follows: the sizes, that is, the thickness and the width, are compared to those of a board foot, which is generally known as one inch in thickness, by twelve inches in width, or the multiple of these, and these ratios are represented by sets of gears. To explain this more thoroughly, I will use for an example, the size, two inches in thickness by four inches in width; this will be compared with the board foot which is one inch by twelve inches in width. Then a set of gears to represent the thickness will have a ratio of two inches compared to one or two to one; a set of gears to represent the width would have a ratio of four inches compared to twelve inches, or one to three. In such manner, the ratio of sets of gears may be calculated to represent any desired sizes of lumber. In cases where different dimensions whose multiple, that is, thickness times width, are the same, one set of gears may be used to calculate both. An example of this is two times four, where the multiple is eight which is the same as one times eight whose multiple is eight. To compensate for the length of each piece, I provide a set of gears having a ratio of one to represent the length ten; the length of ten is used here because it simplifies calculation since the counting device is to register in digits of ten. Then for sets of gears to represent other lengths, that length will be compared to ten, and the ratio of the gears will be the same as that comparison. An example of this is, for the length of eight feet, we will have a ratio of eight feet to ten feet, or eight to ten. For a length of twelve feet, we will have a ratio of twelve feet to ten feet. In this manner, gears can be calculated to represent any desired length.

It is to be understood that the sizes and lengths incorporated in the mechanism may vary widely in the various phases of the lumber business and that it would be impractical to incorporate them all in one machine. Therefore, I am not limited to any particular size or length.

The novel features which I believe to be characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to organization and method of operation, together with additional objects and advantages thereof, will be best understood from the following description of a specific embodiment when it is read in connection with the accompanying drawings in which,

Fig. 1 is a top plan view of a casing for containing the operating mechanism.

Fig. 2 is a view in horizontal section on the line 2—2 of Fig. 3.

Fig. 3 is view in vertical section on the line 3—3 of Fig. 2.

Fig. 4 is view in horizontal section on the line 4—4 of Fig. 2.

Fig. 5 is a view in vertical section on the line 5—5 of Fig. 2.

Fig. 6 is a view in vertical section on the line 6—6 of Figs. 2 and 5.

Fig. 7 is a view in vertical section on the line 7—7 of Fig. 2.

Fig. 8 is a view in vertical section on the line 8—8 of Fig. 3.

By referring to the drawings, it will be noted that a casing 9 for the mechanism has a rectangular shape and is of light design. All of the operating mechanism which is used to set the machine to tally with and to read the results from, is shown on the face in Fig. 1. To the upper right of the face of the machine shown on the drawing in Fig. 1 is a small dial 10 with its pointer and graduated as 1, 2, 3, and 4. This represents the thickness of the material. To the lower right of the machine there is another dial 11 with its pointer and graduated as A, B, and C, which is to represent the width of the material. Located between these two dials is counting device 12 which shows the total number of board feet calculated. To the left of the machine are nine key levers 13 to 21 located along a long edge, which represent the lengths of material as follows: 13 represents four feet; 14 represents six feet; 15 represents eight feet; 16 represents ten feet; 17 represents twelve feet; 18 represents fourteen feet; 19 represents sixteen feet; 20 represents eighteen feet; 21 represents twenty feet. These keys are pressed in a downward motion to tally each piece of material according to its length. To the right of each of these keys, is shown a counting device 22 which is adapted to be operated by the respective key levers and which will total the number of pieces of each respective length tallied. These counting devices may be of stock design and may be bought for use in this system and therefore need not be shown in detail. The approximate depth of the machine and the stroke of the key representing the length may be seen from the end-view drawing in Fig. 3.

In a part build-up and description of this mechanism, I will take first the casing and add in the order of assembly those parts which will be required to complete the system. In reference to Figs. 1 and 2, it will be seen that there is a casing 9, rectangular in shape. There is joined to this casing on the inside two brackets which are marked 23 and 24; these brackets extend to nearly the middle of the casing and their shape may be noted from Fig. 2. The entire casing is to be bored for shafts and cut for keys.

On the lower part of the rectangular casing 9, there are mounted nine small guide bars 25 upon each of which a rack 26 works. Upon each of these bars at different points is a small collar 27 which restricts the stroke of the rack.

Upon each bar 25 which has just been described, there is mounted one of the racks 26 which is made to slide along that respective bar with the stroke of the controlling key and key lever to the collar marked 27 which restricts the stroke; these racks in order have teeth in number from two to 10 inclusive.

The base portions of the racks 26 are connected to the key levers respectively by links 28 as shown in Fig. 3. The key levers are pivoted on a rod 29 which acts as a fulcrum, and these levers are

normally held in retracted position by springs 30 which connect the lower part of the levers to the side of the casing 9. The complete assembly of each of these keys may be seen in Fig. 3. All keys are held in a retracted position by means of springs 30 which connect the lower part of the key levers to the side of the casing as shown in Fig. 3.

As shown in Fig. 2, there is a shaft 32 running the entire length of the machine and free to turn in bearings. There are nine spur gears designated as 33, all of which are identical and have ten teeth each. These gears are fixed to the shaft 32 and are mounted in a position on this shaft so that when the racks 26 corresponding to them in number are made to slide forward on the guidebars 25, the teeth of the racks will engage with the teeth of the respective spur gears 33.

The action of the racks 26 on the spur gears 33 will rotate the shaft 32 in a counterclockwise direction a given portion of a complete turn according to the number of teeth on the racks which is engaged with the teeth of its respective spur gear. When the key is released, it will be returned to its normal position by means of its spring 30, and the shaft 32 will be returned to its normal position, which is made definite by the stop 34 shown in Fig. 2.

Secured to the shaft 32 as shown in Fig. 5, there is a ratchet wheel 35 the teeth of which are engaged by a pawl 36 pivoted to a gear 37 which is rotatable on the shaft 32. The gear 37 is secured to a toothed wheel 38 also rotatable on the shaft 32 and engaged by a detent 39 pivoted to the casing 9. The gear 37 meshes with a long toothed gear 40 while the gear 40 meshes with a gear 41. Therefore when the shaft 32 is turned, the ratchet wheel 35 by means of the pawl 36 will rotate the gear 37 and also the toothed wheel 38. When the shaft 32 and the ratchet wheel 35 return to normal position, the wheel 38 will hold the gear 37 in the forward position to which it has been turned. The gear 41 is secured to a shaft 42 which is free in its bearings in the casing and is of sufficient length to slide back and forth. The teeth of the gear 40 are long to permit it to remain in mesh with the gear 41. The gear 41 has a ratio of one to one with the gear 37 on shaft 32. 43, 44, 45, and 46 are each part of a pair of gears to represent a given thickness and are fixed to the shaft 42. These gears are so arranged on the shaft in consideration of their mating gears referred to later that, as the shaft is shifted from one position to another, the teeth of one pair of gears will be engaged as all others are disengaged. 47 shown on shaft 42 is a shift collar, which is grooved to fit the teeth of the gear 48 on a shaft 48', which is used to govern it. The shaft 48' may be seen in Fig. 3, and consists of a short shaft mounted in the brackets 23 and 24 and running vertically through the machine with the spur gear 48 having teeth to mesh with the grooves of the collar 47. This shaft protrudes through the face of the machine and is turned in connection with the dial 10 representing thickness; this turns the spur gear 48 and causes the collar 47 to slide the shaft 42 thus engaging and disengaging mating gears now referred to. The gears 43, 44, 45, and 46 have a ratio to their mating gears, 49, 50, 51, and 52, which are mounted on a shaft 53 as follows: 43 to 49, a ratio of two to one; 44 to 50, a ratio of four to six; 45 to 51, a ratio of five to four; 46 to 52, a ratio of one to one. The motion is trans-

mitted from shaft 42 to shaft 53 by means of whichever pair of gears are engaged.

The gears, 49, 50, 51 and 52, which are mounted on the shaft 53 are arranged in coordination with their mating gears of the shaft 42 so that only one set of gears may be engaged at any particular time. The counting device 12 through which the shaft 53 passes freely is operatively associated with a collar 54, which fits over this shaft, and is free on the same. The gears marked 55, 56, and 57, shown on the shaft 53 are all fixed to this shaft and arranged in such a position as to coordinate with the arrangement of their mating gears 58, 59 and 60 on a shaft 61. The motion will be transmitted from the shaft 53 to the shaft 61 by whichever pair of gears are engaged. The ratios of the gears is as follows: 55 to 58, a ratio of six to five; 56 to 59, a ratio of three to two; 57 to 60, a ratio of two to one.

The gears 58, 59 and 60 are fixed to the shaft 61; they are arranged in such a position as to enable one set of gears to be engaged while all others are disengaged from their mating gears shown on the shaft 53. The member 62, on shaft 61 is identical with the member 47 on the shaft 42. It consists of a grooved collar fixed to the shaft, and works from the teeth of a gear 63 shown in Fig. 2. 63 is identical with 48, having a vertical shaft 63' projecting through the face of the machine and is turned in connection with dial 11 representing "width." By turning this dial, the shaft 61 may be slid backward and forward engaging and disengaging its gears from their mating gears shown on the shaft 53.

64 is a gear fixed to the shaft 61. It is used to transmit the motion from the shaft 61 to a long tooth gear 65. A gear 66 is secured to the collar 54 which is on the shaft 53, and is used to operate the counting device 12; it is a spur gear and receives the motion transmitted by 65; 66 has a ratio to 64 of two to one.

The counting device 12 which is operated by 66 on a direct drive registers in digits of ten, and may be of stock design.

Having thus explained each particular working part of this system, I will now trace the action throughout these parts, having a key set on the dials for width and thickness, that is, to use a specific size. This will trace the motion of the machine through one specific pair of gears to transform that motion from the shaft 42 to the shaft 53, and one specific set of gears to transform the motion from the shaft 53 to the shaft 61.

Let us suppose that we are to tally, using the size 1 by 6; then the dial 10 for the thickness would be set on the Figure 2. This would cause 47 to slide the shaft 42 into a position so as to engage 46 with 52. Then the dial 11 for width would be set at A, which would cause 62 to slide the shaft 61 into a position so as to engage 60 with 57. One of the keys representing length, would be pressed according to the length to be tallied; if the key 16 representing ten were pressed, the action would be transmitted to the rack which has five teeth. This rack would slide forward on its bar 25 to contact the stop 27. The engagement of the teeth of the rack would turn shaft 32 exactly one-half of a turn in a counter-clockwise motion. The ratchet 35 which is fixed to shaft 32 would engage its teeth with the pawl 36 on the gear 37 and turn the same exactly one-half of a complete turn. When the key 16 was released, the spring 30 attached to the frame of

the machine would bring the shaft 32 back to normal position, which would be held by the return stop, which is designated as 34. The pawl 36 would allow the wheel 38 to turn in a counter-clockwise motion; but, as the shaft 32 returned to a normal position, it would hold the wheel 38 at the given part of a turn to which it has been moved.

The motion would then be transmitted by means of the gear 40 to the gear 41 on the shaft 42 at a ratio of one to one; this would cause 42 to turn likewise in a counter-clockwise motion one-half of a complete turn. Since the gear 46 has a ratio of one to one with the gear 52, the motion would be transmitted to the shaft 53, which would turn one-half of a complete turn in a clockwise motion. The gear 57 would transmit its motion to the gear 60 on the shaft 61, and since the ratio here is two to one, the shaft 61 would turn one-fourth of one complete turn in counterclockwise motion. The gear 64 would then transmit its power by means of the gear 65 to the gear 66 and collar 54 at a ratio of one to two, which would turn the first dial of the counting device 12 one-half of a complete turn; the dial would then register the figure 5. To check this, we would figure the length and size that we have tallied. That is, with one piece of 1 by 6, 10 feet long, the footage is equal to five;

$$\frac{1\times1\times6\times10}{12}=5$$

This operation may be followed using any particular length or size, and it would check out exactly, and when used continuously, will compile on the counting device.

The gears and other parts herein used might be of any particular size and description, might be of any arrangement so justified as to make up a machine which is light in construction, economical to produce, and carries out the same application of principle. Gears of different ratios might be used to represent different sizes not shown or incorporated in this particular machine which I have explained, but being calculated and used in such a manner as to carry out the action following the same application of principle which I have described.

I claim:

1. In mechanism for tallying lumber, the combination of a casing, a plurality of key levers pivoted to said casing and representing different lengths of lumber respectively, springs normally holding said levers retracted, a plurality of rack gears of different length pivoted to said key levers respectively, a plurality of guide bars in said casing on which said rack gears are supported respectively for sliding movement, stop members secured to said guide bars at different places respectively thereon, a longitudinal shaft rotatably mounted in said casing, a plurality of gears secured to said shaft with which said rack gears respectively are adapted to be moved into meshed engagement, a ratchet wheel secured to one end of said shaft, a pawl engaging said ratchet wheel, a gear rotatable on said shaft and to which said pawl is pivoted, a wheel to which said gear is secured, a detent pivoted to said casing and engaging said wheel, a gear rotatably mounted in said casing and with which the last mentioned gear meshes, a slideable shaft mounted in said casing, a gear secured to said slidable shaft and having slideable engagement with said last mentioned gear, a plurality of gears secured to said slideable shaft, a grooved

shift collar secured to said slideable shaft, a vertical short shaft, brackets in which said short shaft is rotatable, a gear secured to said short shaft and having teeth meshing with the grooves of said collar, a dial designating thickness of material secured to the end of said short shaft, a second longitudinal shaft rotatably mounted in said casing, gears secured to said last longitudinal shaft and which may be meshed respectively with coordinated gears of said slidable shaft according to the position thereof as determined by the setting of said dial, and a counting device through which said second longitudinal shaft passes operatively connected to said shaft.

2. In mechanism for tallying lumber, the combination of a casing, a plurality of key levers pivoted to said casing and representing different lengths of lumber respectively, springs normally holding said levers retracted, a plurality of rack gears of different length pivoted to said key levers respectively, a plurality of guide bars in said casing on which said rack gears are supported respectively for sliding movement, stop members secured to said guide bars at different places respectively thereon, a longitudinal shaft rotatably mounted in said casing, a plurality of gears secured to said shaft with which said rack bars respectively are adapted to be moved into meshed engagement, a ratchet wheel secured to one end of said shaft, a pawl engaging said ratchet wheel, a gear rotatable on said shaft and to which said pawl is pivoted, a wheel to which said gear is secured, a detent pivoted to said casing and engaging said wheel, a gear rotatably mounted in said casing and with which the last mentioned gear meshes, a slideable shaft mounted in said casing, a gear secured to said slideable shaft and having slideable engagement with said last mentioned gear, a plurality of gears secured to said slideable shaft, a grooved shift collar secured to said slideable shaft, a vertical short shaft, brackets in which said short shaft is rotatable, a gear secured to said short shaft and having teeth meshing with the grooves of said collar, a dial designating thickness of material secured to the end of said short shaft, a second longitudinal shaft rotatably mounted in said casing, gears secured to said last longitudinal shaft and which may be meshed respectively with coordinated gears of said slideable shaft according to the position thereof as determined by the setting of said dial, a counting device through which said second longitudinal shaft passes, a plurality of gears secured to said longitudinal shaft beyond the opposite end of said counting device, a second slideable shaft mounted in said casing, an operative connection between said counting device and said second slideable shaft, a gear connection between said second slideable shaft and said last longitudinal shaft, a plurality of gears secured to said second slideable shaft, a grooved shift collar secured to said second slideable shaft, a second vertical short shaft, brackets in which said second short shaft is rotatable, a gear secured to said second short shaft and having teeth meshing with the grooves of said collar, and a second dial representing width of material secured to the end of said second short shaft whereby the last mentioned gears of the last longitudinal shaft may be meshed respectively with coordinated gears of the second slideable shaft according to the position thereof as determined by the setting of said second dial.

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