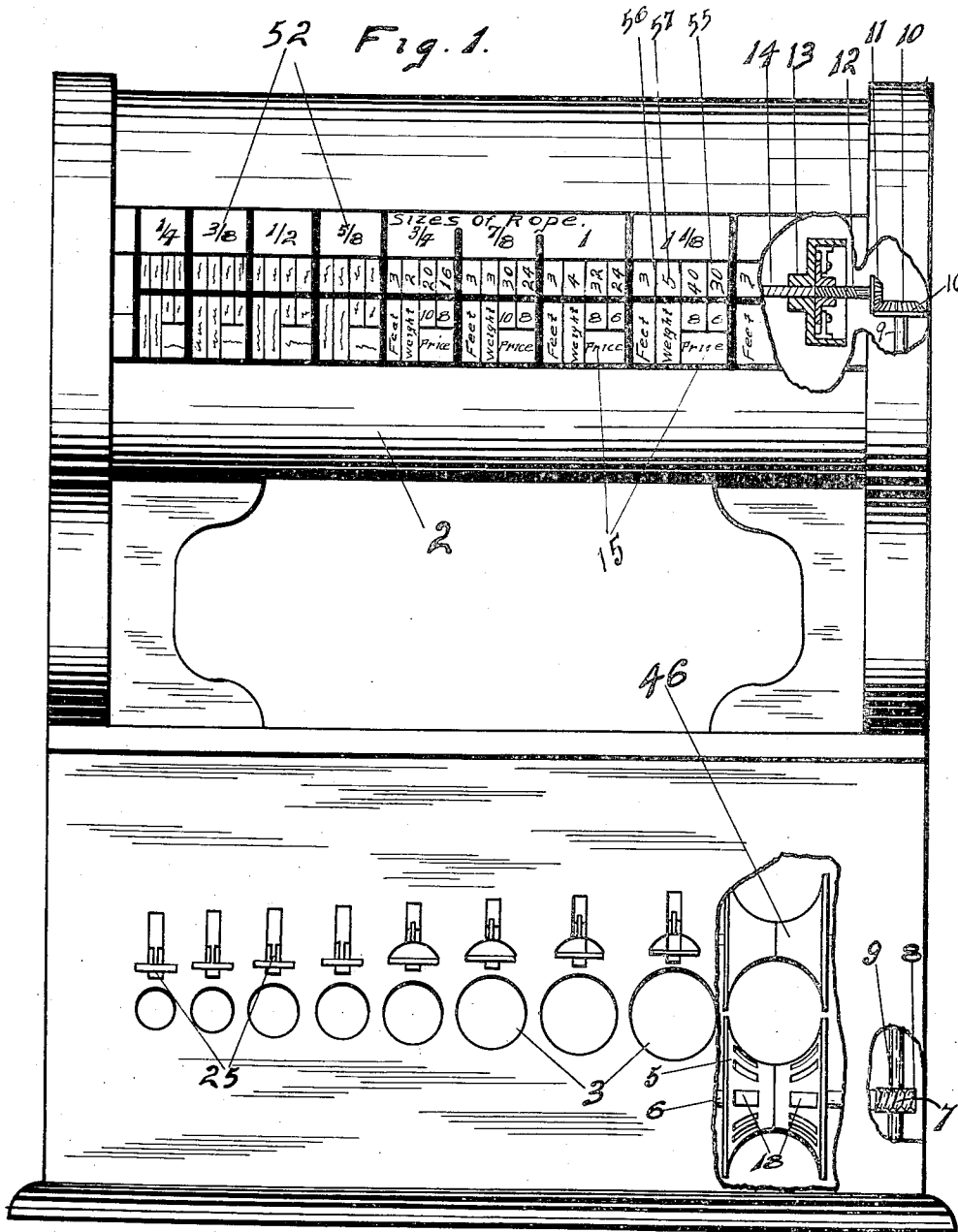


C. A. BENBOW.  
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 APPLICATION FILED MAY 8, 1908.

936,078.

Patented Oct. 5, 1909.

2 SHEETS—SHEET 1.



Witnesses  
 Ed. W. Grant  
 Mrs. Thomas Bilyeu

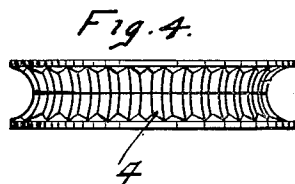
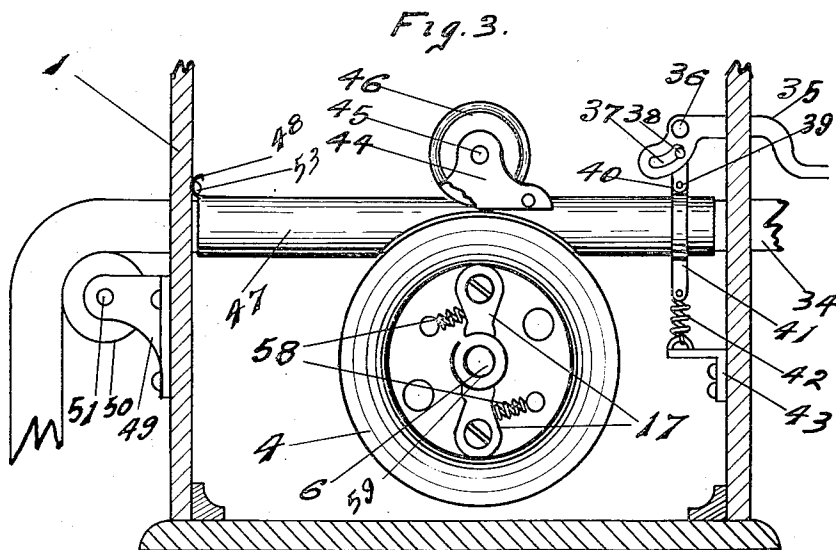
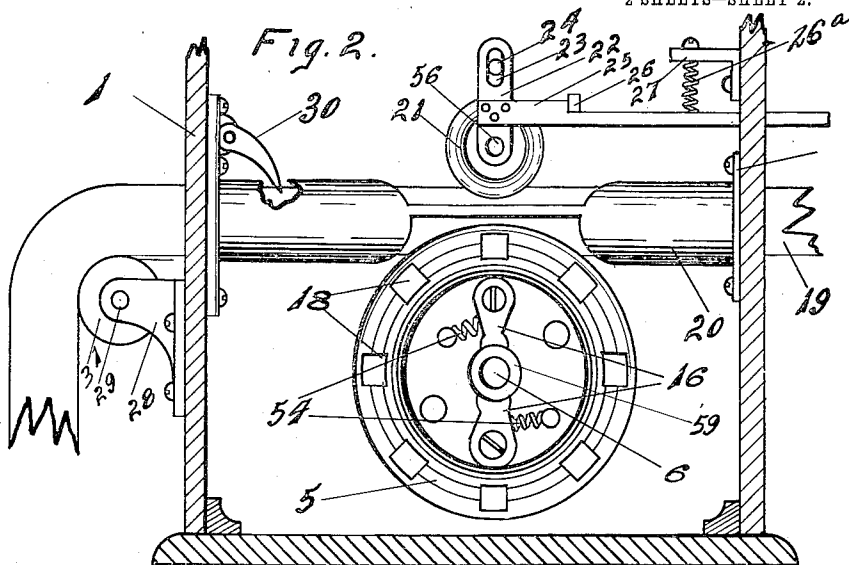
Inventor  
 Charles A. Benbow.  
 Attorney  
 Thomas Bilyeu.

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2 SHEETS—SHEET 2.



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Inventor  
Charles A. Benbow.  
Attorney  
Thomas Bilyeu.

# UNITED STATES PATENT OFFICE.

CHARLES A. BENBOW, OF PORTLAND, OREGON.

## ROPE-COMPUTING MACHINE.

936,078.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed May 8, 1908. Serial No. 431,623.

To all whom it may concern:

Be it known that I, CHARLES A. BENBOW, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Rope-Computing Machine, of which the following is a specification.

My invention relates to improvements in rope computing machines in which the rope is pulled through between two sheaves and by reason of the passage of the rope, the sheaves are caused to rotate a series of shafts connecting these sheaves with a graduated rotating drum having attached to it a series of strips of thin material. A series of levers is so arranged that the smaller of each set of sheaves may be raised or lowered and thereby cause the rope to be held firmly between them and this causes the sheaves to revolve as the rope is pulled through the machine.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a machine embodying the invention; Fig. 2 is a cross section through the machine, showing the arrangement of the sheaves, and how the lever operates for engaging and dis-engaging the two sheaves in connection with the rope. This is the type that is used on the larger rope. Fig. 3 is a cross section through the machine also, showing the method of raising and lowering the smaller sheave. This is the type that is used on the smaller rope. Actual practice has shown that the two different types of sheaves are necessary for the different sizes of ropes. Fig. 4 is the view illustrating the type of sheave used as shown in the cross section of Fig. 3.

Similar numerals refer to similar parts throughout the several views.

1 is the casing of the machine.

2 is the casing of the drum or cylinder in which the drum which contains the graduations revolves.

3 are the openings through which the rope is drawn after passing through between the sheaves.

4 is a corrugated sheave or roller which I prefer to make in two parts and then fasten them together, having corrugations on and around the inner face as shown in Fig. 4. This form is used on the smaller forms of rope. 5 is another form of sheave or roller and is to be used on the larger rope; this is

to be made of pressed metal, in two parts and having holes pressed out, when made, as shown at 18.

6 is the shaft on which all the lower sheaves are journaled. On the end of shaft 6 is a worm 7 which meshes with the worm wheel 8; this is keyed to shaft 9 and as shaft 9 is caused to rotate, it transmits its rotation to beveled gear 10 which in turn meshes with and causes to rotate bevel gear 11. When this revolves, shaft 12 also rotates.

13 is a one way friction clutch so that when shaft 12 is the driving shaft the clutch operates and transmits its motion to shaft 14, but in the event that 14 is the driving shaft, or should be caused to rotate, there is no transmission of rotation to shaft 12.

15 are the graduated strips upon which the feet, the weight, the price, and the amount is stamped for each size of rope.

In order to simplify the construction it is necessary that the sheaves be not rigidly keyed, or otherwise fastened to the shaft 6, but that a friction clutch be used instead. This is accomplished by arms 16 Fig. 2 and 17 Fig. 3; so long as the sheave is driving the arms will grip the shaft, but as soon as the shaft becomes the driver the sheave does not of necessity turn, or but one size of rope can be drawn from the machine at one time.

18 are the holes in the sheave to be used on the larger size of rope.

19 represents the rope to be drawn through the larger sizes.

20 is the tube through which the rope is drawn and is cut out as shown so that the sheaves may come in contact with the rope.

21 is the smaller sheave that comes in contact with the rope on the upper side.

22 is a guide that is journaled to the sheave by means of axle 56.

23 is a slot in the guide and is to allow for the small amount of variation in the sizes of the rope.

24 is a shaft that passes through the slot 23.

25 is an arm that allows for the shifting of guide 22.

26 is a stop that limits the upward movement of the arm 25.

27 is a support for a spring 26<sup>a</sup> that connects arm 25 with support 27.

30 is a pawl and is for the purpose of keeping the rope in place when it is drawn out and cut off—thus not permitting

the rope to recede back through the machine out of reach.

31 is a roller over which rope passes on its way to the machine and 28 is the bracket which holds it in place.

47 is the case through which the smaller ropes pass.

34 is the rope.

35 is the lever by the operation of which the smaller sheaves 46 are lowered and hence brings the rope in contact with the larger sheave 4. 36 is the axial bearing about which it turns.

37 is a slot in arm of 35 and is for the passage of 38 when it is desired to lower the case 47. 39 is the axis about which it will turn and 40 is the link that connects 38 and 39.

41 is a band that encircles the case 47 to the lower end of which is fastened a spring 42.

43 is a bracket that secures the spring 42 to the case of the mechanism. When the lever 35 is raised this permits the lowering of the case 47 because the bearing will pass down the slot 37 due to the action of the spring 42.

44 is a brace that secures the sheave 46 to the case 47.

45 is the journal bearing which passes through the brace 44 as well as through the sheave 46.

48 is a small turn-up at the end of the case 47 and through it passes the pin 53—this allows for the small raising and lowering of the case 47 when the lever 35 is operated.

49 is a bracket that is fastened to the back of the frame and through it passes the journal 51 upon which turns the roller 50.

52 is the metal strip that is fastened to the outside drum 2 having marked upon it the different sizes of rope as shown, these being directly over the strips containing the graduations. As the rope is withdrawn the number of feet appear in space 56; the weight in space 57 and the amount for the different prices in space 55.

54 and 58 are small springs that cause the clutches 16 and 17 to operate upon the enlargements of shaft 6 as 59.

It will be apparent that an essential feature of the present invention resides broadly in the provision of a pair of grooved rope feeding rollers between which each size of rope passing through the machine is adapted to be fed, one of said rollers being mounted for movement toward and from the other roller, whereby upon adjustment of the movable roller sufficient friction is caused between said rollers and the rope to effect the desired operation of the computing mechanism. The pairs of rollers which are employed for feeding the rope are adapted for relative adjustment by independent or separate devices, this being necessary in order

that the computing mechanism may be operated by one pair of feeding rollers, without being affected in any way by the mounting or arrangement of the various other pairs of rollers between which the other sizes of rope pass.

The shaft 24 is suitably mounted in the casing of the machine and supports the upper sheaves of the several pairs aforesaid, each of said upper sheaves being adapted for vertical movement independently of the other sheaves by reason of the provision of the slot 23 through which the shaft 24 passes. The part 24 is practically a pivotal connection between the levers 25 mounted thereon and the casing. As before described the cylinders 47 are provided as guides for the rope passing through the machine and when the levers 35 are operated the cylinders 47 may be raised and lowered by reason of being pivoted at 53 to a wall of the casing in which the sheaves and their parts are mounted.

In operation it will be apparent that when a certain grade or weight of rope is to be vended, the outer end thereof is pulled upon after operating the lever by which the upper sheave coöperating with such rope is actuated. Operation of the lever carries such upper sheave toward the adjacent lower sheave whereby the latter has sufficient frictional contact with the rope to cause turning of the shaft 6. When the shaft 6 is rotated the motion thereof is transmitted through suitable gearing before described so that the shaft 14 will rotate and turn the computing drum or cylinder.

Any suitable computing indicia is provided upon the computing cylinder and as illustrated in the drawings it will be apparent that if one and one-eighth inch rope is being drawn from the machine, assuming that three feet of said rope is to be sold, the computing cylinder will indicate that the said rope will weigh five pounds. If the grade of rope sells at eight cents a pound, five pounds will cost forty cents as noted by numerals on the cylinder, or if the grade of rope sells at six cents a pound the cylinder will disclose that the cost price is thirty cents.

Should it be desired at any time to elevate the sheave 21 from contact with the rope attached to the machine, the lever 25 is pressed downwardly at its outer end and the spring 20<sup>a</sup> which normally holds said lever in the position shown in Fig. 2 will then cause the ends of the lever carrying the sheave 21 to be slightly elevated and rest against the member 22.

In the rope computing machine as described herein, I wish to make the following claims:

1. In a machine of the class described the combination of computing mechanism, rope

feeding mechanism embodying a plurality of sheaves operably connected with the computing mechanism and adapted for contact with the rope passing through the machine, and independent devices cooperating with said sheaves to cause operative contact of the various grades of rope passing through the machine with the sheaves, whereby movement of rope through the machine may turn one sheave independently of the other and thereby actuate the computing mechanism.

2. In a machine of the class described the combination of computing mechanism, a plurality of pairs of sheaves so arranged as to permit various grades of rope to pass between the sheaves of each pair, means operably connecting one of the sheaves with the computing mechanism, independent operating levers connected with the other sheaves to move the same into positions causing operative contact of the rope with the first mentioned sheaves, and means supporting said operating levers and permitting independent actuation thereof.

3. In a machine of the class described the combination of computing mechanism, rope feeding mechanism comprising a plurality of pairs of sheaves between each pair of which various grades of rope may pass in being fed from the machine; a shaft supporting the lowermost sheaves of each pair, said lowermost sheaves being loosely mounted on said shaft, means connecting the shaft with the computing mechanism, means for operably connecting each lower sheave with the shaft when said sheave is turned as rope passes through the machine, whereby the shaft is operable by each lower sheave independently of the other sheave, and means for independent operation of the upper sheaves to cause rope adjacent thereto to be

thrown into operative contact with the adjacent lower sheave.

4. In a machine of the class described, the combination of computing mechanism, rope feeding mechanism embodying a pair of rollers, one of said rollers being movable bodily toward and from the other roller, said pair of rollers being arranged to receive therebetween rope passing through the machine, an operating member whereby the bodily movable roller aforesaid may be moved toward the other roller to cause operating contact of said roller with the rope and actuation of the computing mechanism, and means normally tending to hold the bodily movable roller out of the aforesaid cooperative relation with regard to the adjacent roller.

5. In a machine of the class described, the combination of computing mechanism, including a registering scale, rope feeding means embodying a series of pairs of rollers between each pair of which rope of a certain size is adapted to be fed, one roller of each pair being rotatable about a permanent axis and being operably connected with the computing mechanism, the other roller of each pair being bodily movable toward and from the first mentioned roller to cause operative engagement of the first mentioned roller with the rope adjacent thereto, a lever for effecting bodily movement of the movable roller above referred to, and spring means normally tending to hold the bodily movable roller in a position permitting free passage of rope between the various rollers without operation of the computing mechanism.

CHARLES A. BENBOW.

Witnesses:

ED. W. GRANT,  
Mrs. THOMAS BILYEU.

### DISCLAIMER.

936,078. *Charles A. Benbow*, Portland, Oreg. ROPE-COMPUTING MACHINE. Patent dated October 5, 1909. Disclaimer filed April 27, 1922, by the assignee, *Grand Rapids Show Case Co.*

Enters this disclaimer—

To that part of the description and to that part of the claim in said specification which is in the following words, on page 2, lines 117 to 125, inclusive, of the printed copy of the patent, to wit:

“Should it be desired at any time to elevate the sheave 21 from contact with the rope attached to the machine, the lever 25 is pressed downwardly at its outer end and the spring 20<sup>a</sup> which normally holds said lever in the position shown in Fig. 2 will then cause the ends of the lever carrying the sheave 21 to be slightly elevated and rest against the member 22.

“And also claim 5 of the patent, to wit:

“5. In a machine of the class described, the combination of computing mechanism, including a registering scale, rope feeding means embodying a series of pairs of rollers between each pair of which rope of a certain size is adapted to be fed, one roller of each pair being rotatable about a permanent axis and being operably connected with the computing mechanism, the other roller of each pair being bodily movable toward and from the first mentioned roller to cause operative engagement of the first mentioned roller with the rope adjacent thereto, a lever for effecting bodily movement of the movable roller above referred to, and spring means normally tending to hold the bodily movable roller in a position permitting free passage of rope between the various rollers without operation of the computing mechanism.”

[*Official Gazette May 9, 1922.*]