

W. R. Dutcher.
Cord and Rope Mach.

N^o 17,496.

Patented Jun. 9, 1857.

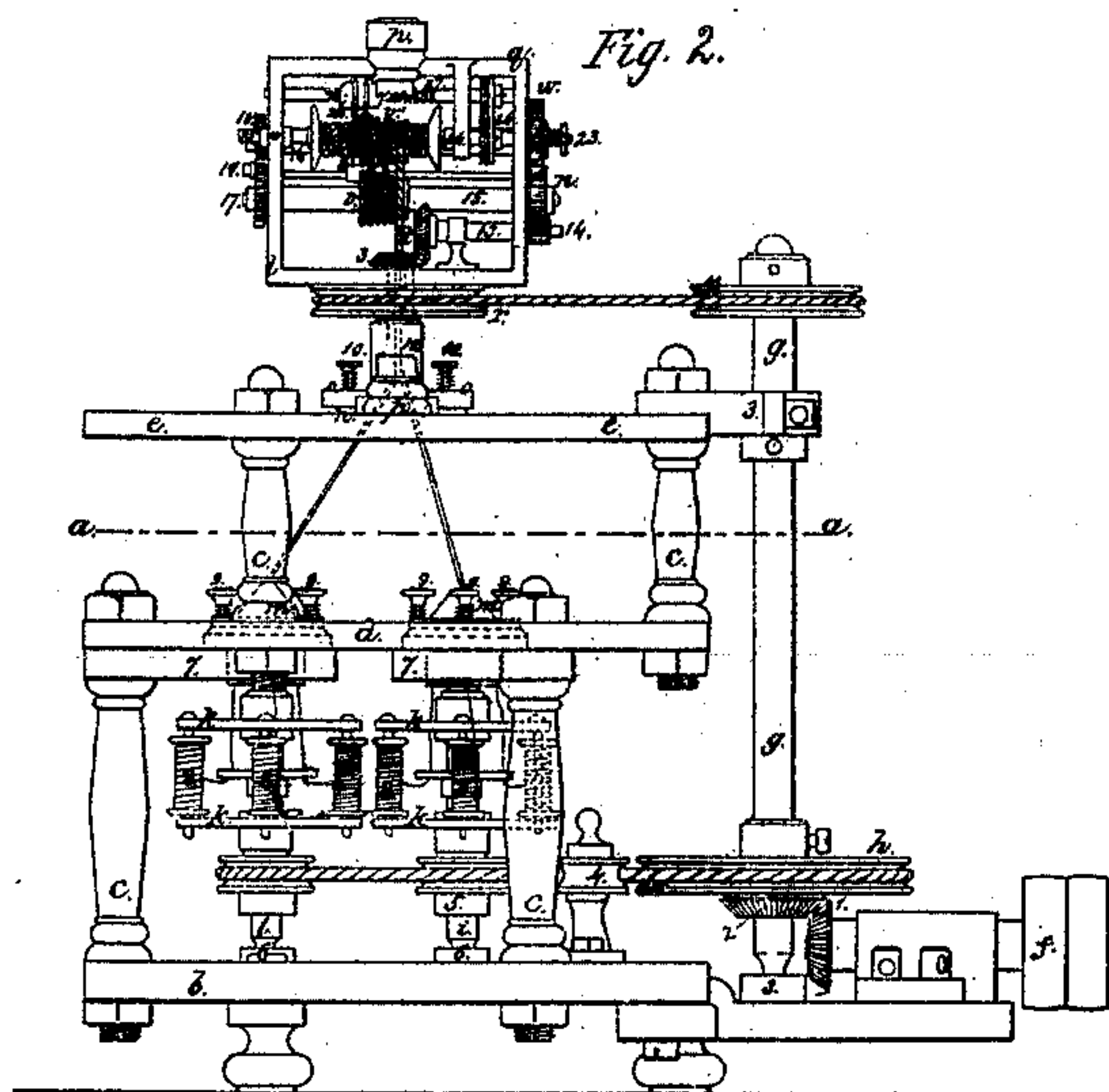


Fig. 2.

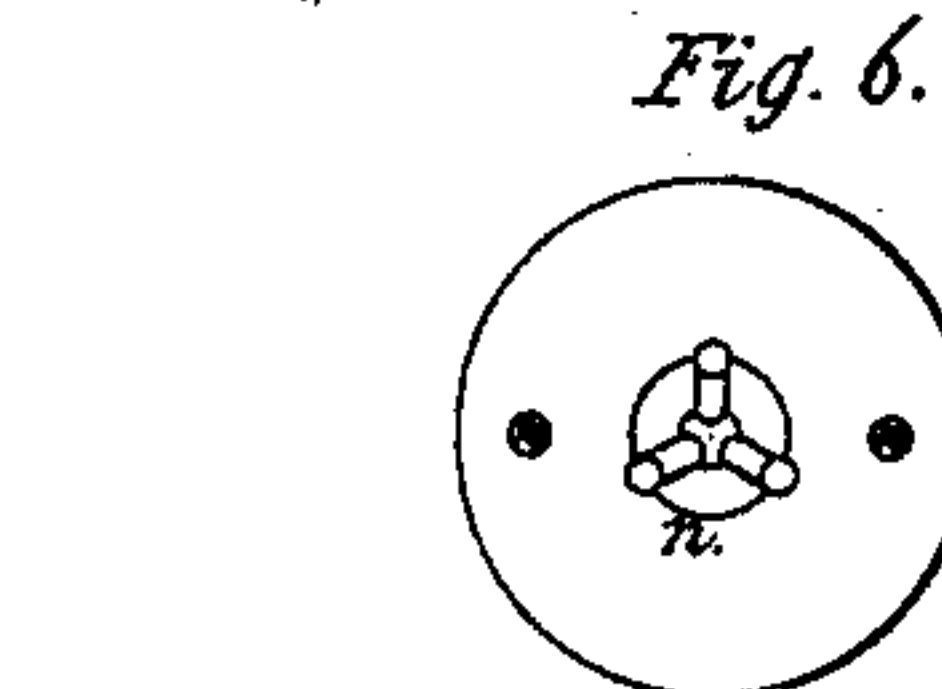
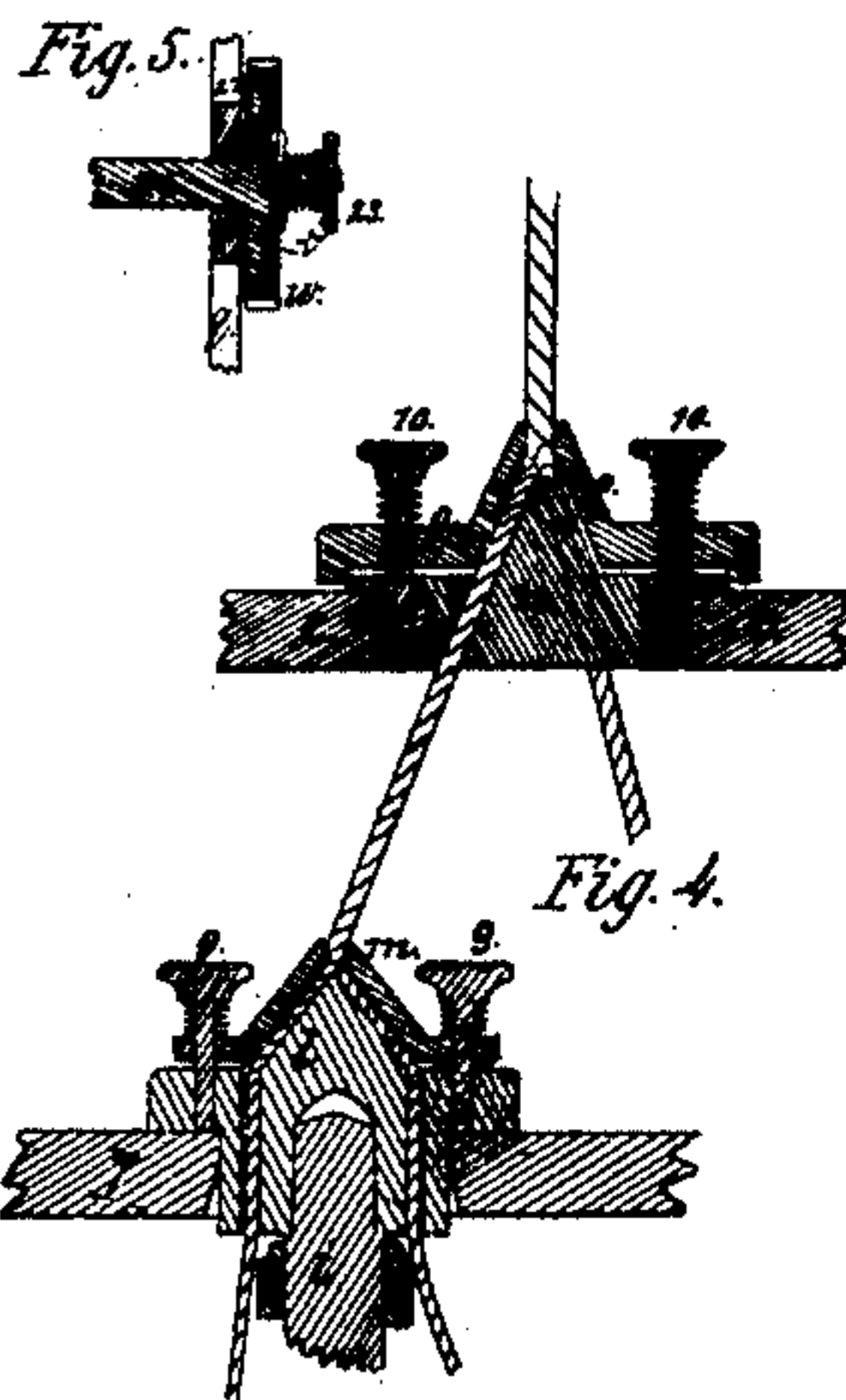


Fig. 3.

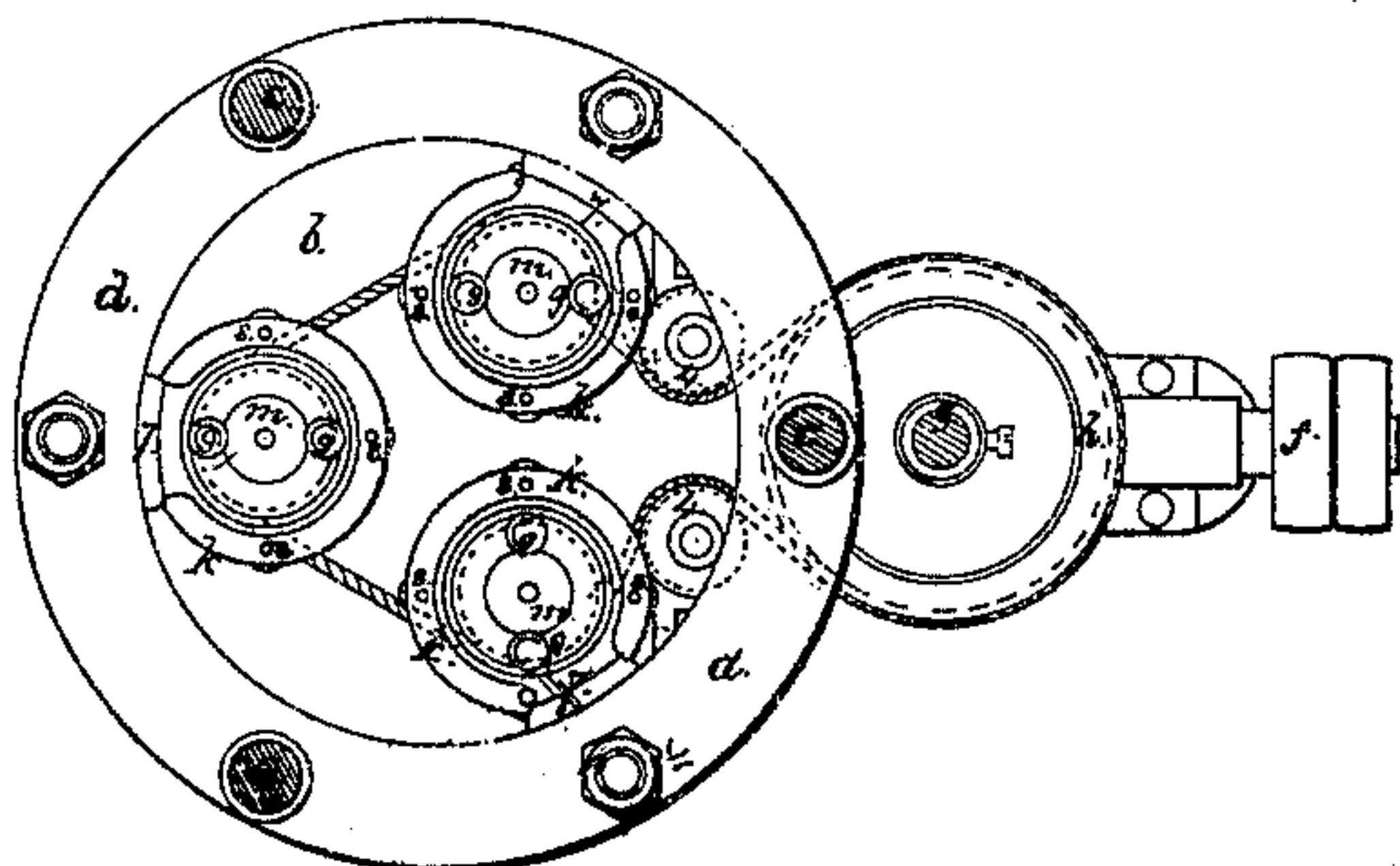
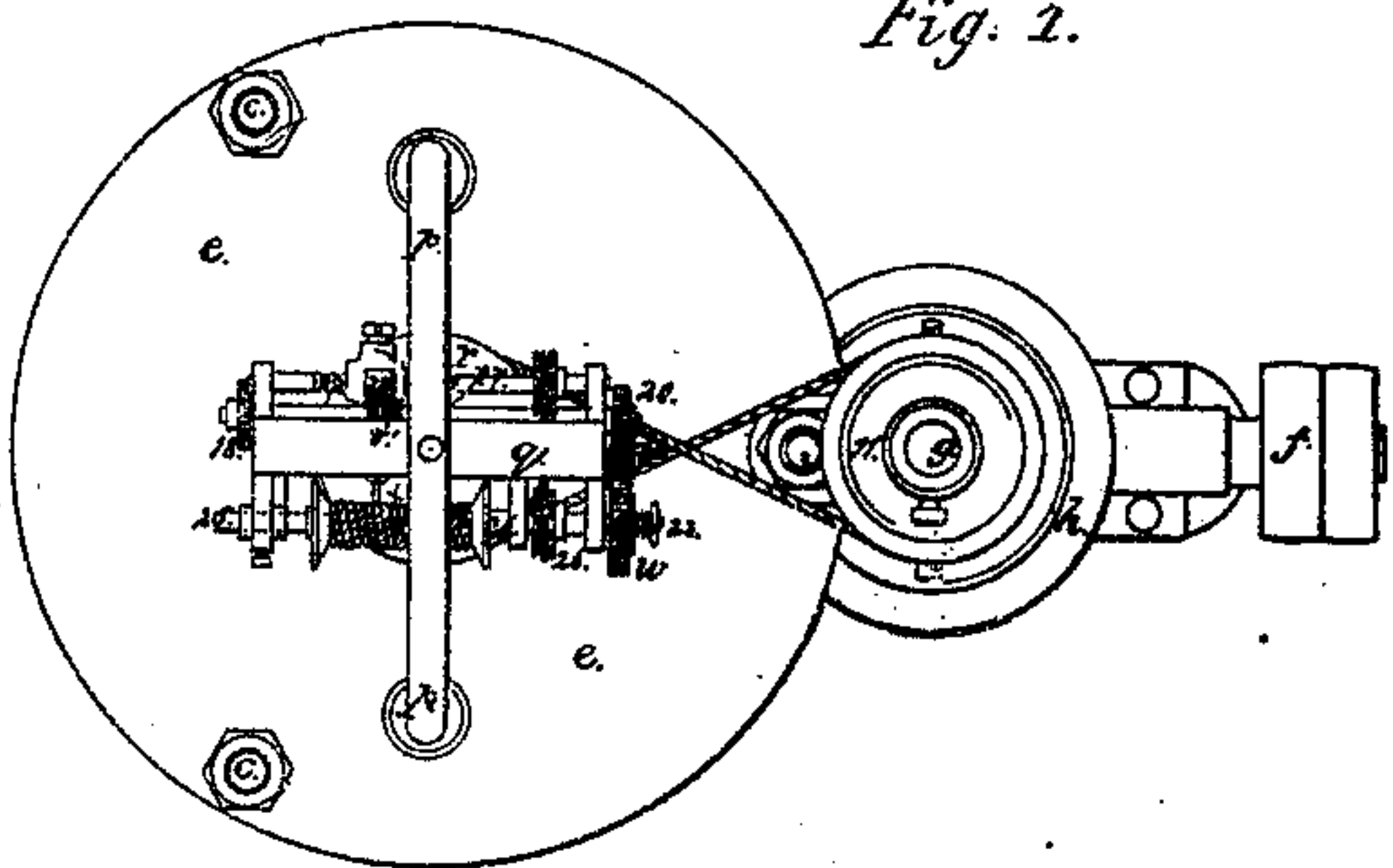


Fig. 1.



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UNITED STATES PATENT OFFICE.

WILLIAM R. DUTCHER, OF LANSINGBURG, NEW YORK.

IMPROVEMENT IN ROPE-MACHINES.

Specification forming part of Letters Patent No. 17,496, dated June 9, 1857.

To all whom it may concern:

Be it known that I, WILLIAM R. DUTCHER, of Lansingburg, in the county of Rensselaer and State of New York, have invented, made, and applied to use certain new and useful Improvements in Machinery for Making Rope and Cordage; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a plan of the machine complete. Fig. 2 is a side elevation. Fig. 3 is a sectional plan at the line *a a* of Fig. 2. Fig. 4 is a section of the lay-up self-adjusting thimble and cone for forming the strand and rope, and Fig. 5 is a section of the friction-plate made use of to revolve the winding-reel.

Similar marks of reference denote the same parts.

The nature of my said invention consists in a self-adjusting thimble applied in combination with a grooved cone, through which grooves the yarns or strands run and are kept at the proper tension by the self-adjusting thimble, which, when applied in forming the strands, lays the same with great precision and causes a uniform strain on all the yarns. At the same time the strands are prevented from breaking in consequence of obstructions caused by knots in the yarn, and the pressure yields to any such obstructions, letting them pass.

In the drawings, *b* is the bed-plate of the machine.

c c c are columns connecting the intermediate rings *d* and the upper bed *e*.

f is the driving-pulley, to which competent power is to be applied to rotate the vertical shaft *g* through the miter-gears 1 and 2. The shaft *g* is supported in journals 3, and is provided with a grooved drum or pulley *h*, from which a belt or cord passes between the friction and tightening rollers 4 and around the pulleys 5 of the creel-shaft *i*. These creel-shafts *i* may be three, four, or more in number, according to the number of strands in the rope to be made in the machine, and are supported in journals 6 and 7 on the bed *b*, and extending from the ring *d*. These creel-shafts are to be rotated in the correct direction and at the desired speed (relatively with

the revolution of the revolving frame that lays up the rope) by changing the relative size of the pulleys, and instead of one pulley *h*, separate grooved pulleys might be used, with a separate belt or cord to each creel-shaft, or gear-wheels might be substituted as a means for rotating the creels or laying up the rope, as hereinafter detailed.

On the creel-shafts *i* rings *k* are attached, receiving the bobbins 8 in one or more ranges and of the desired number, and from these bobbins the yarns are led through guide-rings and in equal number through each of the holes in the strand-cone *l*, the base of which is attached to the top of the creel-shaft *i*, and rotates in the journal-bearing 7. The cone *l* is itself formed with grooves in its inclined surface in which the yarns pass to be formed into a strand at the apex of said cone. If this cone only were used, or if there was any spring-nipper applied to produce tension on the strand, any knots or inequalities would be apt to stick at this point, breaking the yarn, and to produce a rope of uniform strength the yarns forming the strands must be each retained by a uniform tension, which cannot be effected where friction is applied to the spool or bobbin, because the same varies in size as depleted by the winding off, lessening the power against the resistance. I therefore apply a self-adjusting thimble *m*, in combination with said cone *l*, which presses on the yarns as they move along in the grooves in the cone *l*, and said self-adjusting cone-thimble is kept down in place by helical springs around regulating-screws 9, that enter the flange around the base of the cone *l*, so that any amount of power and tension can be applied to each yarn and to the strand as a whole, so as to lay the same with the utmost precision and beauty; and should there be any knot or obstruction to the free passage of the yarn my said self-adjusting cone-thimble yields to the same, and either gradually draws the knot down or allows it to pass. My improved self-adjusting cone-thimble is also to be used in laying up the rope both as a means for causing the strands to come together properly as well as to give the necessary tension on said strands, and the said lay-up cone and self-adjusting cone-thimble is to be stationary when used in the present arrangement, although the same might be revolved

in machines of that character in which the creels revolve around a center-shaft as well as on their own axes.

n is the lay-up cone attached to the upper bed *e*, through the flange of which the strands pass freely and move through the grooves of the cone, (see plan Fig. 6,) and are formed into rope at the apex of the cone.

o is the self-adjusting thimble to the cone kept onto the strands with the desired power from helical springs (or their equivalents) regulated by the adjusting or thumb screws 10.

Above the upper bed *e* is a frame *p*, carrying the revolving frame *q* and reel. One of the columns of the frame *p* is shown as partially removed in Fig. 2 to show the other parts. The frame *q* rests and revolves on a bracket or step 12, that sets over the cone *n* and a center pin or gudgeon in the cross-piece of the frame *p*.

r is a pulley on the frame *q* driven by a band or other suitable means from the pulley 11 on the shaft *g* in the correct direction (relative with the direction in which the creels revolve) and at such a speed as to lay up the rope from the strands in the desired manner.

The rope as formed passes through a pipe on the step 12 and around the stretching-rollers *v* and *v'* on the shafts 15 and 16. These rollers are driven at the proper speed by a stationary gear *s* on the upper end of the stationary pipe through which the rope passes.

t is a gear or miter wheel on a shaft 13, taking motion as it revolves with the frame *q* from the miter-gear *s*.

14 is a pinion communicating motion to the gear-wheel *u* on the shaft 15 aforesaid, and the shafts 15 and 16 are connected together so as to propel the stretching-rollers *v* and *v'* by the gears 17 and 18 and an intermediate pinion 19. The speed of the stretching-rollers may be regulated by changing the pinion 14 for another of a different size, in which case adjustable intermediate gears will be needed.

On the end of the shaft 16 is a gear-wheel 20 to a pinion 21, that matches into a wheel *w*, that incloses a friction-plate 22, against which the wheel *w* is forced with the desired power by a spring and nut 23. The plate 22 is on the end of a short shaft 24, the end of which enters (by a square or similar means) a hole in the end of the winding-reel *x*, and 25 is a centering shaft on which the other end of said reel revolves, or said shaft 25 can be loosened by relieving its clamp-screw and slid along so that the reel can be removed.

26 are pulleys driving the endless screw-shaft 27, communicating motion to the traveler 28 for guiding the rope as it is wound on the reel from the stretching-rollers. The speed of the parts is such as always to take

up the rope as made; but when the winding-reel is nearly full its difference of diameter and speed in winding is compensated by the gear *w* slipping on the friction-disk 22.

It will be apparent that instead of the traveler 28 the reel *x* might have an endwise motion communicated to it by an endless screw or otherwise, so as to cause the rope to be properly wound.

By my arrangement of machinery it will be seen that great simplicity and durability are attained and there is no loss of twist on the strands when the same are laid into rope, as is the case where the planetary or double revolving motion is given to the creels and the rope made is stationary, and in all cases the tension on the yarn or strands is given at the point where they are laid together.

Having thus described my improved machinery for making rope and cordage and shown the operation of the same, I wish it to be understood that I do not claim a cone for laying the strands into rope in itself. Neither do I claim a movable cone or a cone kept to a fixed tube by a spring, as these have before been used; but in this latter device any knot or bunch in the strand or yarn tends to draw the cone into the conical tube and wedge the other strands tighter and cause them all sometimes to break, whereas in my device any bunch or knot tends to lift the adjustable cone-thimble and relieve all the strands slightly and allow a knot to pass and afterward be partly drawn down or stretched with the rope as laid in the machine; but by the use of the self-adjusting thimble with either or both the strand-cone *l* and lay-up cone *n*, the greatest possible uniformity of tension and position are obtained, both on the yarn and strand.

I do not claim a friction applied between the motive power and the reel and allow the latter to slip and only wind the rope as made; but I am not aware that an adjustable friction-plate has ever before been applied in such a manner by the screw and spring 23 as to be adjusted and adapted to different characters of rope.

What I claim, and desire to secure by Letters Patent, is—

The self-adjusting thimble *m* or *o*, combined with the cone *l* or *n*, when kept toward the said cone by suitable yielding pressure for the purpose of laying up either the strand or rope and adjusting itself to any inequalities without breaking either the yarns or strands, substantially as and for the purposes specified.

In witness whereof I have hereunto set my signature this 26th day of March, 1857.

WILLIAM R. DUTCHER.

Witnesses:

LEMUEL W. SERRELL,
THOMAS G. HAROLD.