

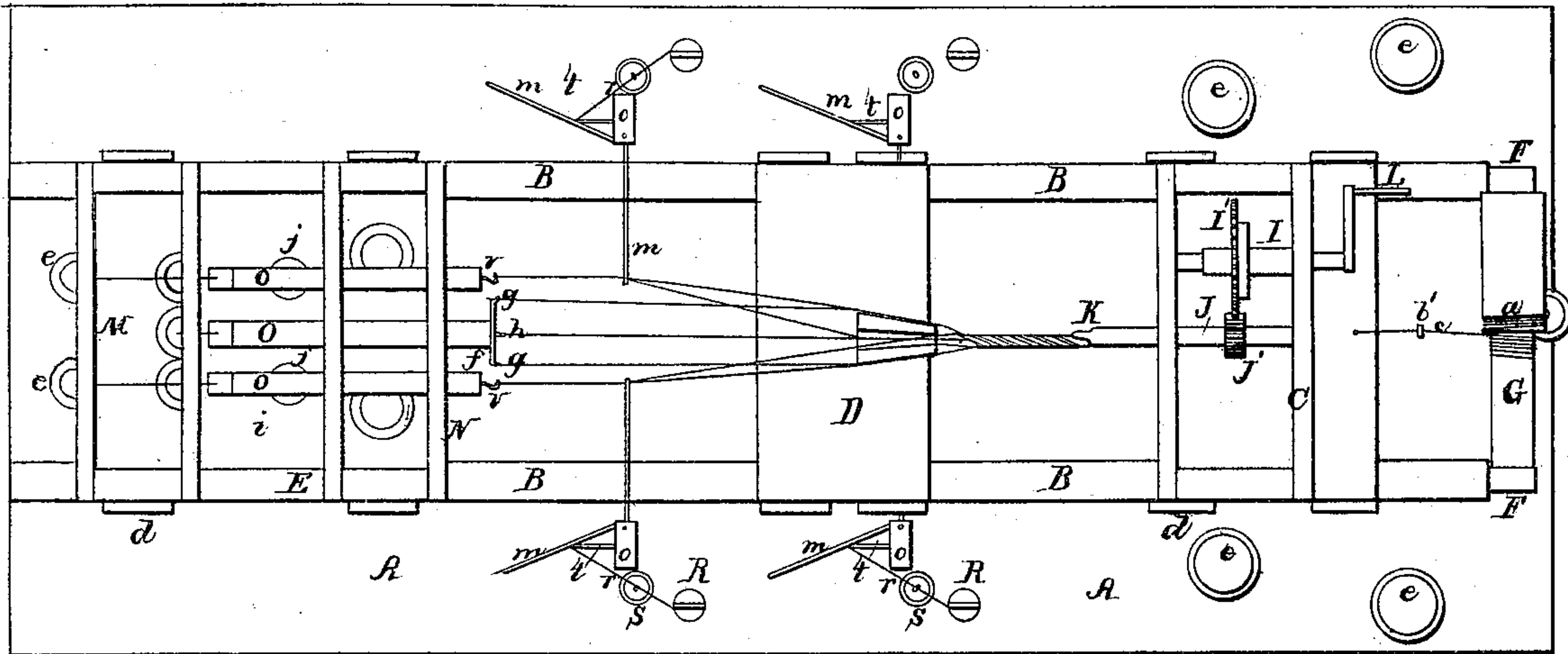
*J. Cushman.*

*Machine for Making Wire Rope.*

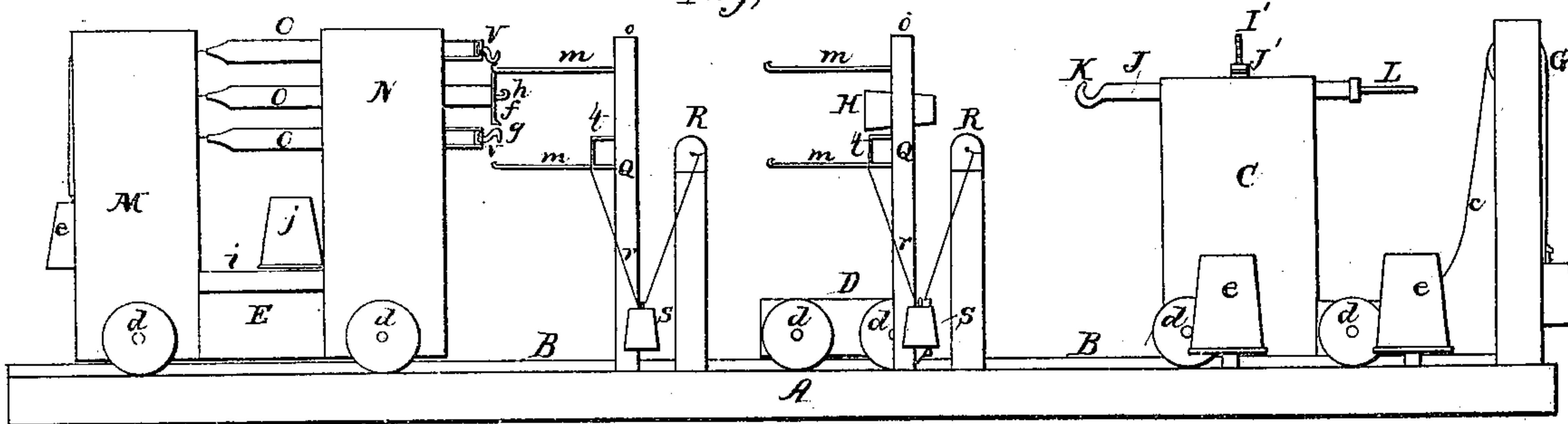
*N<sup>o</sup> 16,790*

*Patented Mar. 10, 1857.*

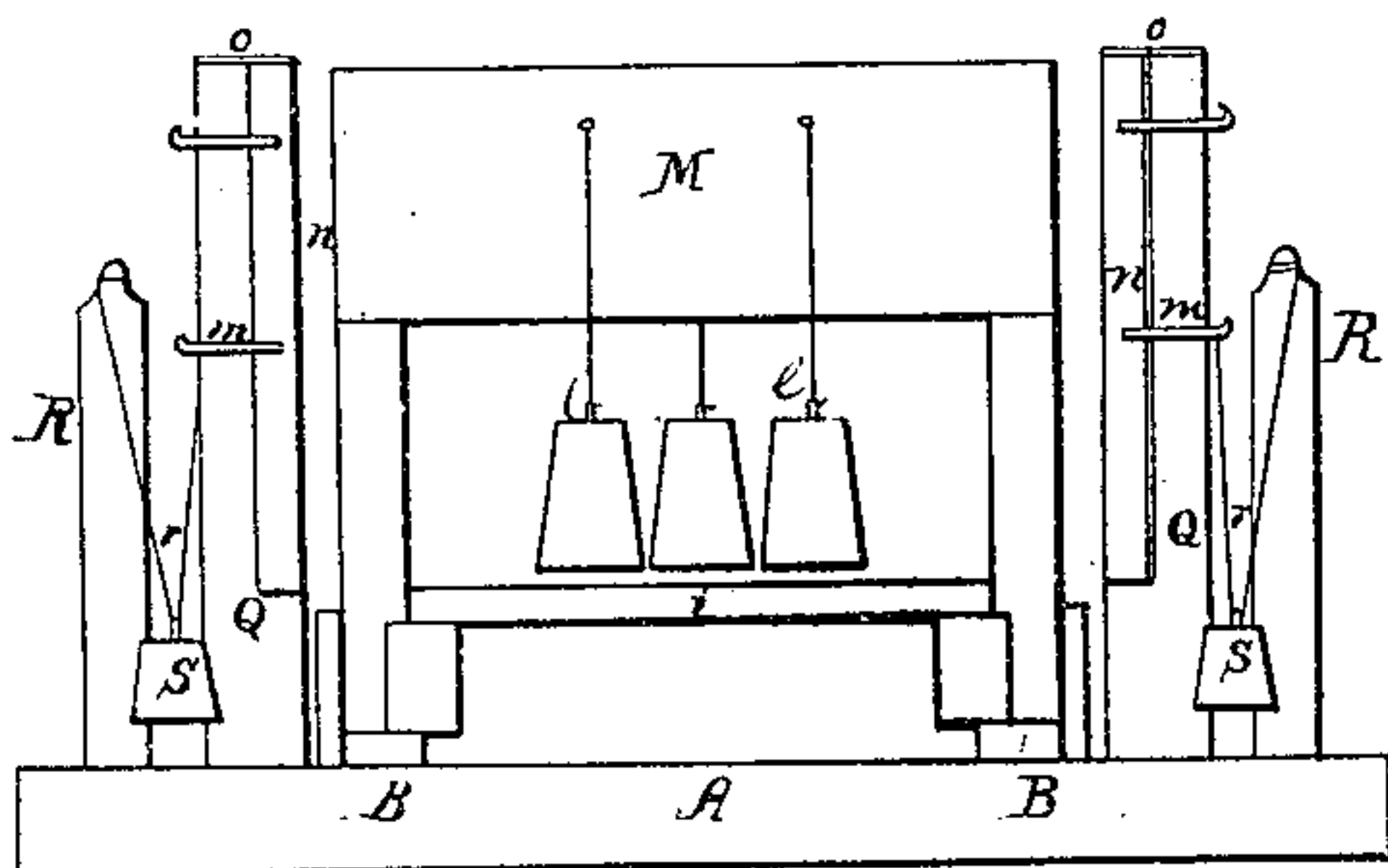
*Fig; 1;*



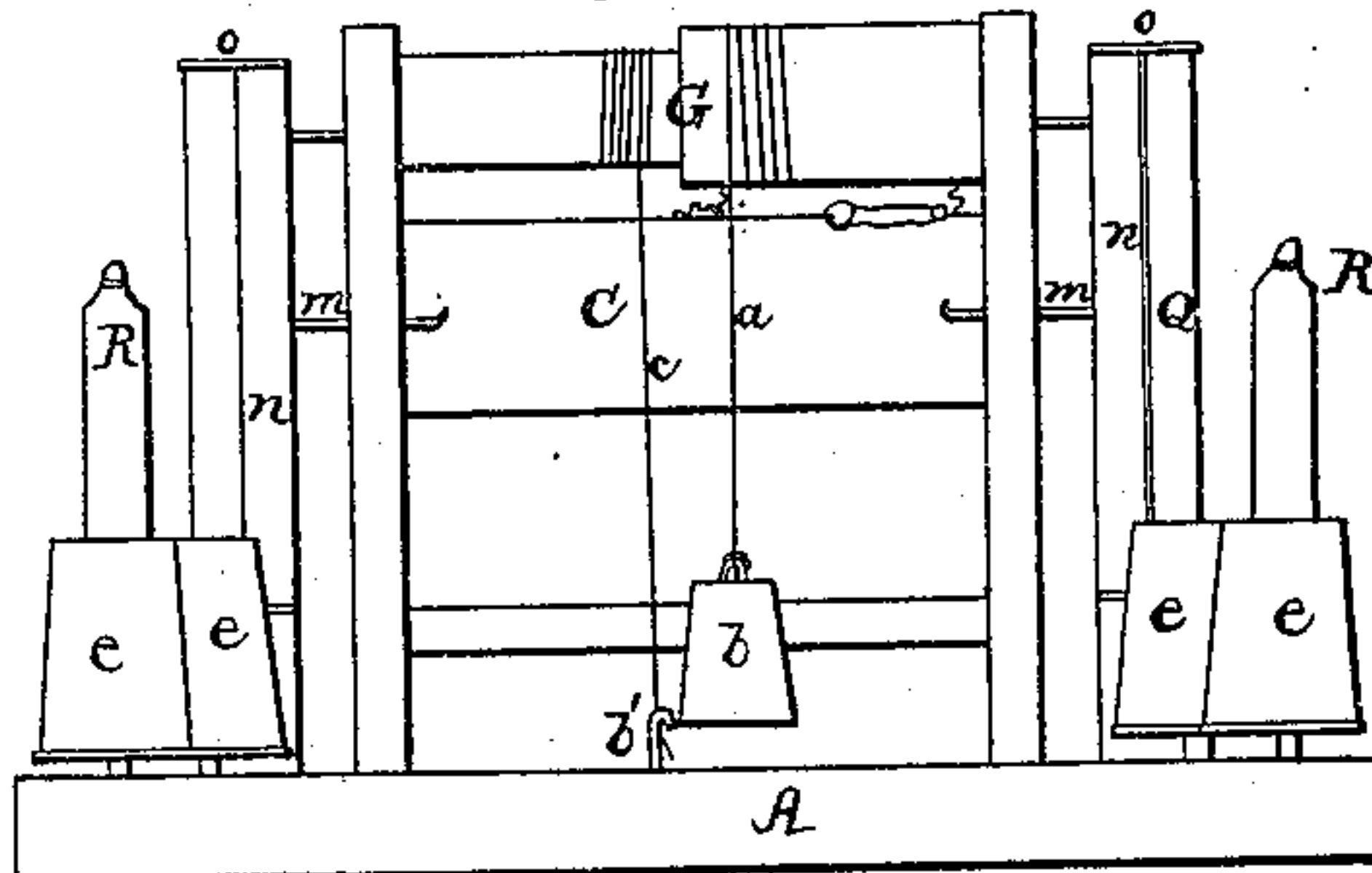
*Fig; 2.*



*Fig; 3.*



*Fig; 4.*





# UNITED STATES PATENT OFFICE.

JOSEPH CUSHMAN, OF RACINE, WISCONSIN.

## IMPROVEMENT IN MACHINERY FOR MAKING WIRE ROPE.

Specification forming part of Letters Patent No. 16,790, dated March 10, 1857.

*To all whom it may concern:*

Be it known that I, JOSEPH CUSHMAN, of Racine, in the county of Racine and State of Wisconsin, have invented a new and useful Machine for Manufacturing Wire Rope or Rods for Conducting Lightning, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings of the same, in which—

Figure 1 represents a plan of my improved apparatus; Fig. 2 a side elevation, Fig. 3 a front elevation, and Fig. 4 a rear elevation, of the same.

My improvement consists in a new arrangement of two sets of reels in combination with the carriage that carries the swivel-hooks whereby the strands may all be adjusted and drawn out to the proper length simultaneously, thus saving both time and labor, and, further, by arranging and combining adjustable swinging arm-frames for preventing the entangling of the strands during the operation of laying, with the traveling top block, which as it advances by the gradual twisting of the rod disengages the arms from the strands at that point where their services are no longer required.

To enable others skilled in the art to make, construct, and use my improved apparatus, I will now proceed to describe it in detail.

A in the accompanying drawings represents the walk or way upon which are secured the rails B, on which the carriages C, D, and E travel. At one end of these rails are erected two standards F F, which support the differential windlass G, one end being of considerably less diameter than the other, to the latter of which is secured and wound one end of a rope *a*, the other being secured to a weight *b*, another rope *c* being secured to the smaller end in a similar manner, but having its other end passing through a loop *b'* or pulley, if desired, and attached to the end of the carriage C that supports the driving-gear of the apparatus. By making the diameter of one end of the windlass larger than the other a smaller weight is enabled to counterbalance the weight of the carriage than would otherwise be necessary. In the cross-beams of the carriage C are mounted two shafts I and J, upon which are secured the driving-wheel I' and pinion J', from which motion is communicated to the twisting or laying hook

K, to which the wires to form the rod are hooked, the driving-wheel I' receiving motion from the crank L, secured upon the end of the shaft I, or in any other suitable manner, the carriage C being supported upon wheels *d*, which travel and are guided by the rails B. At or about and on either side of this carriage are arranged two reels *e*, upon each of which is placed a coil of wire of a length sufficient to form a rod of the required length, each reel being so arranged as not to interfere with the other as the wire is uncoiled.

E represents another carriage supported upon wheels *d*, having two standards on either side and which are connected together by means of cross-beams, so as to form, as it were, two independent frames. Horizontally through the front frame N are mortised a series of holes of a number equal to the number of strands intended to be used for the formation of the rod for the reception of slides O, to the forward end of each of which is secured a swivel or whirl hook *v* in any suitable manner, there being in this instance four slides and hooks, so arranged in relation to each other as to occupy the four angles of a square, while in the center formed by the intersection of the diagonals of this square is another slide having a plate or disk *f*, to the periphery of which and at equal distances apart are secured four more hooks *g* and having a fifth *h* secured to the center, to all of which is secured a strand or wire. On the opposite end of these slides is secured a strong cord or rope, passing through a mortise in the second frame M, having a weight *l* suspended at the other, the weight at the end of these slides being sufficient to counterbalance the weight of the wire or strand, but not sufficiently heavy to prevent the slides from yielding as the wire becomes strained by the laying of the rod. This peculiar arrangement of the slides is for the purpose of forming the rods of wire or strands of different metals, as well as of different diameter, the hooks *v* being for the support of strands of iron wire, while the hooks *g* are for the reception of strands of copper wire, the latter being generally smaller than the former, while the hook *f* in the center of the disk is to support a zinc wire or strand, round which all the others are coiled.

Through the floor *i* of the carriage E are



secured studs, upon which are mounted reels *j* for the reception of the coils of copper wire, these, as with the others for the support of the iron wire, being so arranged as that the strand of the one will not interfere with the others as they are uncoiled.

D represents another carriage, which supports a standard, upon the extremity of which is pivoted the top H, having four sides of a pyramidical shape, in which are cut grooves for the reception of the strands, and which, as it is forced back by the progressive laying of the rod, disengages the hooked arms *m* from the wires, these arms being used for the purpose of preventing the strands or wire from becoming entangled with each other, the arms *m* being secured to rock-shafts *n*, whose lower ends work in a step in the standard Q and the upper end in a bearing formed in a cap *o*, secured to the upper end of the standard Q. On each of these rock-shafts are secured two arms *m*, vertically above each other at a distance from each other equal to the difference of the length of the upper from the lower slides O, the number of these standards and rock-shafts with the accompanying arms being proportioned according to the length of the rope being laid. To the lower arm *m* is secured one end of a strong cord *r*, the other being secured to a standard R, arranged in the rear and on the opposite side of the standard Q to that on which the cord is passed and made fast to the arm *m*, so that as the strands are disengaged from these arms by the advance of the top H the weight *s*, which is strung upon the cord *r*, will draw these arms to the side of the apparatus out of the way of the advancing carriage and strands, the arms being prevented from turning too far by means of a stop *t*, which also serves as a guide to the cord, an eye or hook on its end being provided for that purpose.

Having described my improved apparatus in detail, I will now proceed to describe its operations. The carriage C being placed in the position shown in Fig. 2, the carriage E is brought forward until within a convenient distance of the reels *e*, when the ends of the iron wire coiled thereon are each secured to a hook *v* on the slides O, the same being the case with the wire coiled upon the reels *j*,

mounted upon the carriage E, they being each secured at one end to the hook K. The carriage E is then drawn back until the wires have been severally uncoiled from the reels or until a sufficient length has been run off for the length of rod required, when a zinc wire is attached to the hook K at one end and the hook *h* at the other. The iron wires are then secured to the hook K and the copper wires respectively to the hooks *g* on the disk *f*. This being completed, the top H is then placed in its proper position near to the hook K and the hooked arms extended, as shown in red lines in Fig. 1, so as to grasp the strands of iron wire, when the whole will be ready to commence operation. Motion is then communicated to the driving-wheel I, which, revolving, causes the shaft J, on which the hook K is formed, to revolve, which communicates the twist to the wire, the rod as it thus becomes laid causing the top H to recede before it, disengaging the arms *m* as it reaches them, respectively, until it has reached, or nearly so, the carriage E, when the laying of the rod will have been completed, the two carriages E and C having approached each other gradually as the wires shortened by the laying of the rod, the rod or rope being then removed to permit the apparatus to be again prepared to repeat the operation, the hooks *v* as the wires are laid revolving, thus preventing the fibers of the metal that constitutes the wire from becoming twisted, which materially lessens the strength and tenacity of rope or rod.

I claim—

1. The arrangement of the two sets of reels *e* and *j*, in combination with the carriage E, whereby the strands may all be adjusted and drawn out to the proper length simultaneously, as herein set forth.

2. The swinging arms *m*, in combination with the traveling top H, when constructed, arranged, and operating in the manner substantially as and for the purposes set forth.

In testimony whereof I have hereunto signed my name before two witnesses.

JOSEPH CUSHMAN.

Witnesses:

W. T. SEARCH,  
S. D. CUSHMAN.