R. W. Andrews.

Steadying.

No. 9,540. Patented Jan. 18, 1853.

Fig. 1.

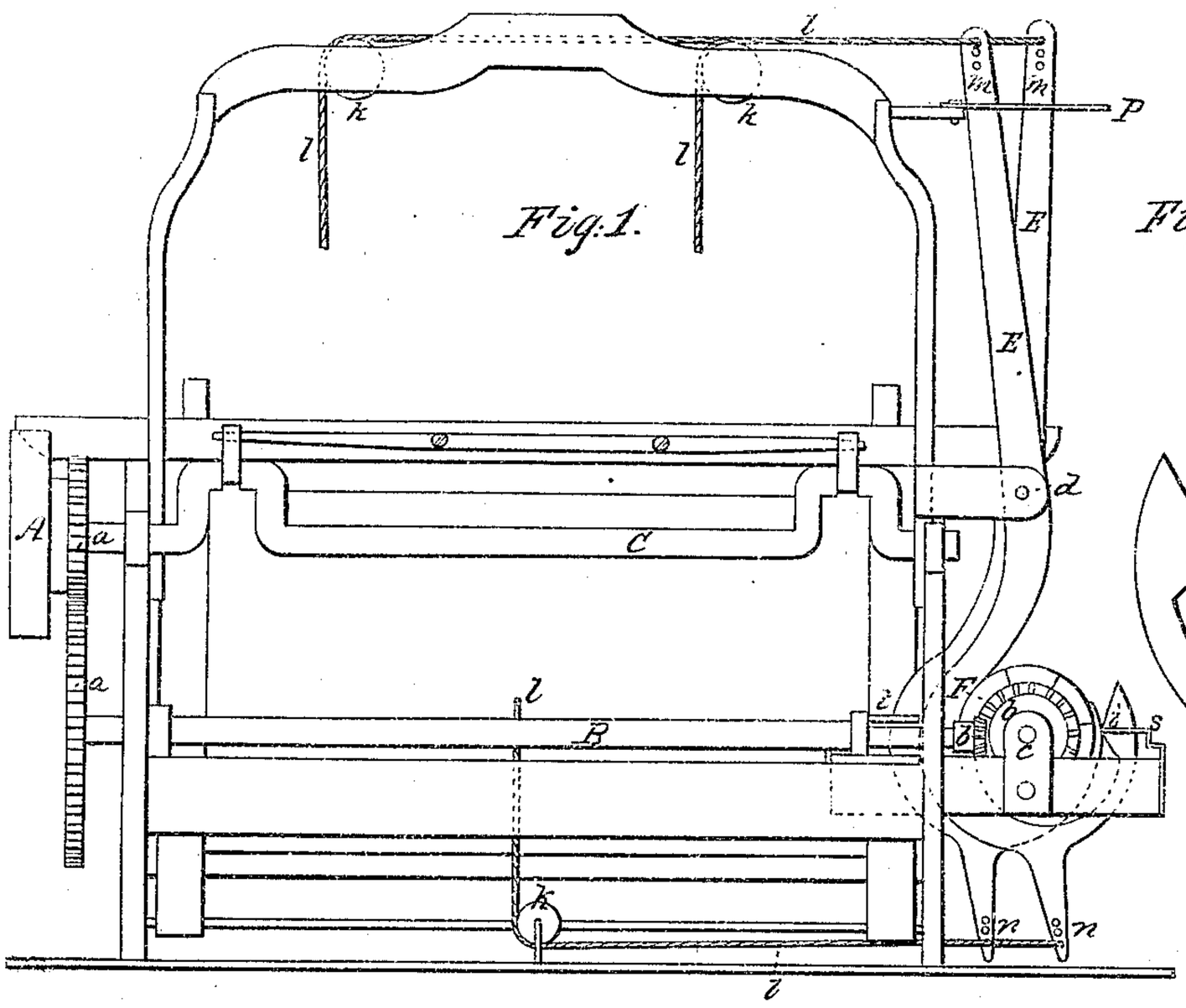


Fig. 3.

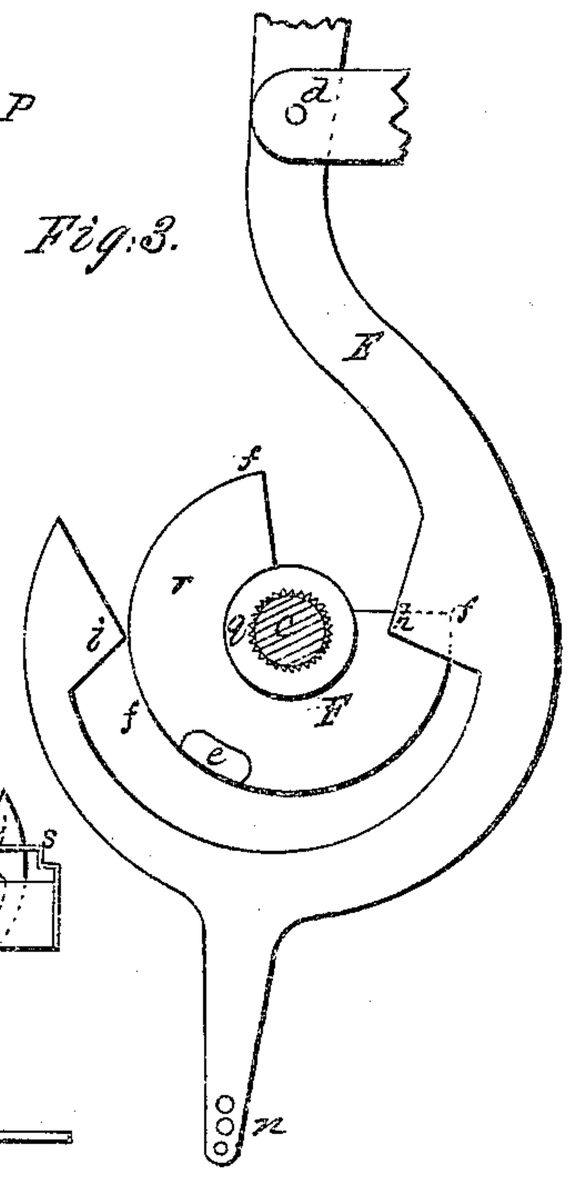


Fig. 2.

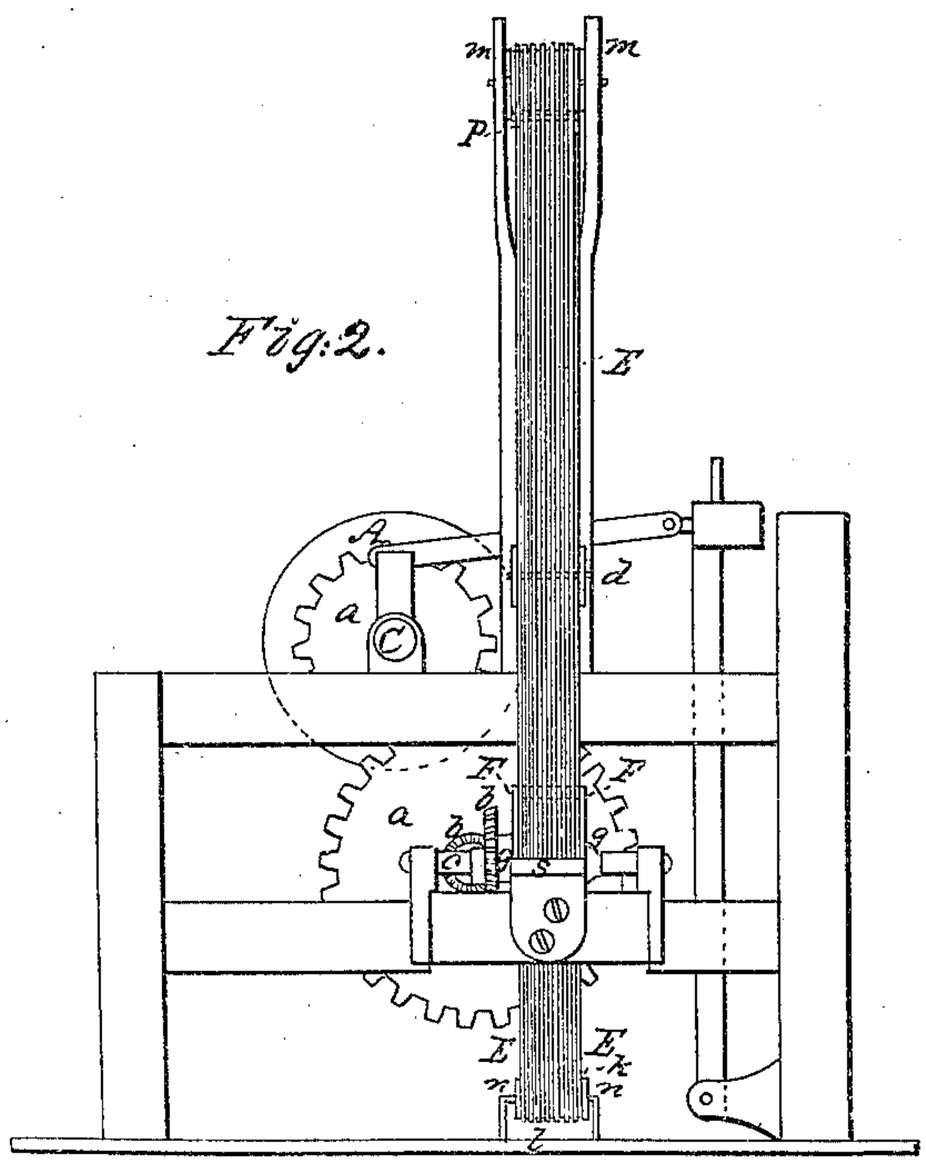
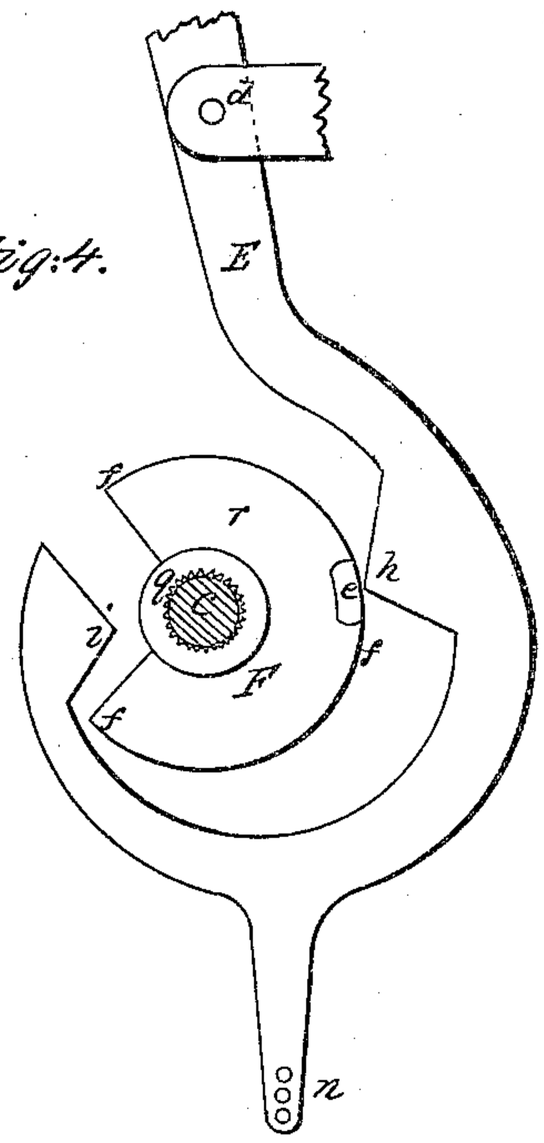


Fig. 4.



UNITED STATES PATENT OFFICE.

ROBT. W. ANDREWS, OF STAFFORD, CONNECTICUT.

OPERATING THE TREADLES OF LOOMS.

Specification forming part of Letters Patent No. 9,540, dated January 18, 1853; Reissued May 12, 1868, No. 2,928.

To all whom it may concern:

Be it known that I, ROBERT W. ANDREWS, of Stafford, in the county of Tolland and State of Connecticut, have invented a new and useful Improvement in Power-Looms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, Figure 1 being a front elevation of such parts of a power-loom as are necessary to exhibit my improvement and its action; Fig. 2, end elevation of the same, and Figs. 3 and 4 side views of a cam and treadle in different relative positions.

Like letters designate corresponding parts in all the figures.

The loom is operated by means of power applied to a pulley A, on the main shaft C. A shaft B, situated below said shaft C, and driven thereby, through the cog-wheels *a*, *a*, in turn drives, through bevel gears *b*, *b*, a shaft *c*, on which the cams F, F, &c., are placed for operating a series of treadles E, E, &c., whose vibratory movements upon a common fulcrum *d*, operate the harnesses, by means of lines *l*, *l*, &c., passing from their extremities *m*, *n*, around pulleys *k*, *k*, &c., at the bottom and top of the loom to said harnesses, in the usual manner.

The nature of my invention consists in operating each treadle E by means of a mover F, having two outwardly acting cam surfaces *e*, *r*, of unequal lengths combined in one piece in such a manner that the position of the said mover upon its arbor can be reversed for the purpose of doubling its capacity for producing different movements and retentions of the treadle, substantially as hereinafter set forth.

The treadles will be moved positively, smoothly, uniformly and gradually in both directions; the permutations in the figure of the fabric woven may be doubled without additional machinery, and the cams and treadles may occupy much less space than would be possible by any other means, in the manner hereinafter fully set forth.

Each treadle is curved so as to embrace its mover, (as shown in Figs. 3 and 4,) and has on the inner periphery of said curved portion two projections, or shoes, *h*, *i*, whose central points are located on opposite sides of, and in the same line with, the center of the cam-shaft *c*, and against which the cam surfaces of the mover act in vibrating the treadle. Each mover has a central hub *q*, of the required thickness, and two cam-plates *e*, *r*, outside of the same, each being of one half the thickness of the hub, and both firmly united or forming one solid piece; the outer peripheries of which plates are of the same radius, and respectively act against the shoes *h*, *i*, of the treadle. The plate *r*, forms nearly an entire disk, having only a gap in its periphery *f f f*, of sufficient width to receive its shoe during the time that the plate *e*, which is of small extent, is acting against its shoe. The unequal sizes of the cam-plates, as shown in the drawings and described above, cause the treadle to remain at one limit of its vibration longer than at the other; but their relative sizes may be varied at pleasure. They are so arranged in reference to one another and the shoes of the treadle, that, at the moment when one commences, the other begins to lessen, its action on its shoe; so that one or the other is incessantly operating to draw or keep the treadle in one or the opposite direction; each during a relative length of time proportional to the length of its outer periphery.

As represented in Figs. 3 and 4, the small cam-surface *e*, actuates the shoe *h*, and the large cam-surface *r*, actuates the shoe *i;* but both the mover and treadle are so constructed that either may be reversed in position upon its shaft or fulcrum, and operate exactly in the same manner, except that when so reversed neither cam-surface acts on the same shoe, as before; whereby the movement of the treadle is reversed and a new figure of the fabric woven produced. This capability of being reversed without adjustment, is peculiar to my double cam mover and treadle, not being possessed by any other known to me. A gap in the curved portion of each treadle above and between the shoes *h*, *i*, wide enough to admit the mover, enables me to reverse the position of either mover or treadle without detaching or disturbing the other movers or treadles. Sets of finger guides *s* and *t*, embrace respectively the several shoes *h*, and *i*, of all the treadles, and hold them precisely opposite their respective cam-plates. This arrangement also enables me to construct the treadles and movers very thin, and thus greatly economize the space which they occupy.

Each treadle and its shoes may be of the thickness of each cam-plate of a mover, and one of the shoes be slightly curved, so that the finger guides *s*, *t*, will bring both shoes opposite their respective cam surfaces of the mover: or each treadle may have the same thickness as the mover, and each shoe one half the thickness thereof. I usually employ the former method as simpler and otherwise preferable.

Each mover may be placed at any angle on the cam-shaft *c*, so that by the permutations of their positions almost an endless variety of figures may be produced in the fabric woven. The central aperture of each cam mover may be smooth and turn freely on the shaft, when not tightened thereon; but I prefer to have it grooved, (as shown in Figs. 3 and 4,) one of which grooves will always fit over a longitudinal ridge on the shaft and thereby prevent the possibility of the mover's turning from its position. They are all tightened in contact with one another on the cam-shaft by nuts *g*, *g*, (Fig. 2,) which are screwed firmly against the two outer movers.

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

1. Operating each treadle by means of a mover having two outwardly acting cam surfaces of unequal lengths combined in one piece and producing the movements and retentions substantially as herein set forth.

2. I also claim such a form and arrangement respectively of the treadles and their movers that the treadles can be reversed in their positions upon their fulcrums, and thereby cause a reversal of the movements and retentions of the said treadles substantially as herein set forth.

The above specification of my improved power loom signed and witnessed this 6th day of October 1852.

ROBERT W. ANDREWS.

Witnesses:
M. R. West,
John L. Washburn.

[First Printed 1913.]