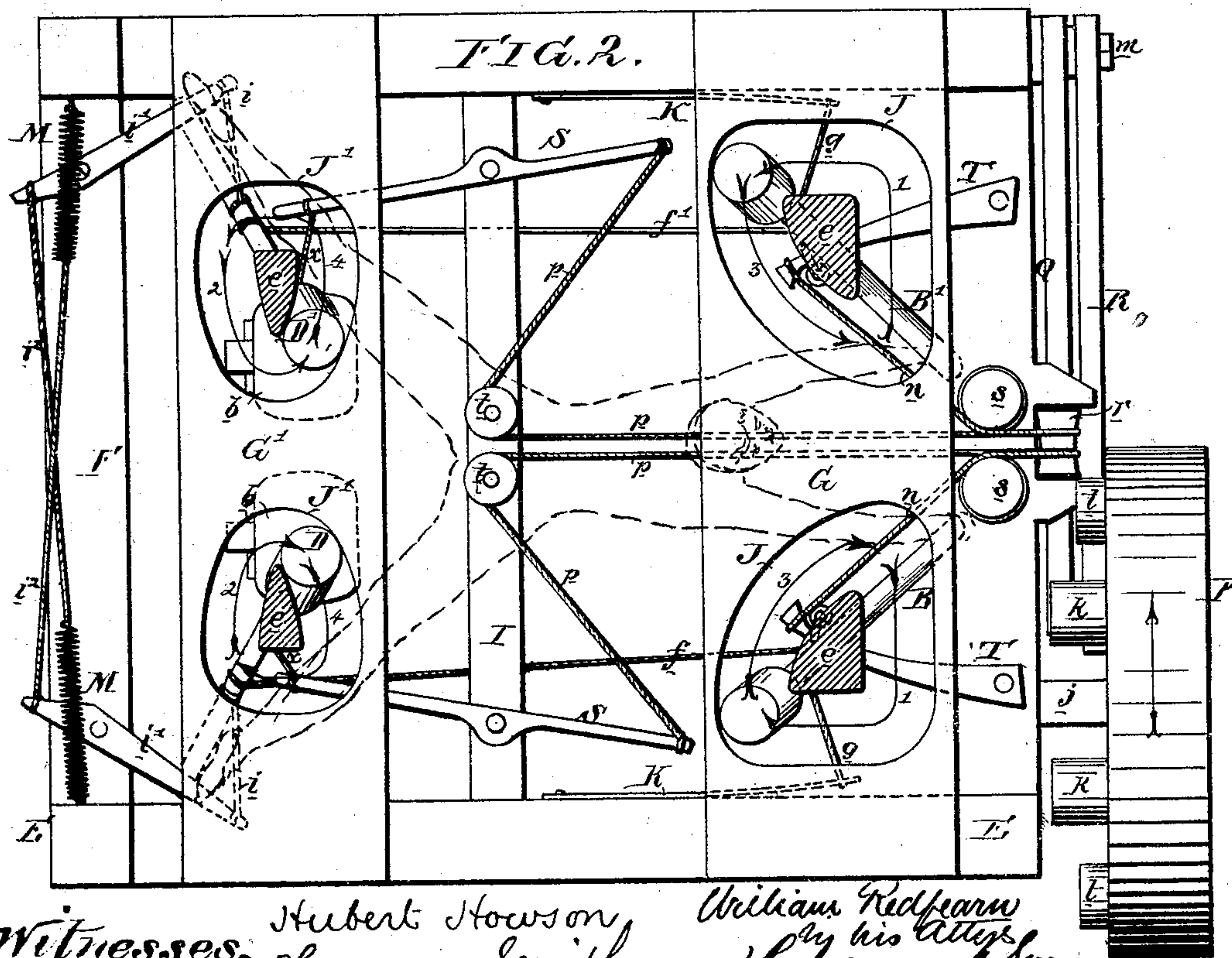
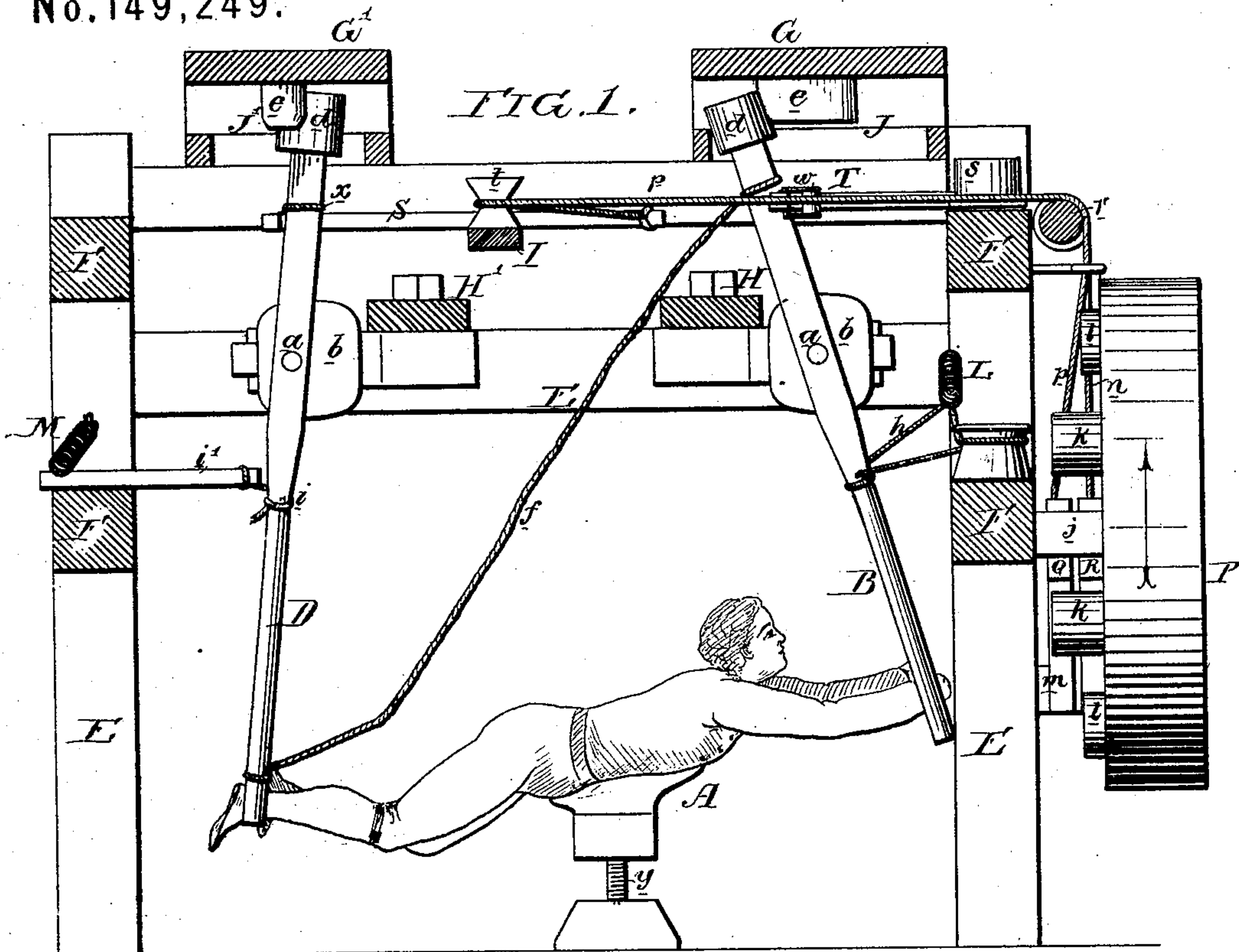


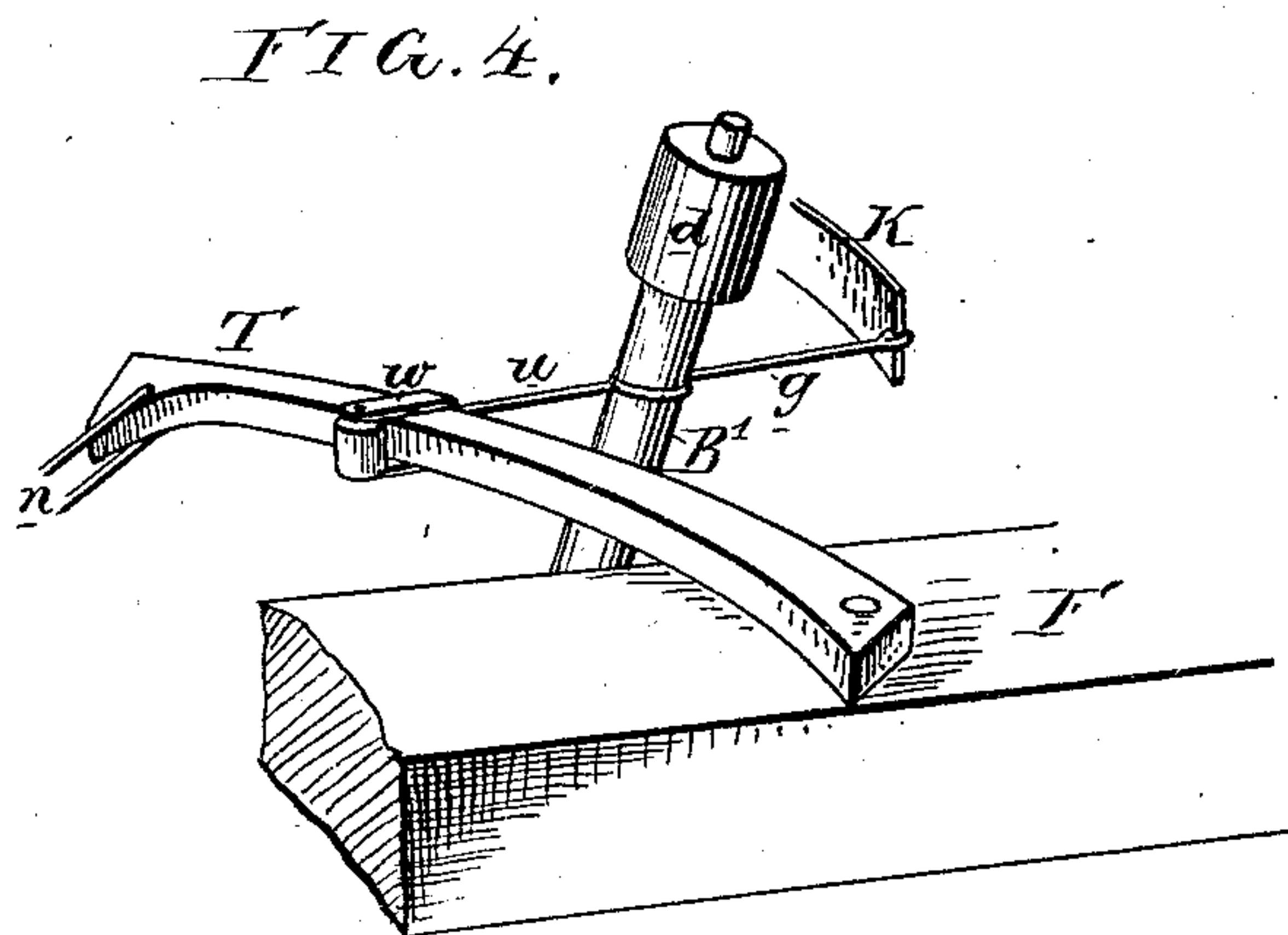
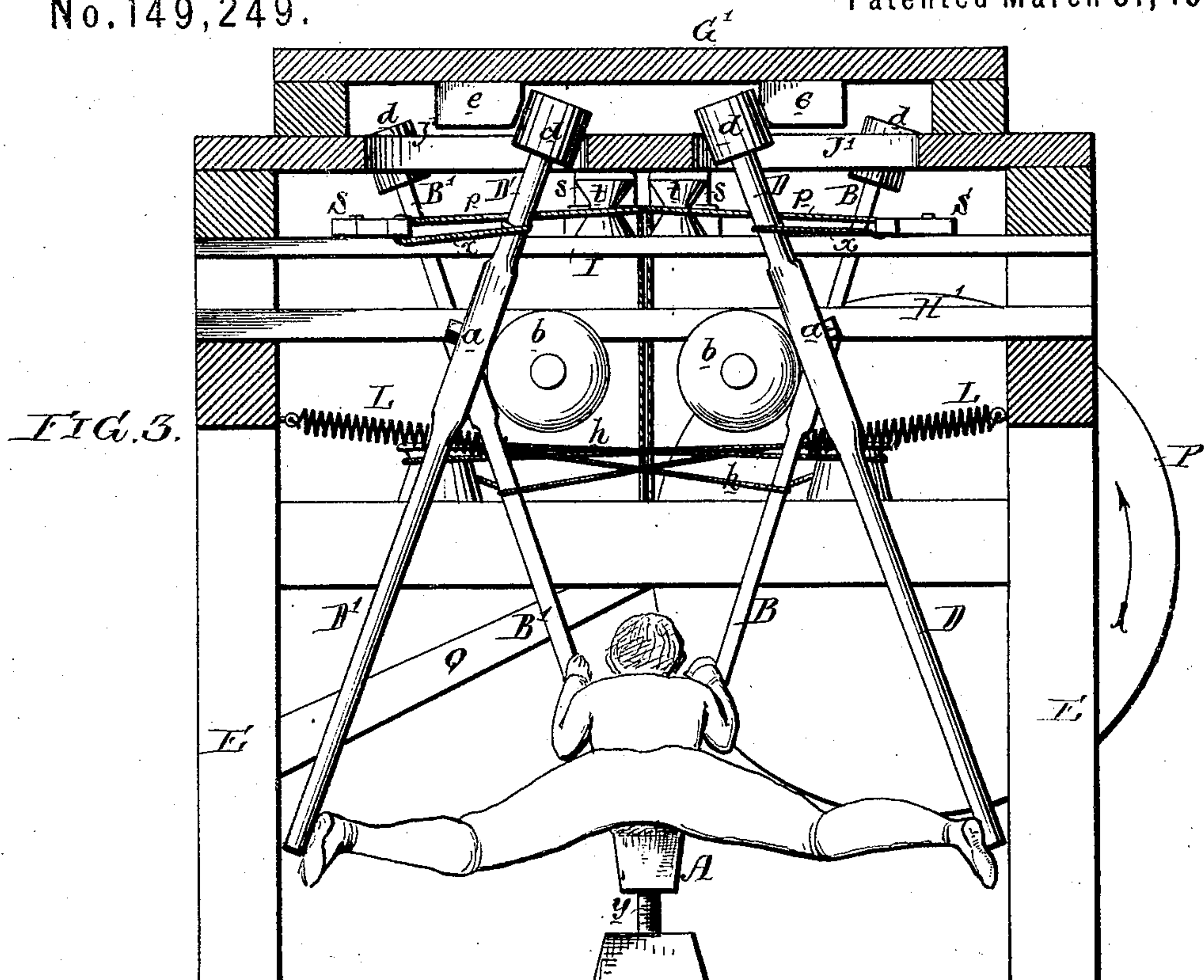
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Apparatus for Teaching the Art of Swimming.
 No. 149,249. Patented March 31, 1874.



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UNITED STATES PATENT OFFICE.

WILLIAM REDFEARN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR TEACHING THE ART OF SWIMMING.

Specification forming part of Letters Patent No. 149,249, dated March 31, 1874; application filed January 29, 1874.

To all whom it may concern:

Be it known that I, WILLIAM REDFEARN, of Philadelphia, Pennsylvania, have invented a Machine for Facilitating the Teaching of Swimming, of which the following is a specification:

The object of my invention is to facilitate the teaching of swimming by accustoming the limbs of the learner to the several movements required, so that, on taking to the water, the learner will instinctively make the same movements, and will be enabled to swim perfectly after comparatively little practice.

I attain this object by the use of the machine illustrated in the sectional elevation, Figure 1, plan view, Fig. 2, and transverse sectional elevation, Fig. 3, of the accompanying drawing, the main features of the said machine being a body-rest, A, and four levers, B B', and D D', to which the arms and legs of the learner are attached, and to which the required compound movements are imparted by means of devices fully described hereafter. The fixed portion of the machine consists of opposite side frames, E E, connected by cross-pieces F at the ends, and by intermediate cross-pieces G G', H H', and I. The arm and leg levers have their fulcrums *a* on swivel-blocks *b*, hung to projections on the cross-pieces H H' of the fixed frame, this permitting the said levers to be moved in any direction required. At the upper extremity of each arm-lever B there is an anti-friction roller, *d*, preferably faced with rubber, which extends into a cam-slot, J, in the cross-piece G of the frame, and anti-friction rollers at the upper extremities of the leg-levers D D' extend likewise into cam-slots J' in the cross-piece G' of the frame. In the present instance these cam-slots are formed between projections *e* secured to the upper bars of the cross-pieces, and the correspondingly-recessed portions of the lower bars of the said cross-pieces; but the said slots may be otherwise constructed, if desired. The lower extremity of the leg-lever D is connected to the upper extremity of the arm-lever B by a cord, *f*, for a purpose explained hereafter, and the leg and arms levers D' B' are similarly connected by a cord, *f'*. (See Figs. 1 and 2.) Each arm-lever B B' is connected at a point above its fulcrum by a cord, *g*, to a strong

plate-spring, K, and at a point below its fulcrum by a cord or cords, *h*, to a spring, L, the tendency of these springs being to cause the said levers to traverse the portions of the cam-slots J, indicated by the arrows 1 in Fig. 2, and in the direction pointed out by said arrows. Each leg-lever D D' is, in like manner, connected at a point below its fulcrum by a cord, *i*, lever *i*¹, and cord *i*² to a spring, M, the latter tending to turn the said leg-levers in the direction and through the portions of the cam-slots J' pointed out by the arrows 2 in Fig. 2. A driving-wheel, P, arranged to be turned by hand or otherwise, is hung to a short shaft, *j*, secured to the front portion of the frame of the machine, and at opposite points on the inner face of this wheel are two sets of projections, *k* and *l*, of different lengths, the former projection being a little in advance of the latter. Two levers, Q and R, arranged side by side, and having their fulcrums at *m* on the fixed frame, extend into the path of the projections *k* and *l* of the driving-wheel, the arrangement being such that both levers shall be depressed by the long projection *k*, and the outer lever R held down by the short projection *l* for a brief interval after the inner lever Q has been released by the long projection, the object of which will be explained hereafter. The arm-levers B B' derive their movements from the outer lever R, and the leg-levers D D' from the inner lever Q, the connections being as follows: Cords *n n* and *p p*, attached to the said levers R and Q, extend upward over a guiding-pulley, *r*, and between pulleys *s s* on the fixed frame, the cords *n n* being connected to levers T T hung to one of the cross-bars F, while the cords *p p*, after passing around other guiding-pulleys, *t t*, on the cross-bar I of the frame, are connected to levers S S hung to the said cross-bar. The levers T T are connected to the arm-levers B B' above their fulcrum-points by cords *u u*, each of which terminates in a yoke and pulley, *w*, (see detached perspective view, Fig. 4,) arranged to travel to a limited extent on the inner curved surface of its lever, T. The levers S S are connected directly by cords *x x* to the leg-levers D D' above the fulcrum-points of the latter. The depressing of the levers R and Q will cause the upper extremities of the arm

and leg levers, through the medium of the above-described connections, to traverse the portions of the cam-slots J and J', indicated by the arrows 3 and 4 in Fig. 2, and the recoil of the springs K, L, and M, consequent upon the release of the levers R and Q, will cause the upper extremities of said arm and leg levers to suddenly complete the circuit of the cam-slots, as indicated by the arrows 1 and 2.

The course described by the lower extremities of the arm and leg levers will correspond to the shape of the cam-slots; but the circuit will be more extended, owing to the greater length of said lower extremities.

The operation of the machine is as follows: The learner is caused to lie upon the rest A, which is adjusted in altitude, as required, by the screw y, and his arms and legs are extended and attached to the levers B B' and D D', in any suitable manner. The wheel P is then turned in the direction of the arrow, and at the rate of about twenty revolutions per minute. As shown in Fig. 2, the learner is in proper position for commencing a stroke, the arms being extended and the legs spread apart. During the first portion of the movement of the levers B B' and D D', in the direction of the arrows 3 and 4, the arms will be spread apart as in swimming, and the legs slightly bent and caused to approach each other, which may be termed the floating or buoying motion. This is continued until the lever Q has been released by the projection k on the driving-wheel, when the further depression of the lever R, by the short projection l on the said driving-wheel, will cause the arm-levers B B' to complete the last portion of the movement indicated by the arrows 3, and to thus throw the learner's arms back and direct his elbows in toward his body. This occurs simultaneously with the drawing up of the legs by the levers D D', the latter of which are now free to move in any direction, in consequence of the release of their lever, Q, being operated by the arm-levers through the medium of the cords f f'. The instant the lever R is released by the projection l of the driving-wheel, the recoil of the springs K, L, and M will cause the leg and arm levers to suddenly traverse the portions of the cam-slots indicated by the arrows 1 and 2, which will cause the learner's arms to be suddenly extended forward simultaneously with the rearward projection of his legs, which motions correspond exactly with those required to propel the body in swimming.

Thus stroke after stroke is made by the learner, who soon becomes used to the motion, and will be able in a short time to reverse the condition of things, and to operate the levers and parts connected therewith by the voluntary movements of his arms and legs; and, after having thus acquired the proper movements, comparatively little difficulty will be experienced in swimming in the water.

The connecting-cords f f' are an important feature of the machine, as they insure the drawing up of the legs at the proper moment, and thus overcome at the outset one of the principal difficulties in learning the art of swimming.

I claim as my invention—

1. The combination, in a machine for teaching the art of swimming, of levers B B' and D D', operated substantially as and for the purpose specified.
2. The combination, substantially as described, of a vertically-adjustable body-rest, A, with the levers B B' and D D'.
3. The arm and leg levers B B', D D', hung to swivel-blocks b, and adapted at their upper ends to cam-slots J and J', all substantially as and for the purpose specified.
4. A swimming-machine provided with arm and leg levers, having the desired differential movements imparted to them simultaneously partly by a driving-wheel and partly by springs, substantially as and for the purpose specified.
5. The combination of the connecting-cords f f' with the arm and leg levers B B', D D', for the purpose specified.
6. The combination of the driving-wheel P and its long and short projections, k and l, with the levers Q and R.
7. The combination, substantially as described, of the lever R, cords n, levers T, cords u, and arm-levers B B'.
8. The combination, substantially as described, of the lever Q, cords p, levers S, cords x, and leg-levers D D'.
9. The combination of the springs K and L, and their connections, with the arm-levers B B'.
10. The combination of the springs M and their connections with the leg-levers D D'.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM REDFEARN.

Witnesses:

WM. A. STEEL,
HARRY SMITH.