F. G. JOHNSON.

Health Lift Apparatus.

No. 169,002. Patented Oct. 19, 1875.

Fig. 1.

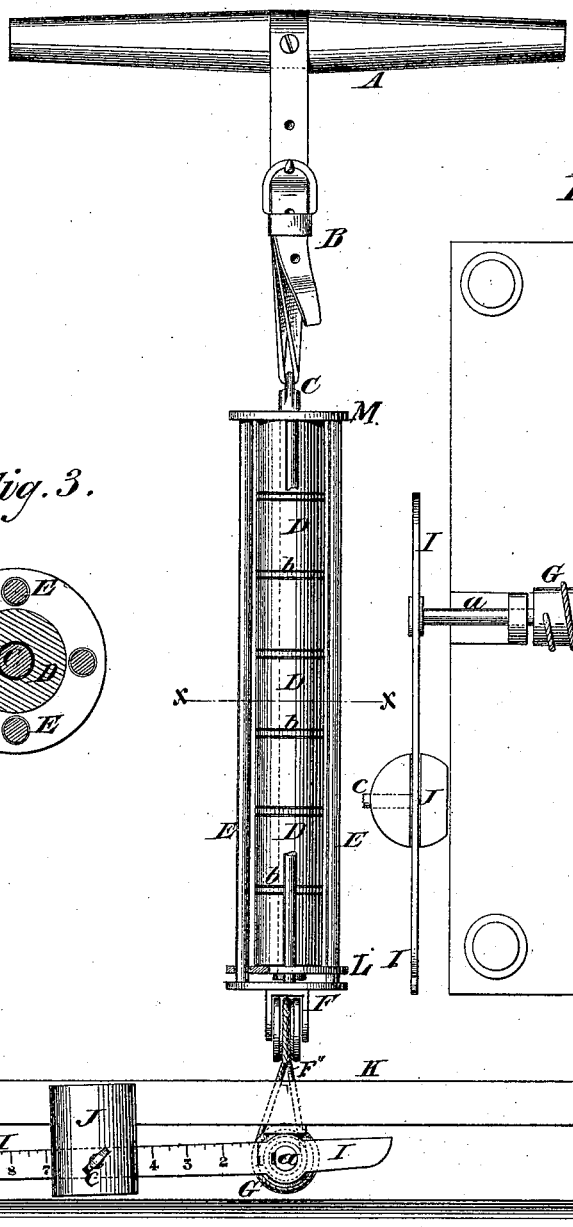


Fig. 2.

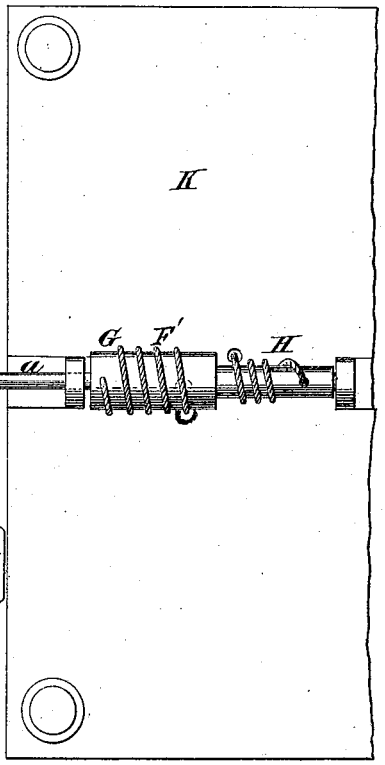
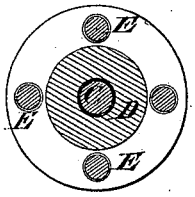


Fig. 3.



WITNESSES:

Gustave Dieterich

Chas. Nida

INVENTOR:

Frank G. Johnson.

UNITED STATES PATENT OFFICE.

FRANK G. JOHNSON, OF NEW YORK, N. Y.

IMPROVEMENT IN HEALTH-LIFT APPARATUS.

Specification forming part of Letters Patent No. **169,002**, dated October 19, 1875; application filed April 20, 1875.

To all whom it may concern:

Be it known that I, FRANK G. JOHNSON, of the city, county, and State of New York, have invented a new and useful Health-Lift Apparatus; 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 accompanying drawings, making a part of this specification.

The nature of my invention consists in the devices hereinafter described and claimed, whereby a person lifting for exercise or health may exert a force of from one to hundreds of pounds against a dead weight of only one or two pounds. The person taking the exercise can also set the small or dead weight to balance whatever force he may from time to time desire to exert, and also the force exerted takes a gradual or elastic hold of the weight to be lifted.

To enable others to make and use my invention, I will describe its construction and operation in detail.

Figure 1 illustrates a general view of the apparatus, in which A represents the handle, and B the strap connecting the handle to the yielding bar C. This bar C passes down through a series of cylindrical rubber springs, D D D, and is riveted into the circular plate L. *b b b* are metallic washers placed between the rubber springs. E E E are four connecting-rods, riveted into the circular plates F and M. The plate L slides on the connecting-rods E E E. On the lower face of the plate F is provided a pulley.

Fig. 3 represents a transverse section of Fig. 1 at *x x*, the outer ring indicating the sliding plate L. K is a platform, upon which the person stands while taking exercise.

Fig. 2 represents an inverted view of the platform K, suitably elevated (Fig. 1) by legs. G and H is a differential shaft, secured to the lower side of the platform by suitable bearings. *a* is a spindle of the shaft, extending to the front edge of the platform, and on the end of which is fastened a graduated lever, I I. Upon the graduated lever is a sliding weight, J, secured to the lever by means of a thumb set-screw, *c*. The connection between the part of the apparatus seen above and the part seen below the platform is made by means of a suitable cord, F′, passing from the pulley on the plate F down through the platform and around the differential shaft G H. The shaft at G is larger than the shaft at H. One end of the cord is fastened in the shaft at G. The cord is then wound a few times around the G portion of the shaft; then passed up through the platform over the pulley on the plate F; then passed down through the platform, and a few times around and secured to the H portion of the shaft. The cord is wound around the two portions (G and H) of the differential shaft in opposite directions.

The operation of my invention is thus described: By standing on the platform, grasping the handle, and lifting upward, the sliding plate L will be raised, and the rubber springs will be compressed until the force exerted raises the weight J. The amount of force required to thus elevate the weight J will depend upon the distance between the weight and the center of the spindle *a*, and the difference in the two diameters of the differential shaft G H. By means of the differential shaft a light weight is made to balance a heavy one. It is evident, were both parts of the shaft of the same diameter, and the cord wound around it in opposite directions, that no amount of strain or force exerted on the handle would have any tendency to rotate the shaft, and so elevate the lever I I and the weight J. But with my apparatus, force exerted on the handle will have a tendency to rotate the shaft, and so elevate the lever and weight in proportion to the difference in the two diameters of the differential shaft G H. By means of this differential shaft a small and convenient weight, J, can be made to balance any amount of force that may be desirable to exert on the handle A; and by means of the sliding of the weight on the graduated lever or arm I the apparatus admits of determining within certain limits (from a few pounds to a thousand) the amount of force to be exerted at different times and by different persons, as may be required. The short arm of the lever, by striking the floor, serves to limit the upward movement of the long arm and weight. By means of the strap B the apparatus can be adjusted to different heights; and by means of the rubber springs or their equivalents the

weight to be lifted is not all overcome at an instant, but gradually brought to bear on the person exercising.

I do not limit myself to the use of the particular mode described of constructing the spring or elastic portion of the apparatus, for, instead of the cylindrical compressed rubber spring, rubber straps or spiral metallic springs may be employed.

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

1. The combination of the differential shaft G H with the lever I I and shifting weight J, substantially in the manner and for the purpose set forth.

2. The rubber springs, arranged as described, in combination with the cord F′, differential shaft G H, lever I I, and sliding weight J, substantially in the manner and for the purpose set forth.

FRANK G. JOHNSON.

Witnesses:

CLARENCE M. HYDE,

J. L. BUTLER.