

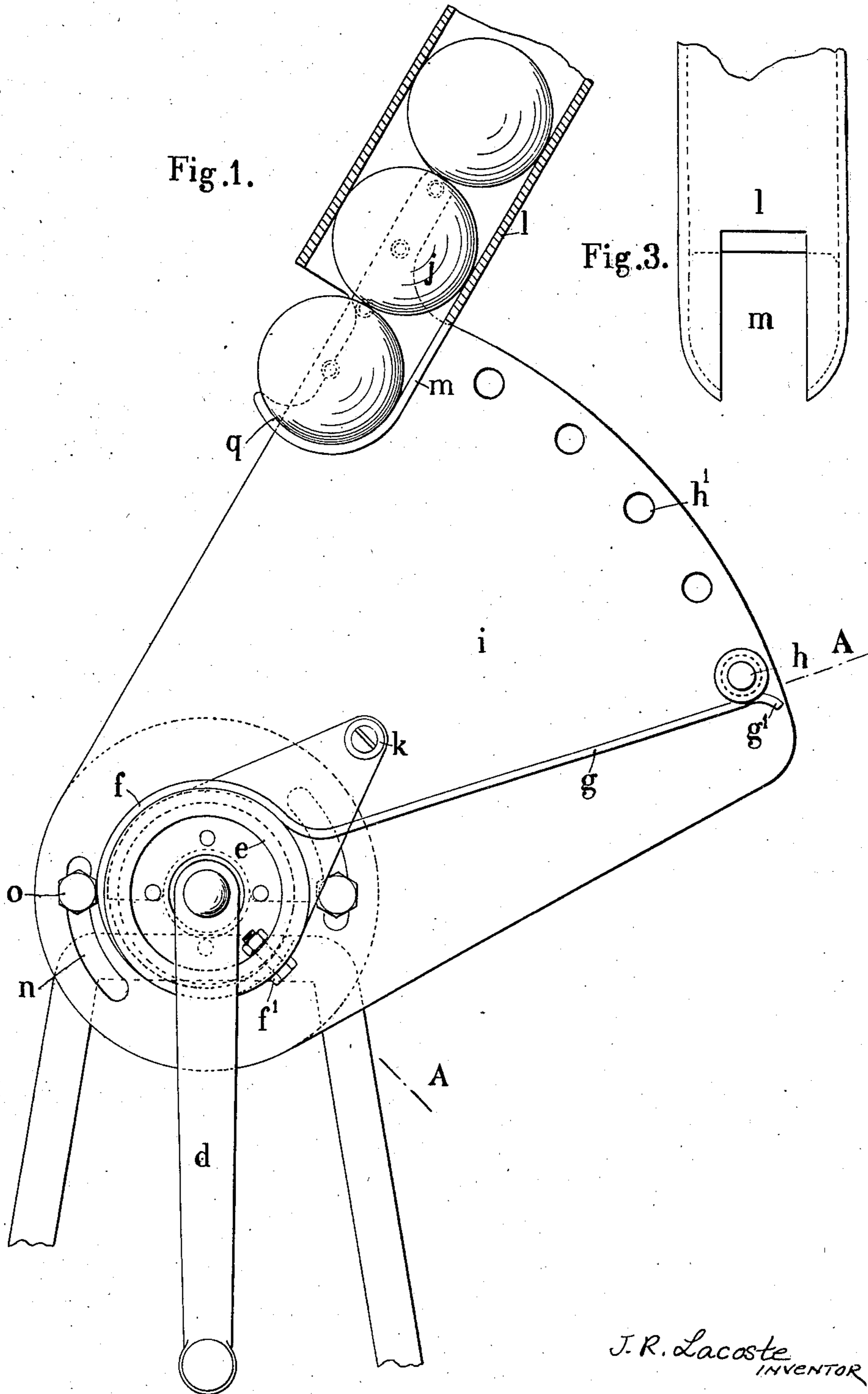
Oct. 7, 1930.

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BALL THROWING DEVICE

1,777,976

Filed Nov. 8, 1927

3 Sheets-Sheet 1



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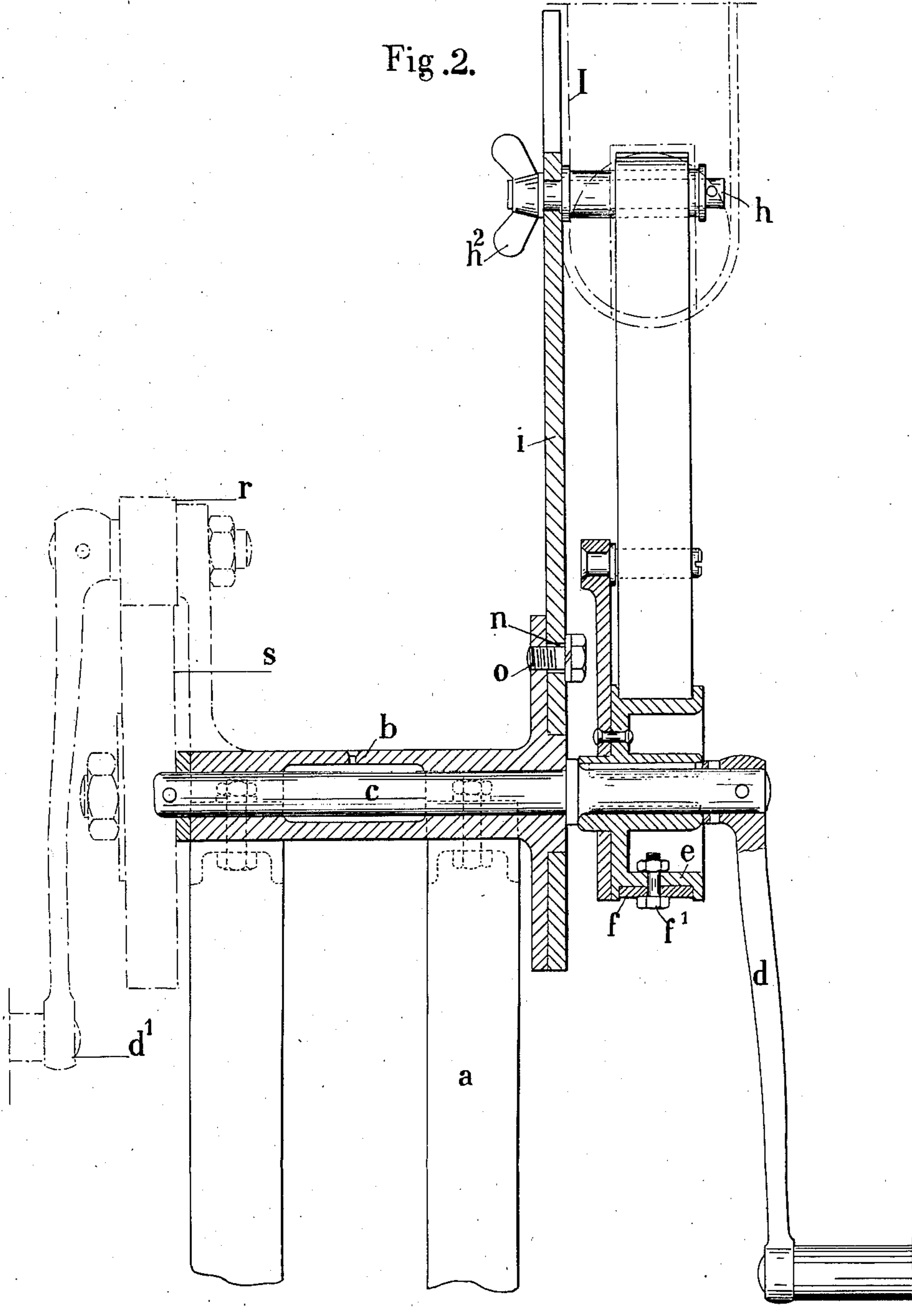
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Fig. 2.



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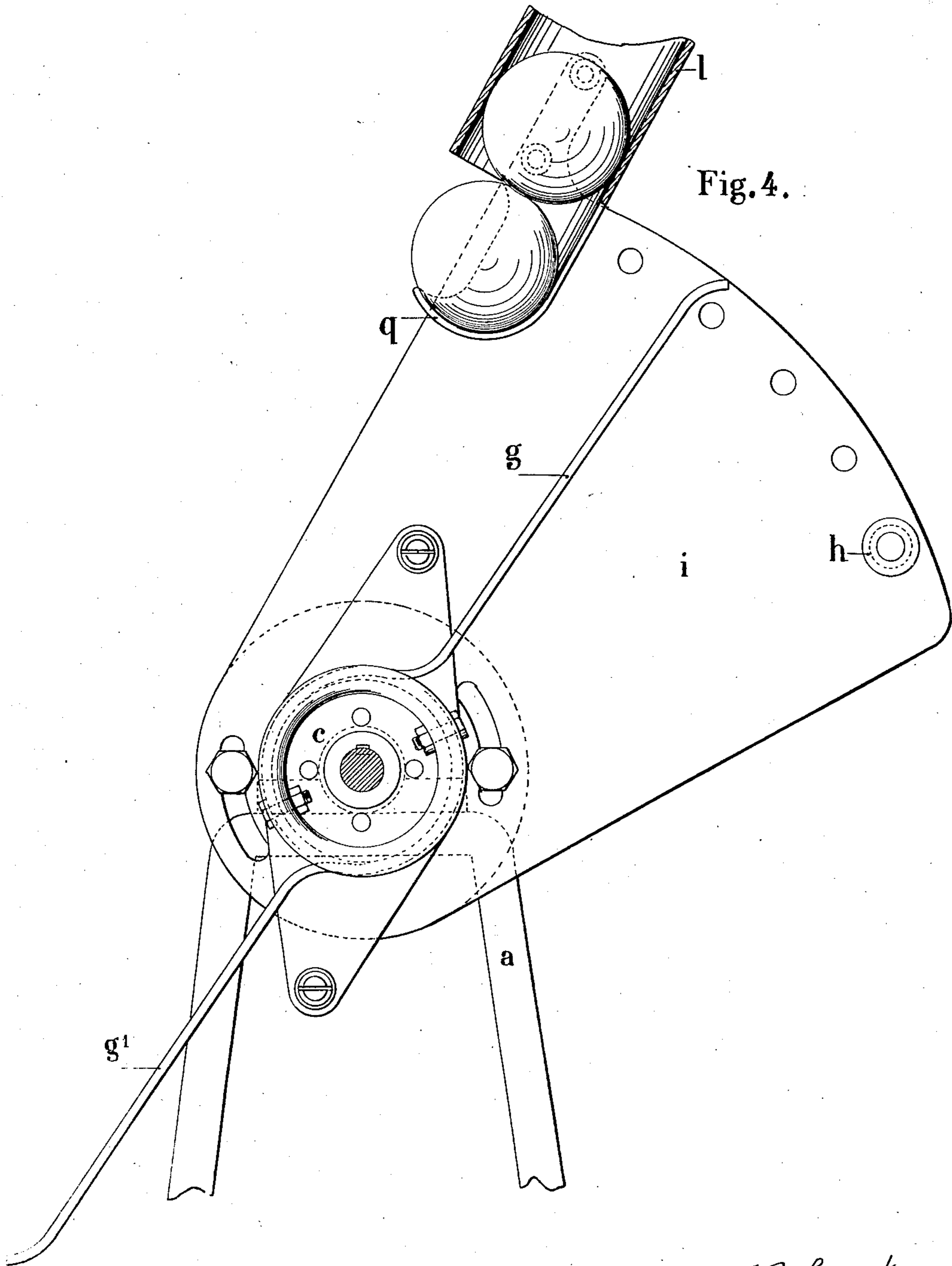


Fig. 4.

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UNITED STATES PATENT OFFICE

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BALL-THROWING DEVICE

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The present invention has for object an apparatus adapted to mechanically throw balls, such as balls for tennis or similar games.

It is particularly applicable to the method-
5 ical practice of predetermined strokes for which it is necessary to throw to the player who is exercising, a great number of balls at about the same place. This practice is usually effected with the help of a professor who
10 sends the balls to the player by throwing them at the proper place. The new apparatus allows of dispensing with a professor or an expert player; it can be actuated by a child; if need be, it can be mechanically driven so as
15 to be absolutely automatic.

The apparatus forming the subject-matter of the invention is essentially characterized by a spring device which is bent and which, when it is released strikes the ball in
20 the same way as a blow from a racket, then projects it according to the desired trajectory and in the required direction.

It is moreover characterized by the combination with the above-mentioned device of
25 a feeding system which constantly presents a ball to the action of the spring, in such a manner that the apparatus can rapidly send a great number of balls and that the interval of time between the throw of two balls can be
30 regulated at will.

This feeding device can be set in such a way that the ball struck by the spring can occupy a different position in the path of this spring, thus modifying at will the tra-
35 jectory.

In the form of construction preferably adopted, a crank actuates a leaf spring or springs the free end of which encounters an adjustable abutment which stops the spring
40 until the latter, having been sufficiently bent, frees itself from the abutment, suddenly relaxes and strikes the ball.

In order that the invention may be clearly understood, a form of construction of the new
45 ball-throwing apparatus, is illustrated, by way of example only, in the accompanying drawing in which:

Fig. 1 is a side view of the apparatus.

Fig. 2 is a section made according to line
50 A—A of Fig. 1.

Fig. 3 is a partial front view corresponding to Fig. 1.

Fig. 4 is a side view of a slightly modified form of the invention.

As illustrated in the drawing, the new ap-
55 paratus comprises a frame *a*, of suitable shape, carrying a socket *b* in which can freely rotate a shaft *c* on which is rigidly secured a crank *d*.

On this shaft is also rigidly secured a drum
60 *e* on which is attached the end of a leaf spring *f*, for instance by means of a bolt *f*¹. The spring winds on a portion of the periphery of the drum and extends in an arm *g*, the end
65 *g*¹ of which is slightly curved.

This end *g*¹ comes opposite an abutment *h* which can be provided with a roller for di-
70 minishing the friction. This abutment is carried by a plate *i* provided with a series of holes *h*¹, this permitting to insert the abut-
75 ment in one of these holes, to immobilize it therein by a wing nut *h*² and to adjust the distance between the said abutment and the ball *j* to be thrown.

Another abutment *k* is adapted to limit the
75 relaxation of the spring.

The ball *j* is the first one of a column of balls filling a feeding conduit *l*. The lower
80 end of the latter has an aperture or recess *m* (Fig. 3) permitting the passage of the spring. Moreover, an aperture on the front side al-
85 lows the issue of the projected ball.

The conduit *l* is carried by the plate *i*. The
85 latter is so mounted that it can rotate concentrically with the axis *c* and it can be locked in the required position by means of clamp-
90 ing screws *o* inserted in circular openings *n* in the said plate.

The operation is as follows:

The feeding conduit *l* is filled with balls.
90 For throwing the balls, it suffices to turn the crank *d*. When the spring *g* encounters the abutment *h*, it is stopped. It is then bent until it frees itself from the abutment *h*. At
95 this moment, it relaxes and violently strikes the ball *j* which is thus projected forwardly.

This ball is immediately replaced by the next one which is thrown in the same way
100 upon the following revolution of the crank. By adjusting the inclination of the plate *i*

by means of the bolt *o*, the initial direction of the ball is modified and, consequently its trajectory is altered.

By varying the position of the abutment *h* on the plate *i*, the distance between this abutment and the ball and, consequently the free relaxation stroke of the spring are modified before the latter comes in engagement with the ball, this modifying the speed of the ball on its trajectory.

In order that, after the projection of a ball outside the base of the feeding conduit, the next ball may take the place of the preceding one and may not escape, the base of this conduit is provided with a slightly projecting nose *g*. For facilitating the issue of the ball, this nose might be pivoted and provided with a returning spring.

Instead of directly actuating the spring by means of the crank, as just described, a set of intermediate pinions *r*, *s* can be used, as indicated in dot and dash lines in Fig. 2. The crank is then placed at *d*¹.

This latter arrangement has the advantage of ensuring a more regular throw of the balls. In fact, in the arrangement illustrated in full lines, if the crank is acted upon with more or less force, a slightly different impulse is produced. With a speed reducing device this result cannot occur and the speed with which the crank is turned is sufficiently uniform for causing the balls to be thrown more regularly.

On the other hand, instead of a single spring *g*, two springs *g* and *g*¹ can be provided (Fig. 4).

Each of these springs is successively bent against the abutment *h*, is released and projects the ball. The number of balls thus thrown can be doubled. This arrangement prevents the apparatus from running light during an appreciable portion of the revolution, this is so much the more important with a speed reducing device that it is necessary to cause the crank to turn through several revolutions so that the drum of the springs accomplishes one revolution.

Instead of two springs, three or more springs might also be provided.

The above arrangements are given by way of example only; the forms, materials, dimensions and all detail arrangements can be varied without departing thereby from the principle of the invention.

Claims:—

1. In a ball-throwing apparatus, a system for feeding the balls, an elastic system comprising a plate spring and a rotary shaft carrying the plate spring, an abutment for arresting this plate spring placed at a certain distance from the ball to be thrown, a support carrying the abutment and means for regulating the position of this support concentrically with respect to the shaft.

2. In a ball-throwing apparatus, a system

for feeding the balls, an elastic system comprising a plate spring and a rotary shaft carrying the plate spring, an abutment for arresting this plate spring placed at a certain distance from the ball to be thrown, a support for the feeding system and the abutment, the said support adapted to move concentrically with respect to the shaft.

The foregoing specification of my "ball-throwing device" signed by me this 26th day of October, 1927.

JEAN RENE LACOSTE.

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