

(No Model.)

E. KETCHUM.
EDUCATIONAL APPLIANCE.

No. 547,217.

Patented Oct. 1, 1895.

Fig. 1.

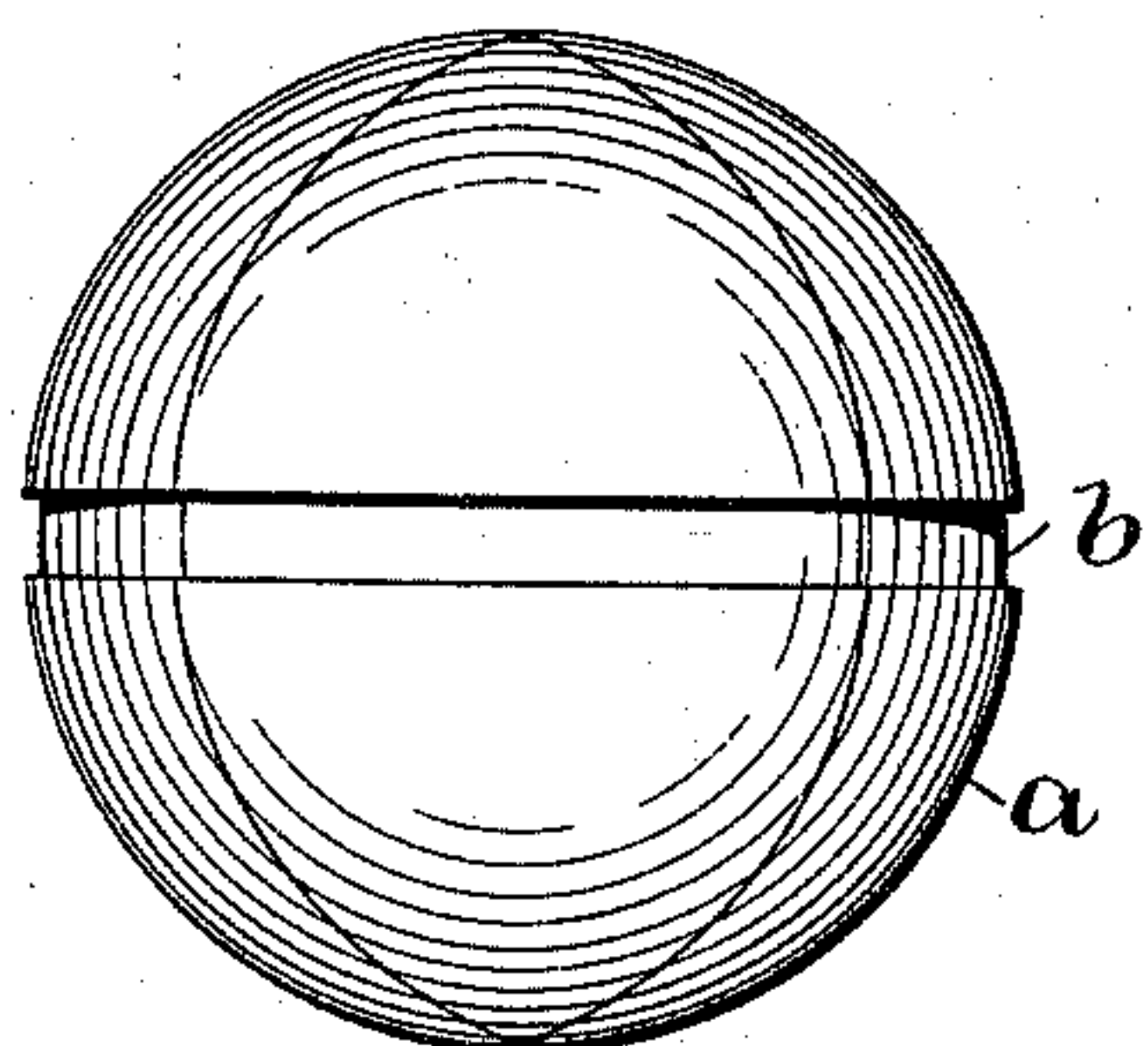


Fig. 2.

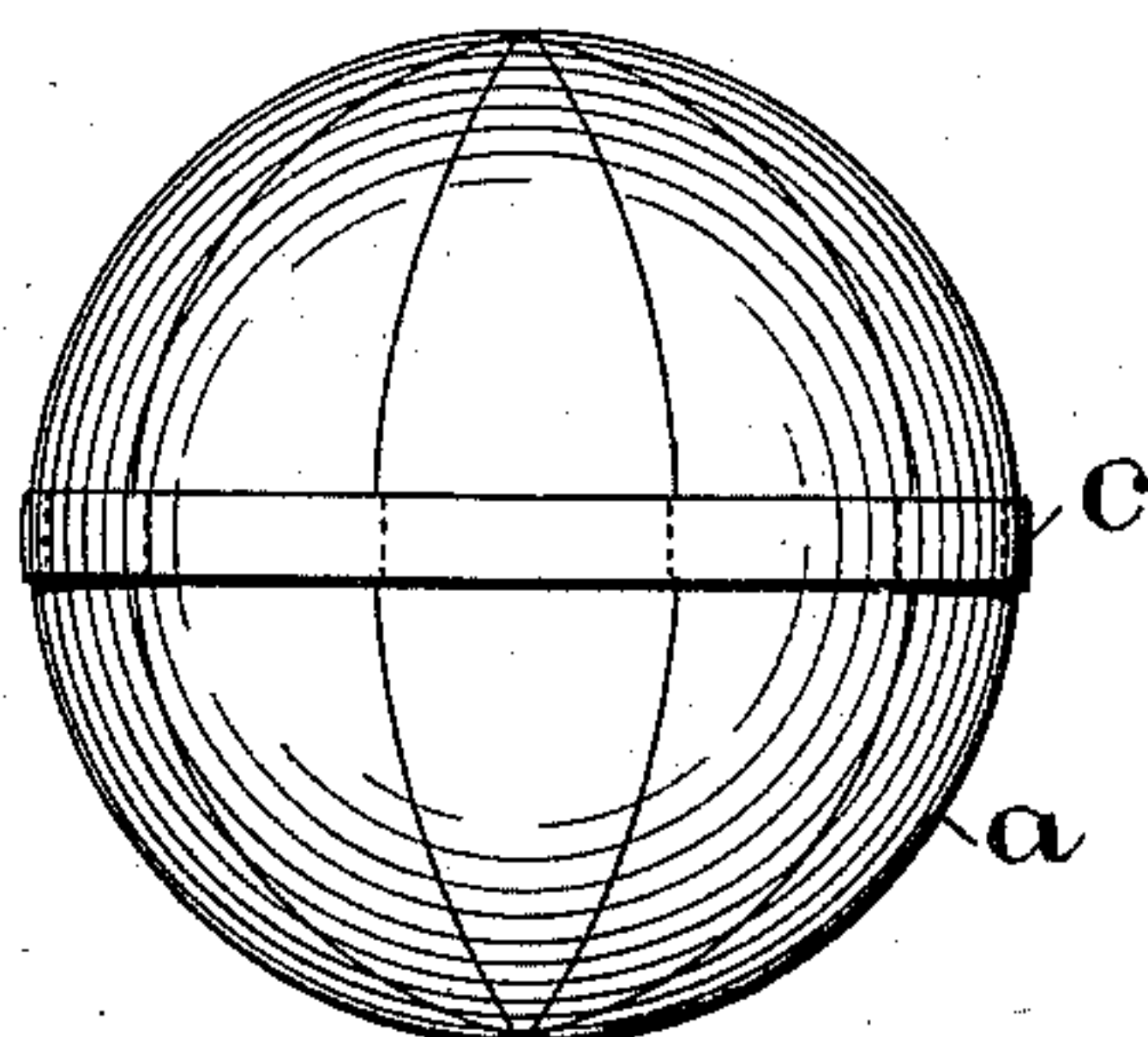


Fig. 4.

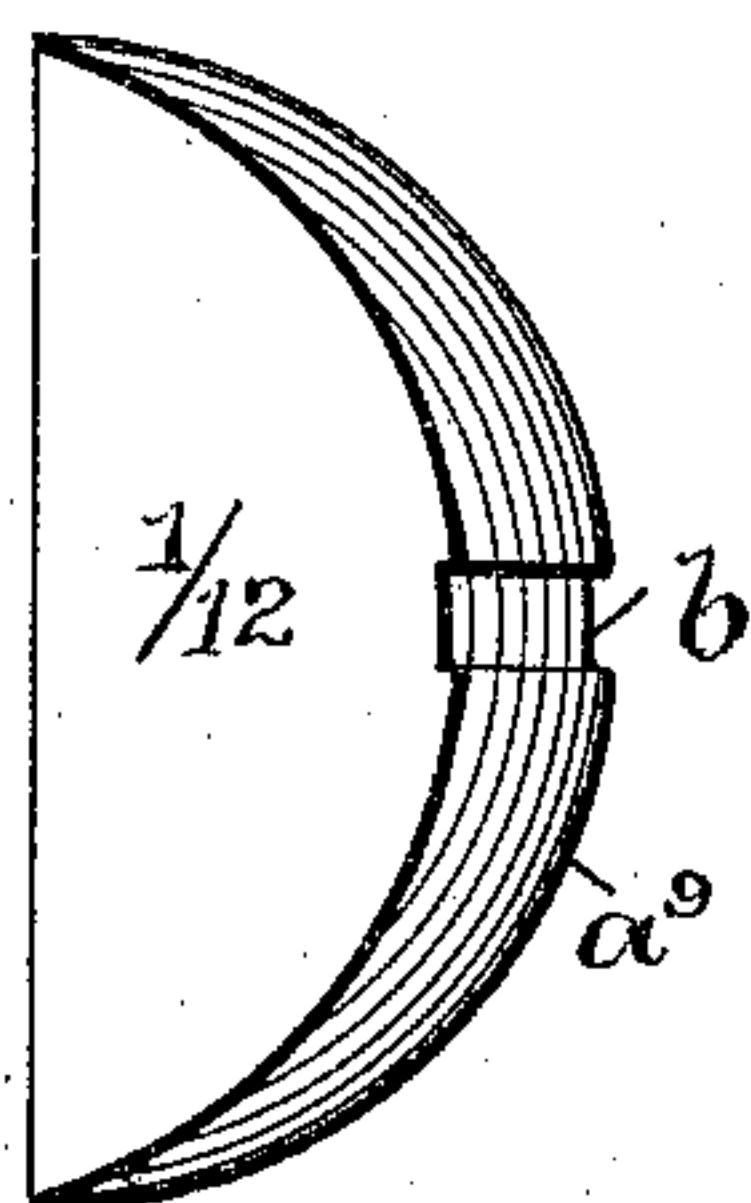


Fig. 3.

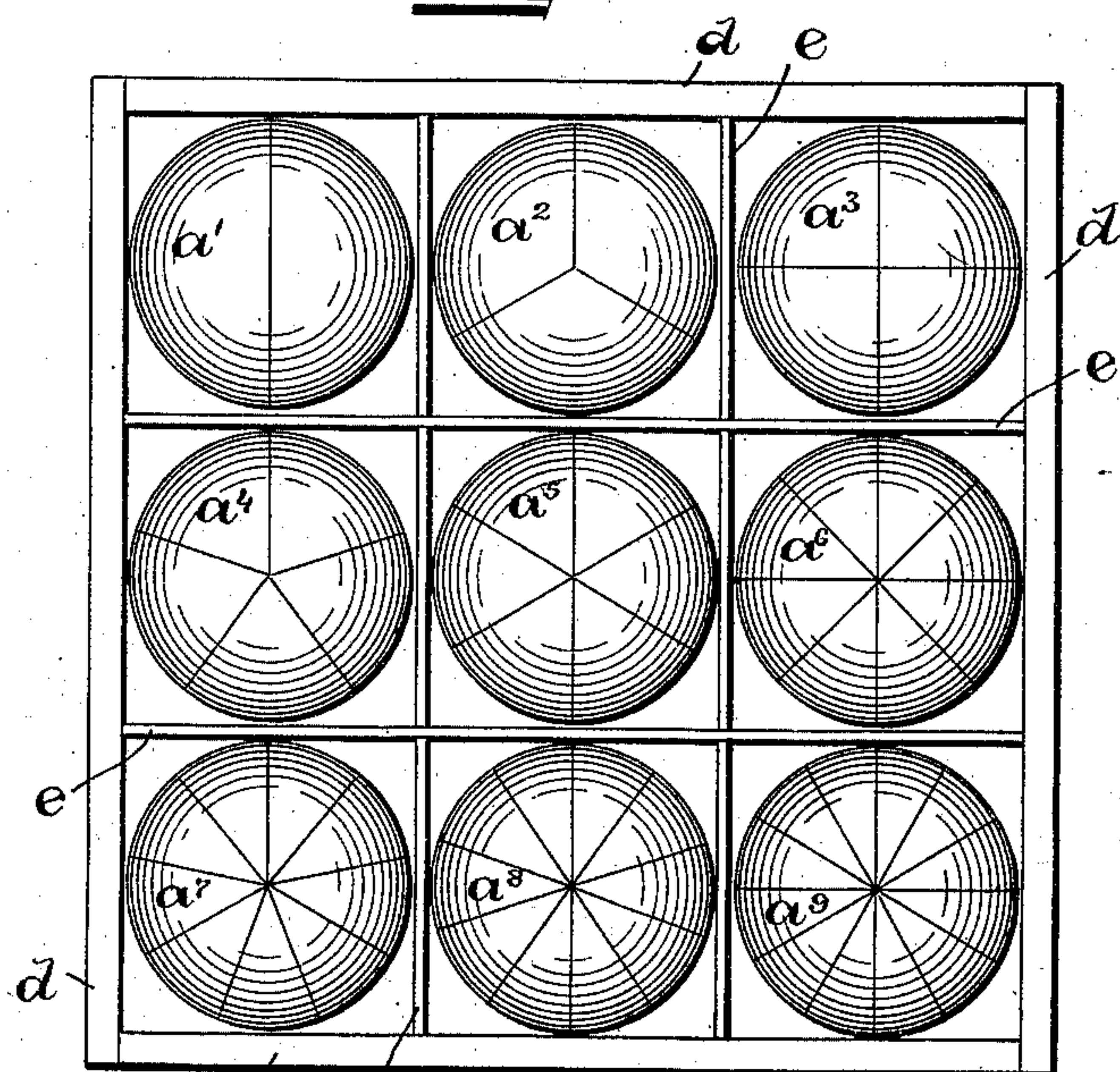


Fig. 5.

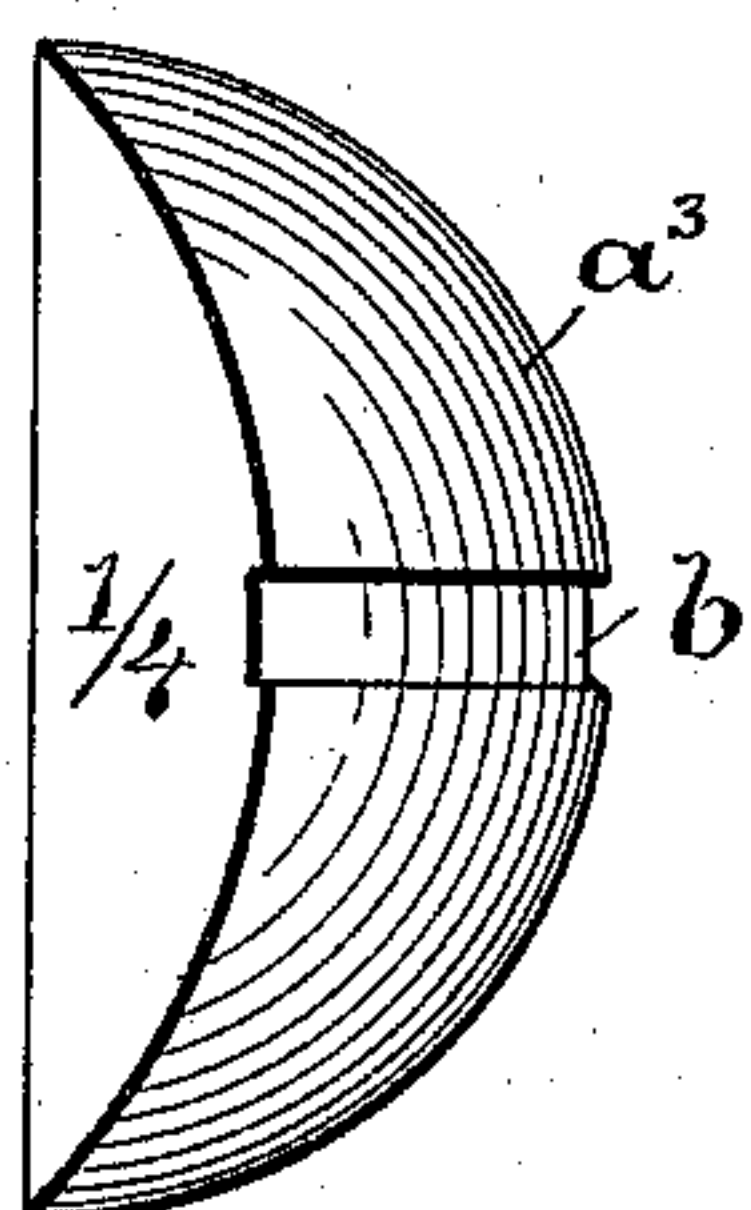


Fig. 7.

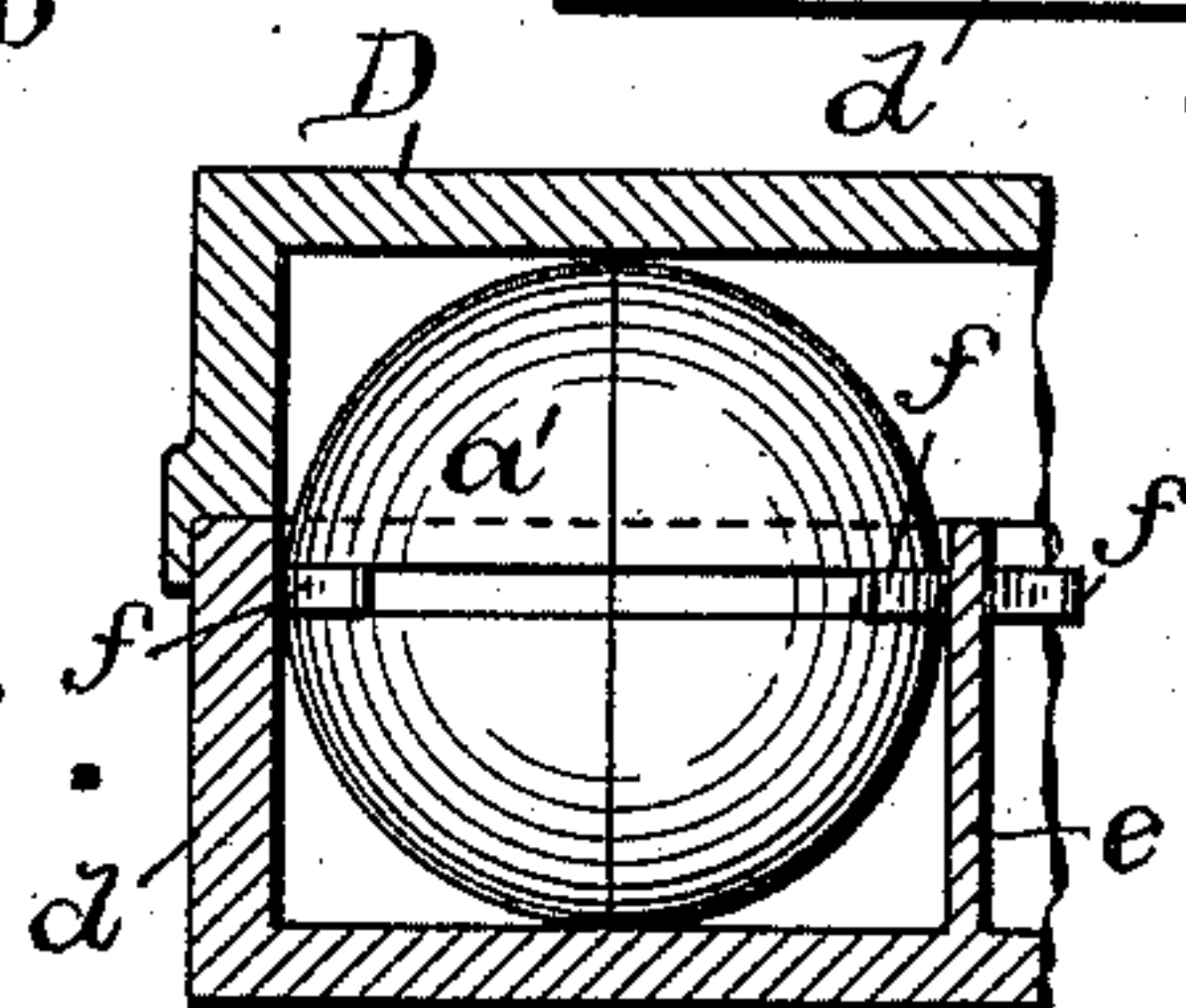
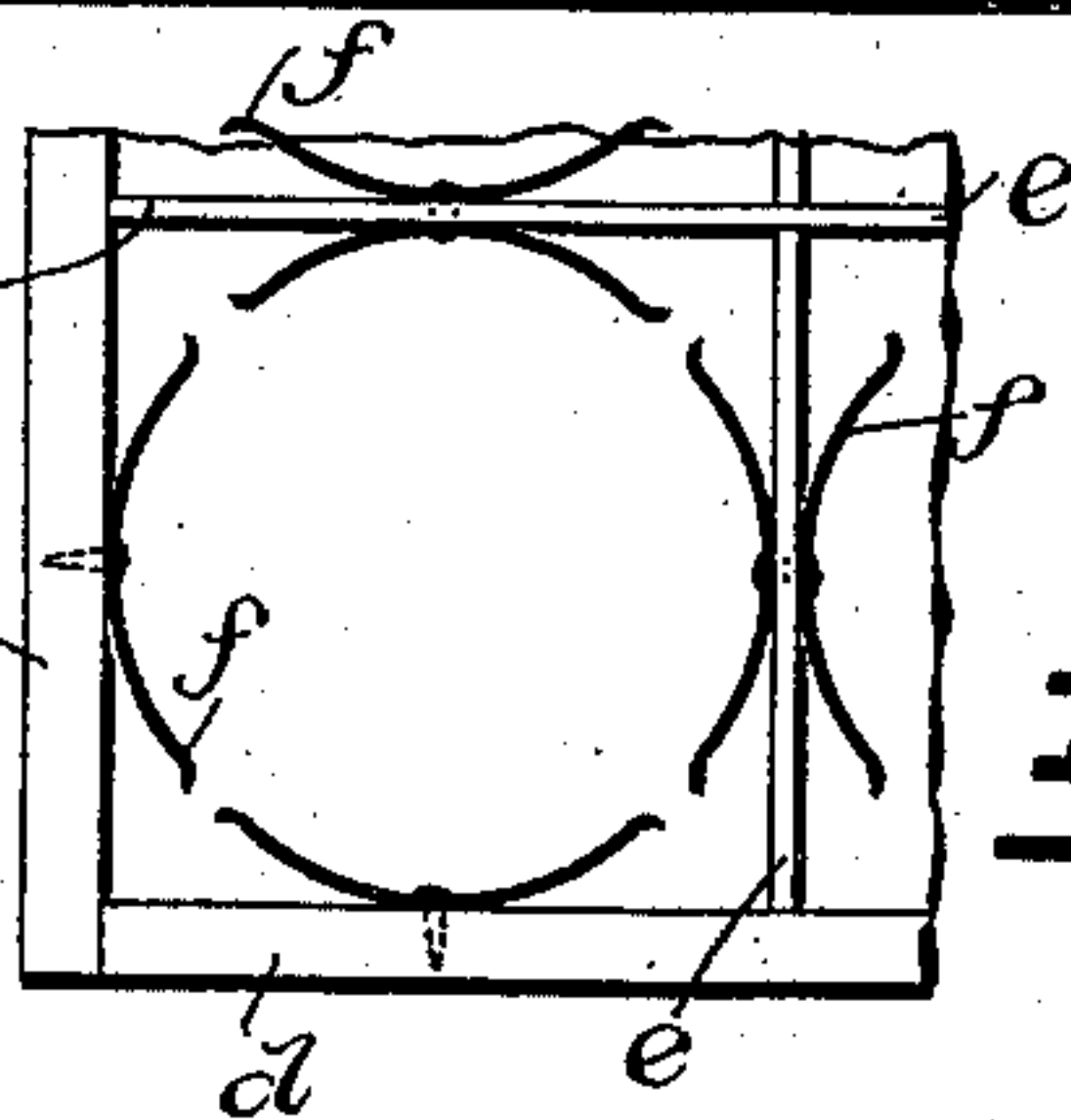


Fig. 6.



WITNESSES:

M. F. Bligh.
Chas. H. Luther Jr.

INVENTOR:

Emoline Ketchum
Joseph Miller Dec.
Atty.

UNITED STATES PATENT OFFICE.

EMOLINE KETCHUM, OF PROVIDENCE, RHODE ISLAND.

EDUCATIONAL APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 547,217, dated October 1, 1895.

Application filed March 19, 1895. Serial No. 542,353. (No model.)

To all whom it may concern:

Be it known that I, EMOLINE KETCHUM, of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Educational Appliances; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in educational appliances adapted to teach spherical fractions.

The object of this invention is to produce a set of spheres divided into different fractions adapted to be associated so that spheres may be readily formed of equal fractions or composed of different fractions, and when so formed may be held in the form of a sphere or globe and handed to pupils for examination, so as to more readily impress the mind of the scholar with the value, shape, and proportion of the respective fractions and their value to the whole in teaching spherical sections or fractions.

To this end my invention consists in forming a series of balls or globes from two or more sectional parts and providing a box and springs for associating and holding the sections together to form the ball or sphere and permit of their being handled and examined, as will be more fully set forth hereinafter.

Figure 1 is a perspective view of a ball made up of four sections, each section being provided at the equatorial line with a shallow groove. Fig. 2 is a perspective view of a ball made up of eight sections provided with an elastic band placed in a shallow groove to hold the sections together and permit of their being handled. Fig. 3 is a top view of a box divided into spaces to receive the associated sections. Fig. 4 is a perspective view of a section forming one-twelfth of a ball or sphere. Fig. 5 is a perspective view of a section forming one-fourth of a ball or sphere. Fig. 6 is a top view of part of a box divided into spaces to receive the associated sections provided with curved springs arranged to enter the groove on the sections, so as to hold the associated sections in place and permit handling. Fig. 7 is a vertical section of part of the box.

Similar letters of reference designate corresponding parts throughout the views.

In the drawings, *a* designates the ball or sphere, divided into fractions on lines radiating from the axis and extending from one pole to the other; *b*, a shallow groove formed on the outer side of the section on the equatorial line of the ball or sphere; *c*, an elastic band adapted to enter the groove *b* and hold the sections firmly together, so that they can be freely handled without danger of displacement. A set of these balls or spheres usually consists of nine balls divided into vulgar fractions, as shown in the drawings, or into decimal fractions. *a'* is made up of halves, *a''* of thirds, *a'''* of fourths, *a''''* of five-fifths, *a'''''* of six-sixths, *a''''''* of eight-eighths, *a'''''''* of nine-ninths, *a''''''''* of ten-tenths, and *a'''''''''* of twelve-twelfths.

The box shown in Fig. 3 consists of the outer parts *d* and the partitions *e e*. It may be of a depth equal to the thickness of the balls or spheres; but I prefer to make them, as shown in Fig. 7, only little more than one-half the depth, so that when the cover is removed the upper part of the balls will extend above the lower part of the box and the partitions. By making the compartments so as to closely fit the balls, as is shown in Fig. 3, the rubber bands *C* will hold the balls in the compartments by contact with the sides. The cover *D* may be hinged to the lower part of the box, or it may set over the lower part, as shown in Fig. 7.

I prefer to mark the value of each section of the sphere or ball on the same, as is shown in Figs. 4 and 5, preferably with a die; but such marking may be omitted.

The manner in which the spheres or balls are used in teaching is as follows: The pupil is first made familiar with the balls divided into the different sections, as shown in Fig. 3, so as to understand the proportions of different fractions to the whole. One fraction of each ball is now usually removed from the balls successively, so that the pupil can become familiar with the shape of each fraction and the remaining portion of each ball. When the pupil has become familiar with the fractions, mixed fractional balls are formed—that is to say, one section of the ball *a'* and two sections of the ball *a''* are associated to

form a ball. As each section is provided with the groove *b*, the so associated fractions may be placed into the box and will be held together by the springs *f f*, secured into each
5 compartment and adapted to enter the groove *b*, or they may be securely held together by placing the band *c* around the ball in the groove *b*. By reason of the groove the elastic band holds each section in its respective place,
10 so that the associated balls can be freely handled and examined by the pupils. It also permits the springs *f*, which are located to enter the groove, to firmly hold the sections in place and permit the handling and exhibition of
15 the fractional balls in the box without incurring the liability of disturbing or dropping any fraction or ball.

It is evident that various combinations of fractions may be formed and placed into the
20 compartments of the box, as they, by reason of the groove *b* and the band *c* or springs *f*, are held firmly. The box containing the fractional balls may be set up perpendicular on the teacher's or the pupil's desk and the com-
25 parative relations of the fractions to each

other and to each ball studied by the pupil. The pockets in the box are preferably made square, so that the round balls may be more readily inserted and removed, the square corners facilitating the insertion of the fingers. 30

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In an educational device, the combination with a series of balls made up of varying frac- 35 tional parts, and a groove formed on the equatorial line of the curved surface of each section of the balls, of a box provided with a series of compartments adapted to receive the balls, and the springs *f, f*, adapted to enter 40 the groove and hold the fractional sections together and retain them in the box, as described.

In witness whereof I have hereunto set my hand.

EMOLINE KETCHUM.

Witnesses:

JOSEPH A. MILLER,

JOSEPH A. MILLER, Jr.