(No Model.) 2 Sheets—Sheet 1.

A. H. KENNEDY.

MENSURATION FORM.

No. 538,261. Patented Apr. 30, 1895.

Fig. 1.

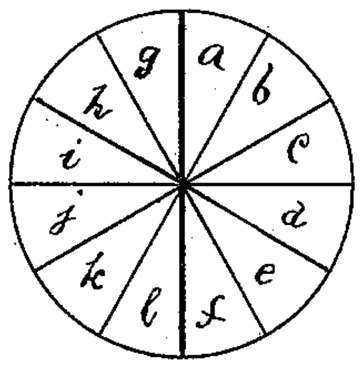


Fig. 2.

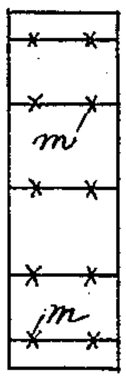


Fig. 3.

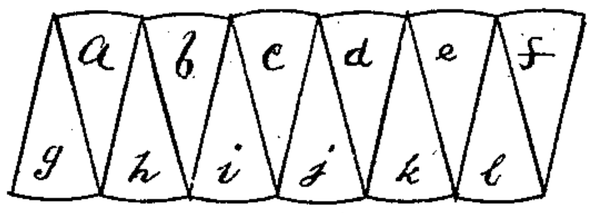


Fig. 4.

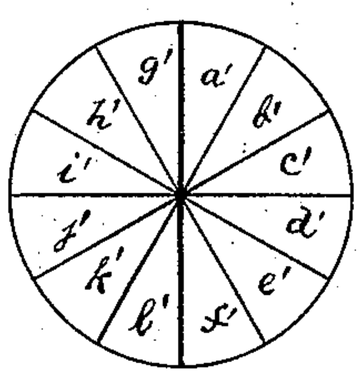


Fig. 5.

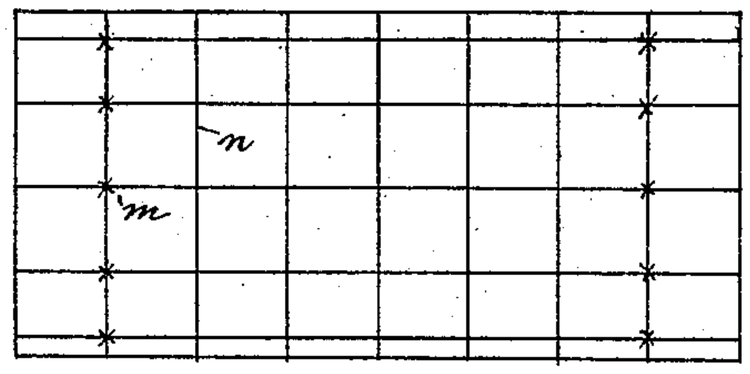
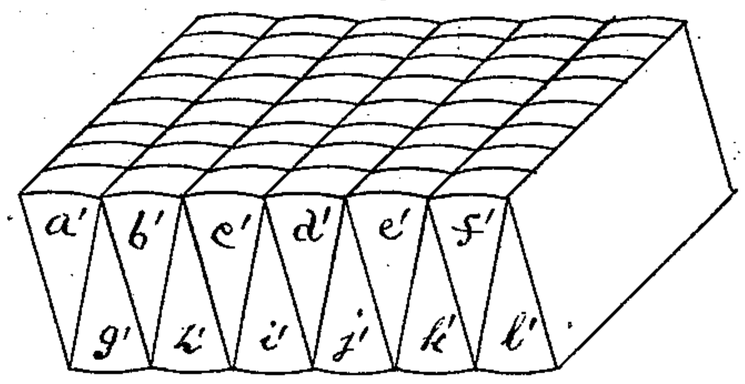


Fig. 6.



Witnesses.
E. E. Wesseler
J. L. Burton

Inventor
Albert H. Kennedy.

(No Model.) 2 Sheets—Sheet 2.

A. H. KENNEDY.

MENSURATION FORM.

No. 538,261. Patented Apr. 30, 1895.

Fig. 7

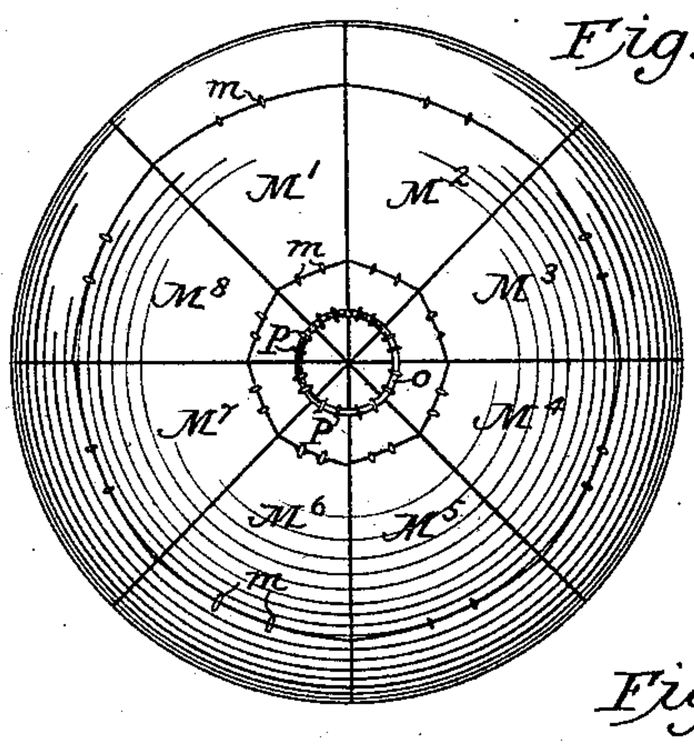


Fig. 8

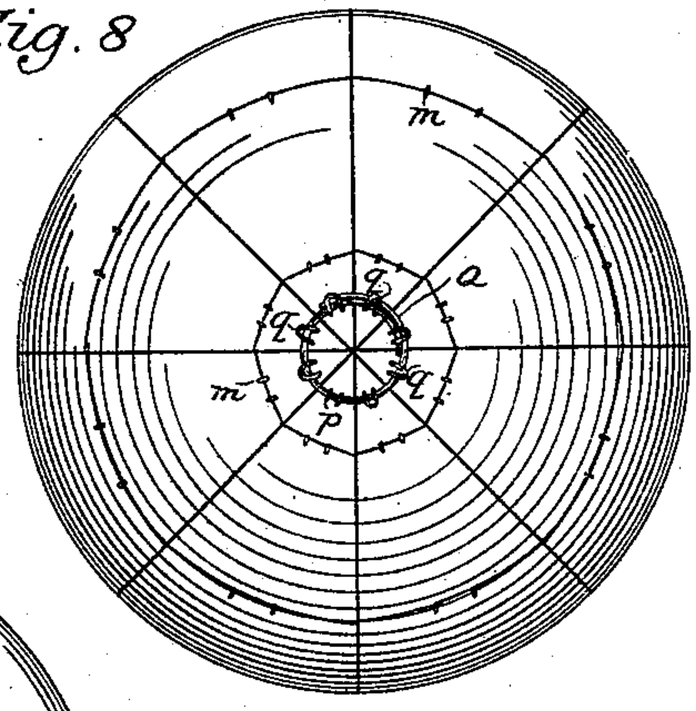


Fig. 9

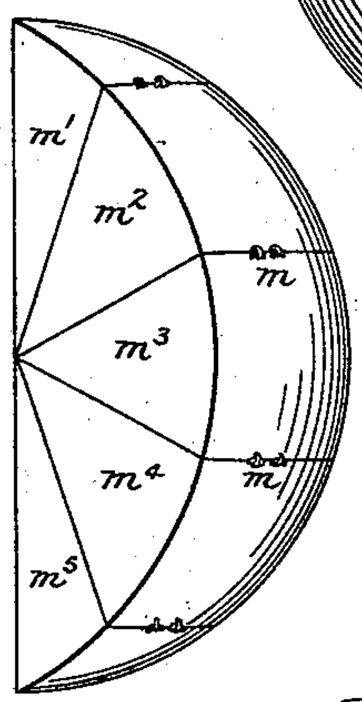


Fig. 11.

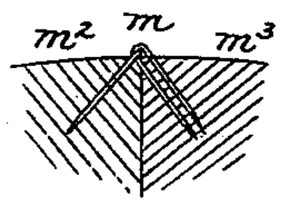
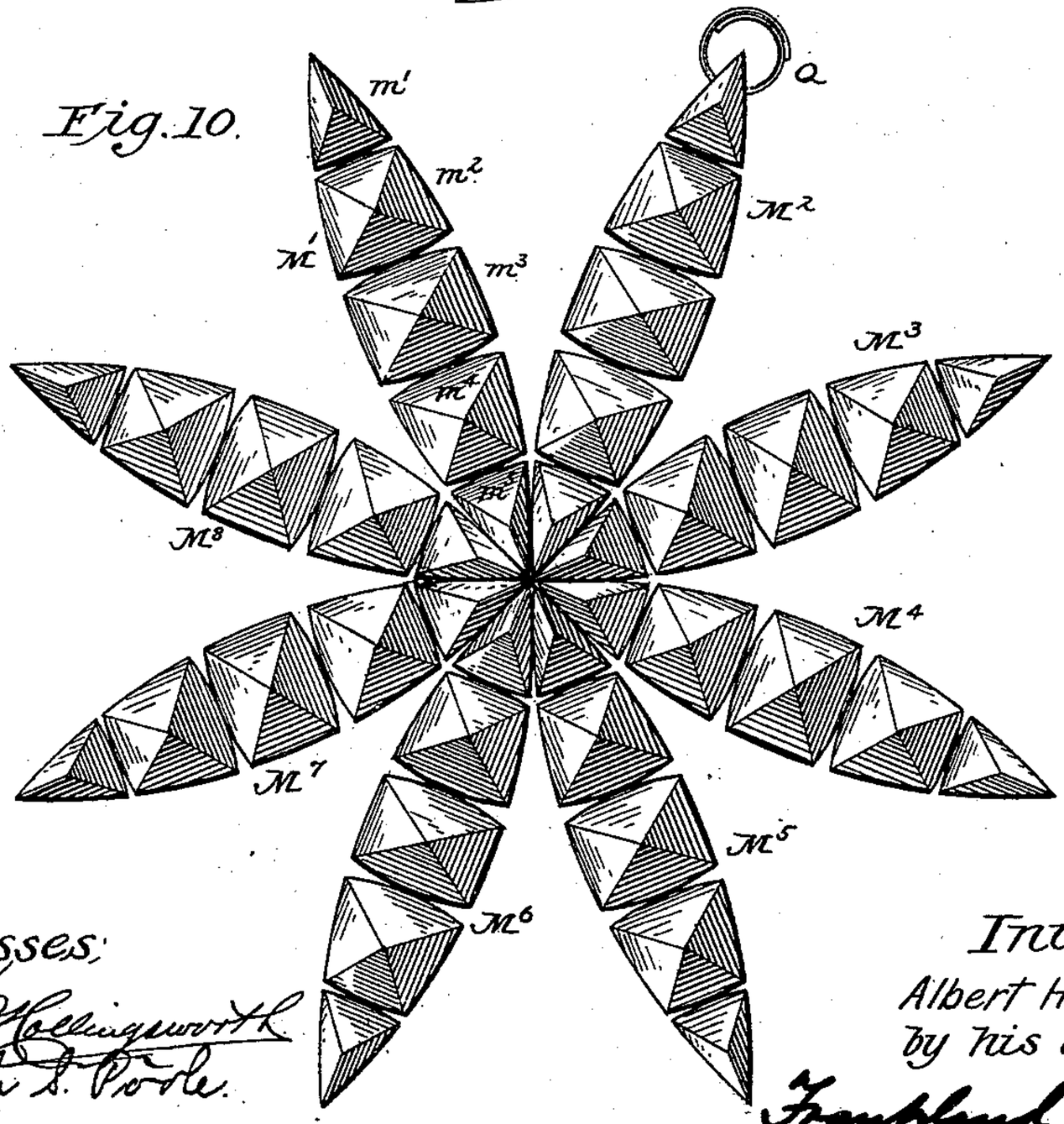


Fig. 10.



Witnesses:
Sidney P. Hollingsworth
Elizabeth L. Poole.

Inventor:
Albert H. Kennedy
by his attorney
Frankland James

UNITED STATES PATENT OFFICE.

ALBERT H. KENNEDY, OF ROCKPORT, INDIANA.

MENSURATION FORM.

SPECIFICATION forming part of Letters Patent No. 538,261, dated April 30, 1895.

Application filed August 14, 1894. Serial No. 520,334. (No model.)

To all whom it may concern:

Be it known that I, ALBERT H. KENNEDY, a citizen of the United States, residing at Rockport, in the county of Spencer and State of Indiana, have invented a new and useful Combination of Dissected Mensuration Forms, of which the following is a specification.

My invention relates to improvements in mensuration forms in which the several round geometrical surfaces and solids are dissected so that their elementary parts may be separated, thus showing in a simple and concrete manner the elementary principles upon which the rules of mensuration are based.

The object of my invention is to provide cheap and durable wire hinges in such a manner that they may be rapidly and securely applied and afford the utmost flexibility of parts. I attain this object by the mechanisms illustrated in the accompanying drawings, in which—

Figure 1 is an end view of a sub-divided or dissected circle. Fig. 2 is an end view thereof. Fig. 3 is an end elevation showing the sectors of the circle opened out and one-half interposed in the other half. Fig. 4 is an end view of a cylinder. Fig. 5 is a view in elevation of the cylinder. Fig. 6 is a view in perspective showing the two halves of the cylinder opened out, and one interposed in the other. Fig. 7 is a plan view of the lower half of a dissected sphere, closed and showing the means for holding the parts together. Fig. 8 is a plan view of the upper half of the same sphere, showing the detachable top fastenings. Fig. 9 is a perspective view of one of the spherical wedges into which the sphere is divided. Fig. 10 is a plan view of the entire sphere opened out. Fig. 11 is a fragmentary detail showing one of the staple hinges in position.

In Figs. 1 and 3 are shown the elementary, triangular sectors, *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, *j*, *k*, *l*, of which the circle is composed. The circle is divided into two halves along the central, thick line, and the adjacent sectors of each half are connected by means of hinges *m*, which are shown in detail in Fig. 11, and indicated in position in Fig. 2. When the two halves of the circle are separated and the sectors opened by movement of the sectors upon their hinges, they may be interposed, as shown in Fig. 3, making a figure very nearly like a parallelogram. By connecting the parts as stated, they are securely connected, and yet quite flexibly so, and may be manipulated as desired. The hinges *m*, which I prefer to use, are made of two, interlocked wire staples, forced obliquely into the meeting edges of the parts to be joined, and by interlocking will hold their parts in their relative positions, so that the dissected form may be opened or closed, or placed in any desired position. Furthermore, the rounded portions of the hinges projecting, if they do project, above the surfaces to be united, do not cause any inconvenience or damage; and I find this form of hinge to be exceedingly durable, as well as permanent, when properly applied. This hinge also is comparatively inconspicuous, and mars the surface less than that of any other form of hinge with which I am acquainted.

Figs. 4, 5 and 6 illustrate the application of the foregoing to a cylinder, which is represented as an elongation of the circle, Figs. 1, 2 and 3. The cylinder is divided into two halves along the heavy line, Fig. 4, and the elementary, triangular sections are marked *a'*, *b'*, *c'*, *d'*, *e'*, *f'*, *g'*, *h'*, *i'*, *j'*, *k'*, *l'*. These parts are connected by the hinges *m*.

While the cylinder is in the lathe the surface is marked at appropriate intervals by marks or grooves *n*, and when the cylinder is divided into its elementary parts these squares are formed. The hinges being placed at the intersections of these lines preserves the symmetry of the squares. Two rows of hinges, as indicated in Figs. 2 and 5, are sufficient to maintain the sectors of a circle, or of a cylinder, in the desired relation to each other, and are therefore sufficient for the purpose; but where still greater strength is desired, as where large and heavy forms are used, the hinges may be provided at more of, or at all of the points where the blocks are divided by the saw to form sectors, and the intersections of the grooves *n*.

Figs. 7 and 8 show the bottom half and the top half of a sphere, which in this instance is composed of eight wedges, M', M^2, M^3, M^4, M^5, M^6, M^7, M^8, such as seen in Fig. 9, which fit together as would the pieces of an orange.

Each of these wedges is subdivided into a number of parts, as here shown into five parts, m', m^2, m^3, m^4, m^5, which illustrate the elementary pyramids of which this sphere is composed. The parts m', m^2, m^3, m^4, m^5 of each wedge, are connected by hinges m, which are preferably constructed as shown in Fig. 11; that is to say, composed of two, interlocked wire staples driven obliquely into the edges of the pieces to be joined, permitting the members of each wedge to be opened out and thereby to separate their elementary pyramids, as shown in Fig. 10. The staple hinges m are preferred, because, when properly inserted they are very difficult to displace. Then again they offer no sharp corners. Furthermore they occupy very little space, have considerable freedom of movement, and have no pins to become loose and slide out. It is obvious, however, that some other form of hinge might be substituted without departing from the invention.

The several members or pieces of which this sphere is composed, are assembled by securing them near one pole to a ring or band o, as seen in Fig. 7, by means of staples P, which allow of movement of the parts, so that the sphere may be opened out, as shown in Fig. 10. In order to hold the several parts of the sphere together in the form of a sphere, I provide at the free extremity of one of the pieces, M^2, a ring or band Q, which is preferably elastic. As illustrated, the band Q is a ring of spring wire, the ends of which are not joined. A rubber band would also answer the purpose. The ring Q is movably attached near the end of the piece M^2 by staples p. Each one of the remaining pieces, M', M^3, M^4, M^5, M^6, M^7, M^8, is provided near its extremity with means for detachably connecting it with the ring Q. As here shown, said means comprises in each instance a staple q, which is driven into the free end of the piece at about the same distance from the pole of the sphere, and then bent over so as to hook over the ring Q the hooks pointing away from the pole. The head of a tack projecting from the circumference of a sphere at the same point, or the head of a screw, would suffice to engage the said ring Q and thereby hold the pieces of the sphere in position. As the pieces, M', M^2, M^3, M^4, M^5, M^6, M^7, M^8, of the sphere are brought together, the staples, tacks, or screws are pushed under the ring, or the ring Q, or band, is sprung over them, so that when all are in place the sphere will be securely held together.

To detach one or more of the pieces, M', M^2, M^3, M^4, M^5, M^6, M^7, M^8, the ring or band Q is sprung or stretched outwardly, or the piece to be released may be pushed inwardly somewhat, the other pieces yielding to permit its release in this manner. Where preferred, an open, elastic ring, such as shown at Q, might be used in connection with staples p, in the free end of each piece, M', M^2, M^3, M^4, M^5, M^6, M^7, M^8, and the parts being held together by running the ring through them; but the form illustrated is much simpler and less trouble.

This method of hinging dissected mensuration forms is applicable to the dissected cone, frustum of a cone, and any others where hinging is required. Its merits are flexibility, durability, neatness and cheapness, thus affording for the teacher an easy and rapid means of demonstration and illustration, and allowing of a more general introduction in schools, where the expense of their manufacture has hitherto precluded them.

Having described the invention, what I claim is—

1. A mensuration form comprising a solid dissected into several similar geometrical forms each of said forms being subdivided, hinges located at the meeting edges of the subdivisions, a ring permanently uniting one end of all the forms, and a detachable ring adapted to secure the opposite ends of all the forms, to illustrate the configuration of the original solid, substantially as described.

2. The combination with a spherical body divided into segments, of a ring surrounding one pole and flexibly secured to each segment, and an open or elastic ring surrounding the opposite pole and detachably secured to the segments.

3. The combination with a spherical body divided into segments, of a ring surrounding one pole and flexibly secured to each segment, an elastic ring surrounding the opposite pole, permanent connections between said ring and one of the segments, and detachable connections between the remaining segments and the ring.

A. H. KENNEDY.

Witnesses:
E. E. WESSELER,
J. A. ARMSTRONG.