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PATENTED JAN. 15, 1907.

W. KOOPS & H. REIMERS.

DEVICE FOR FACILITATING THE TEACHING OF FRACTIONS.

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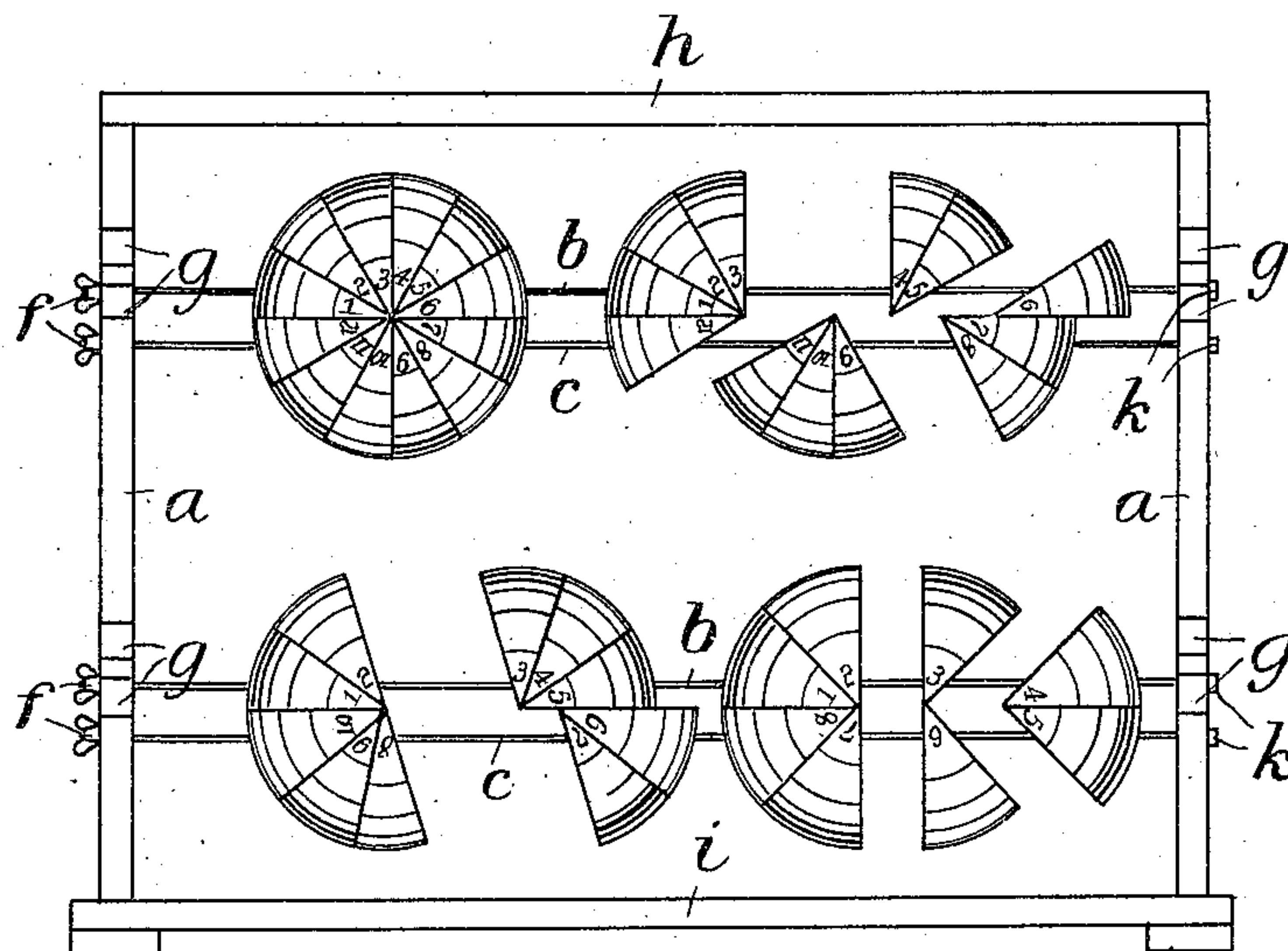


Fig. 1.

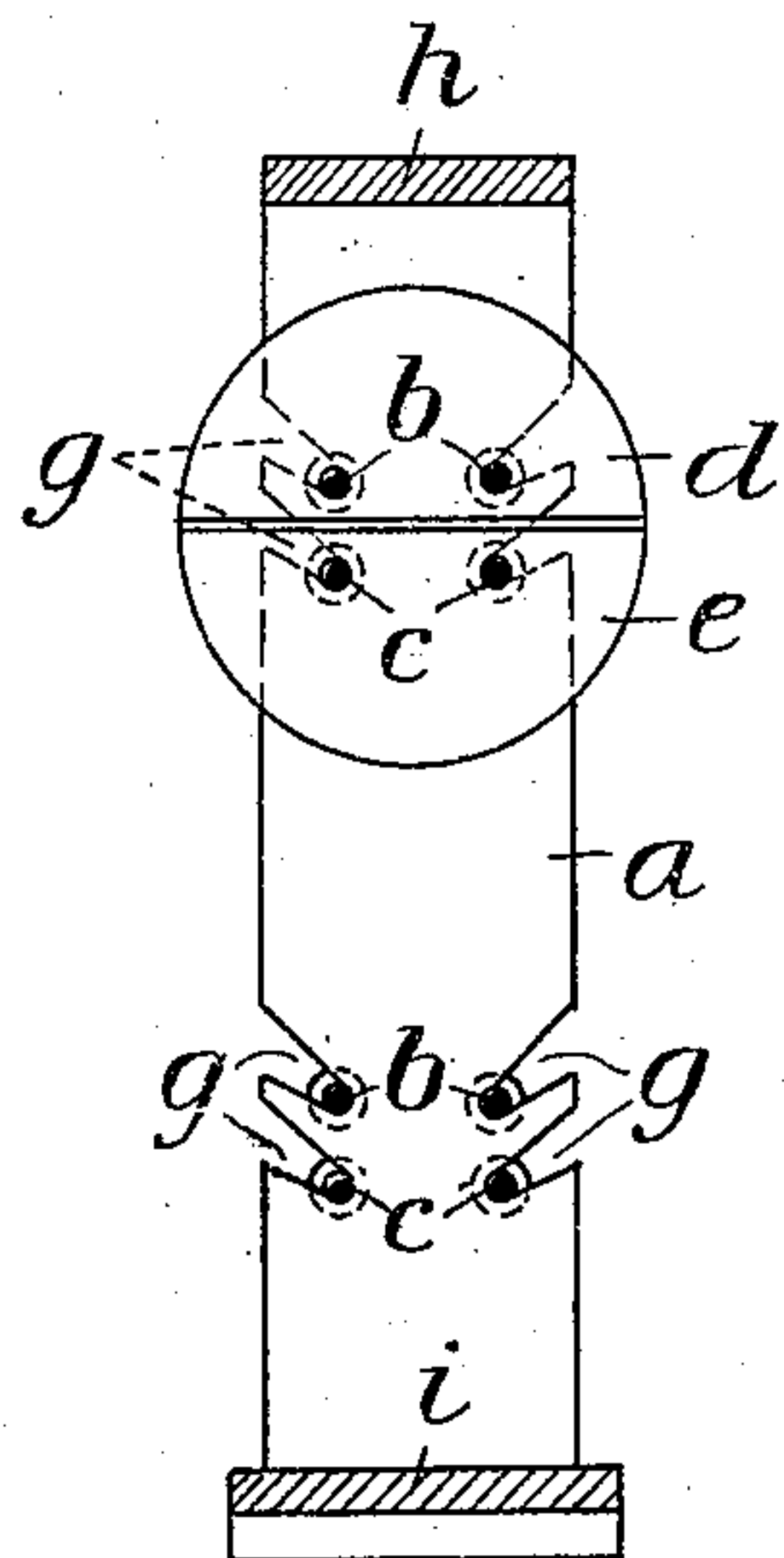


Fig. 2.

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DEVICE FOR FACILITATING THE TEACHING OF FRACTIONS.

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Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed February 14, 1906. Serial No. 301,111.

To all whom it may concern:

Be it known that we, WILHELM KOOPS, teacher, a resident of No. 12 Heitmannstrasse, and HANS REIMERS, head teacher, a resident of No. 92 Veddeleer Bruckenstrasse, Hamburg, in the Empire of Germany, citizens of Germany, have invented a new or Improved Device for Facilitating the Teaching of Fractions, of which the following is a specification.

The present invention relates to an improved educational device particularly adapted for imparting a knowledge of fractions; and it has for its object to provide a device of the kind referred to which is in a high degree efficient, serviceable, and durable.

With these ends in view the invention consists in the novel combination and arrangement of parts, all as hereinafter described, shown in the accompanying drawings, and specially set forth in the appended claims.

In the drawings, Figure 1 is a front elevation of the device, and Fig. 2 is a vertical section of Fig. 1.

According to our invention we employ a spherical body, which for the sake of lightness, economy, and general fitness for the purpose is preferably made of wood or like material. The sphere is divided into halves, and each half is subdivided into any suitable number of equal segments on lines radiating from a common axis. The individual segments of a sphere thus divided coincide in shape and cubical dimension. The value of each segment is preferably marked thereon, as is shown in the drawings, and adjacent segments are preferably distinguished from one another by different colors or like colors in different shades.

The individual segments of the upper half *d* of the sphere are free to move along, but not rotatably on a pair of horizontal wires or guides *b*, and the individual segments of the lower half *e* are similarly mounted and freely movable along a second pair of wires or guides *c*, as shown in Figs. 1 and 2. The holes for the penetration of the wires *b* or *c* in the segments of the sphere are so located that said segments can be assembled together to constitute a unit in the shape of a sphere, as indicated in the left-hand top corner of Fig. 1.

For supporting the wires *b c*, of which two sets are shown in the drawings; a wooden frame is employed comprising a pair of ver-

tical standards *a*, connected together at their top ends by a transverse bar *h* and attached at their lower ends to a base *i*, sufficiently wide to afford a firm footing. The standards *a* carry the wires *b* and *c* horizontally, the said wires preferably being detachable to enable the removal, interchange, and replacement of the spheres. This may be accomplished by providing open bearings *g*, cut from the lateral edges of the standards, as shown in Fig. 2. Each wire *b* or *c* is provided at one extremity with a head *k*, wider than the bearing, and at its other extremity with a screw-threaded portion on which is fitted a winged nut *f*. By screwing home the latter against the respective standard the wires are firmly fixed in the standards *a*. The employment of the winged nuts *f* further provides for the proper tensioning of the wires. The four wires *b c* of each set are parallel with each other and they preferably inclose a square between them, as indicated in Fig. 2. This renders the two halves of a sphere independent of the support on the top or lower set of wires *b* or *c*.

It has been found in practice that a device of the kind hereinbefore described employing two spheres divided into twelve equal segments is sufficient for ordinary school purposes, such a device enabling fifty-four fractions of various kinds to be illustrated. If it is desired to illustrate a greater number of fractions, other spheres divided into a different number of segments can be employed—for instance, ten or eight segments—as shown at the lower part of Fig. 1. The eight, ten, and twelve segment spheres will, however, be most useful in practice. The device may also serve for demonstrating addition, subtraction, multiplication, and division.

The simple construction of the device and the easy adjustability of the individual sphere-segments render the present invention especially suitable for the philosophic teaching of fractions, the more so as not only a great number and variety of fractions but also the operations with the latter, can be illustrated.

While in the accompanying drawings the preferred form of the invention is illustrated, it will be understood that the invention is not limited to the precise form shown, many variations of the details being possible without departing from the spirit of the inven-

tion, and we therefore reserve the right to make all such modifications as are included within the scope of the following claims.

What we do claim as our invention, and
5 desire to secure by Letters Patent, is—

1. A device for teaching fractions comprising a sphere divided into halves, said halves subdivided into a plurality of equal segments and means for supporting the sphere, said
10 means preventing the individual members of the sphere from rotation, but enabling same to be rectilinearly moved and separated from each other and moved together to form a sphere, substantially as set forth.

15 2. A device for teaching fractions comprising a sphere divided into halves and subdivided into a plurality of equal segments, two sets of supporting-wires for the sphere, one set of said supporting-wires penetrating the
20 individual members of the upper half, the other set penetrating the individual members of the lower half of the sphere and means for securing the supporting-wires in horizontal position, substantially as set forth.

25 3. A device for teaching fractions comprising a sphere divided into halves and subdivided into a plurality of equal segments, two sets of supporting-wires for the sphere, one set of said supporting-wires penetrating the
30 individual members of the upper half, the

other set penetrating the individual members of the lower half of the sphere, standards for the reception of the supporting-wires, attached to a sufficiently wide base to afford a firm footing, means for detaching the
35 supporting-wires from the standards and means for pulling taut the wires between the standards, substantially as set forth.

4. A device for teaching fractions comprising a sphere divided into halves and subdivided into a plurality of equal segments, two
40 sets of supporting-wires for the sphere, one set of said supporting-wires penetrating the individual members of the upper half and the other set penetrating the individual members of the lower half of the sphere in such a
45 manner that the two halves may be interchanged on their supporting-wires, and means for securing the supporting-wires in horizontal position, substantially as set forth. 50

In witness whereof we have hereunto signed our names, this 31st day of January, 1906, in the presence of two subscribing witnesses.

WILHELM KOOPS.
HANS REIMERS.

Witnesses:

ERNEST H. L. MUMMENHOFF,
EDWARD BÜFFNER.