(No Model.)

2 Sheets—Sheet 1.

J. & C. LINDAHL.

ZODIACAL CHART.

No. 573,091. Patented Dec. 15, 1896.

Fig. 1

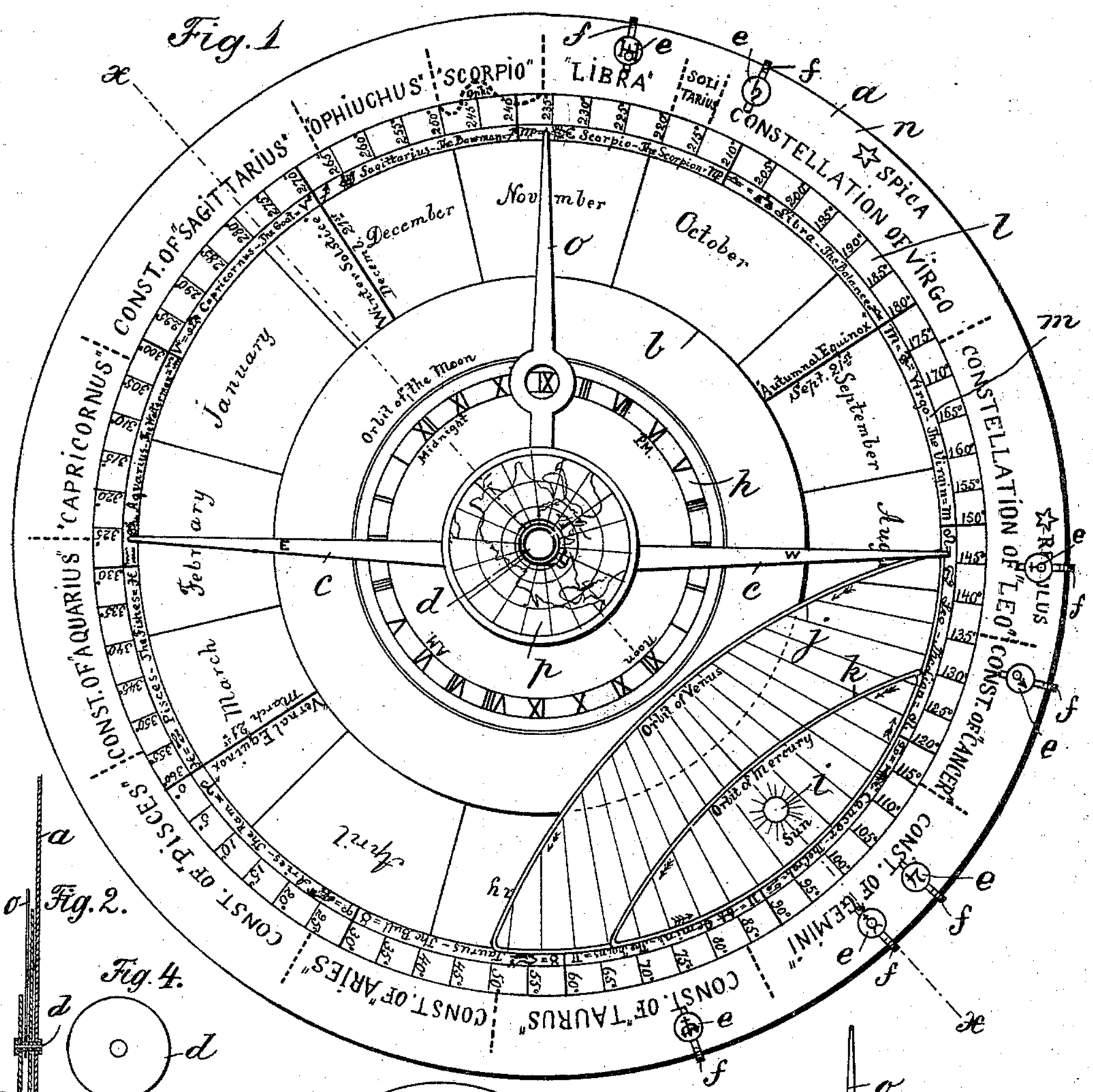


Fig. 2.

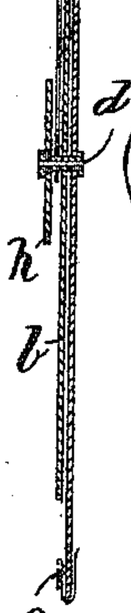


Fig. 4.

Fig. 6.

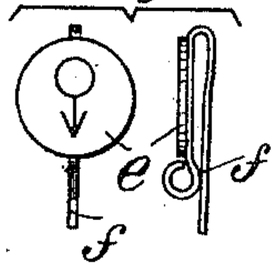


Fig. 3.

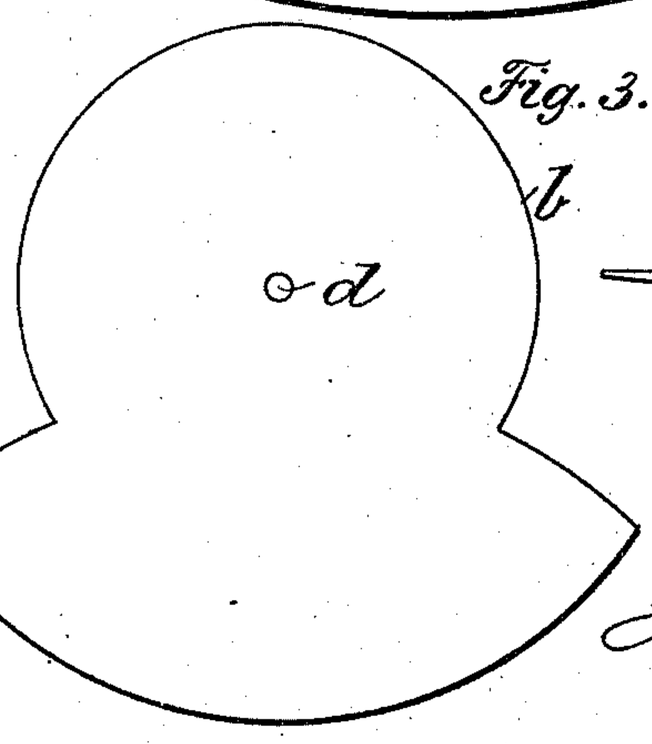
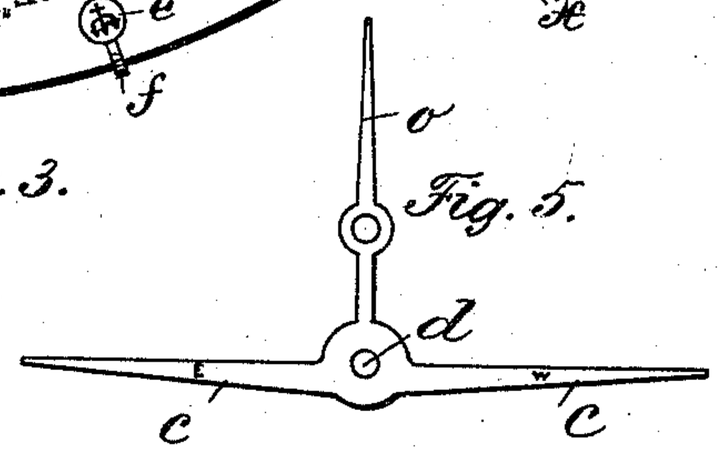


Fig. 5.



WITNESSES.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

J. & C. LINDAHL.

ZODIACAL CHART.

No. 573,091. Patented Dec. 15, 1896.

Fig. 1.

Table of Geocentric Celestial Longitudes.

1895.		☿ Mercury	♀ Venus	♂ Mars	♃ Jupiter	♄ Saturn	♅ Uranus	♆ Neptune
Noon.								
July	1	99°	145°	133°	106°	211°	226°	74°
	7	96	151	137	107	211	226	74
	14	95	157	141	109	212	226	75
	21	98	163	146	111	212	226	75
Aug.	1	113	172	153	113	212	226	75
	7	124	175	156	114	212	226	75
	14	139	178	161	116	213	226	76
	21	153	180	165	117	213	226	76
Sept.	1	172	180	172	119	214	226	76
	7	182	178	176	121	215	227	76
	14	192	175	181	122	215	227	76
	21	201	171	185	123	216	227	76
Oct.	1	213	167	192	125	217	228	76
	7	217	166	195	126	218	228	76
	14	220	166	200	127	218	228	76
	21	217	169	205	127	219	229	76
Nov.	1	206	176	212	128	221	230	75
	7	207	180	216	129	221	230	75
	14	214	185	221	129	222	230	75
	21	224	193	226	129	223	231	75
Dec.	1	239	203	233	129	224	231	75
	7	248	210	237	129	225	232	75
	14	259	217	242	129	225	232	74
	21	270	225	247	128	226	233	74

WITNESSES.

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UNITED STATES PATENT OFFICE.

JOSUA LINDAHL, OF CHICAGO, ILLINOIS, AND CALEB LINDAHL, OF NATIONAL MILITARY HOME, LOS ANGELES COUNTY, CALIFORNIA.

ZODIACAL CHART.

SPECIFICATION forming part of Letters Patent No. 573,091, dated December 15, 1896.

Application filed November 9, 1895. Serial No. 568,458. (No model.)

To all whom it may concern:

Be it known that we, JOSUA LINDAHL, of Chicago, Illinois, and CALEB LINDAHL, of Soldiers' Home, Los Angeles county, California, citizens of the United States, have invented certain new and useful Improvements in Planetographs or Zodiac Charts, of which the following is a specification.

The object of our invention is to construct a simple, easily-intelligible, and inexpensive contrivance by which anybody, without the study of books and at any time, may be able to point out the position of the planets and of the constellations and signs of the zodiac and to observe their motions, as hereinafter described, reference being made to the accompanying drawings, in which—

Figure 1 is a diagram of our improved planetograph or chart constructed to represent the plane of the ecliptic. Fig. 2 is a transverse section of the chart on the line *x x* of Fig. 1 and drawn to a smaller scale. Fig. 3 is a diagram of the smaller disk of the chart detached from the larger one. Fig. 4 is a diagram of a third and still smaller disk that may be used for a circumpolar map of the earth, if desired. Fig. 5 is a diagram of movable pointers used on the faee of the chart. Fig. 6 represents a plan and side view of a tag employed for a planet-symbol, one being used for each planet and adapted for changeable connections with the margin of the chart. Fig. 7 is a table of geocentric celestial longitudes for the current half-year to be used with the chart, said table to be continued indefinitely.

Our invention consists in the combination of two disks *a* and *b* of unequal size, and, preferably, a calendar-hand *o*, also a straight rod *c*, all perforated through their centers *d* and there pivoted together one upon another in such manner that they may be caused to rotate about the pivot independently of each other, a set of tags *e*, on each of which is marked the name or symbol of a planet, and having a pin, gripping-spring *f*, or other means of detachable connection with the margin of the disk *a* to represent the position of the planets, the whole to be used with a table *g*, showing either the geocentric celestial longitude or the *ascensio recta* of the planets and sun. One of the two disks, the smaller one, has a dial *h* of terrestrial time, and also shows on a lateral extension *q* of one side the position of the sun, as *i*, and the orbits *j k* of the inferior planets as observed from the earth, which is to be understood as at the center of said disk. The other disk shows in concentric circles either the ecliptic *l*, divided into degrees of longitude, or the celestial equator divided into hours of sidereal time, the signs of the zodiac *m*, the constellations *n*, reaching the ecliptic, the months and days marking the summer and winter solstices and the equinoctial points, but in this example of our invention we have only represented the several devices indicated by letters of reference, the other being omitted. Said disk also has angles of celestial meridians represented on it.

The straight rod *c* forms the common diameter of both disks, and its two ends marked, respectively E and W, when held in proper position, will point east and west. It is more particularly useful when the chart is constructed to represent the celestial equator. The calendar-hand serves for the double purpose of showing the time on the hour-dial and also of indicating the proper way of holding the chart while an observation on the sky is being taken. This hand should then always point to the meridian.

At the center of the chart there is placed a polar map of the northern hemisphere *p*, representing the earth. It should be attached to the rod in such position that the meridian of the place of observation in the map will always coincide with the median line of the hour-hand. The symbols of planets may be tags attached to the disk by pins or pincers, or in any other manner which will admit of their position being easily changed.

The rule for using the chart, as represented in the drawings, is as follows: Set the sun in the smaller disk according to its longitude for the date in the table which is nearest to the date of observation. Arrange the planet-symbols around the edge of the larger disk according to the table of longitude for the date nearest to the date of observation. Turn the hour-hand so as to cover the number on the time-dial which corresponds to the hour

of observation, and keep it there. Hold up the card, its face toward the pole of the ecliptic and the hour-hand pointing to the meridian. The center of the chart represents the center of the earth, and any radius of the chart, if extended, will reach the ecliptic on the sky at exactly that degree of longitude which is indicated where the said radius crosses the margin of the chart. It will point out planets or the sun or any sign or constellation of the zodiac, as their respective symbols may be shown at the margin of the chart.

It will be seen that the device is a zodiac chart, which, if held in proper position, as hereinabove directed, will point out any desired point of the ecliptic (or of the celestial equator) and especially the sun, the planets, and the signs and constellations of the zodiac, according to their respective geocentric celestial longitudes, (or *ascensio recta*,) as given in tables accompanying the chart, or to be supplied in the future, year after year. In this system we see all the planets in the background of the zodiac and see them all as moving among the stars of the zodiac all on the same spherical surface, (the firmament,) and therefore all of them on the same apparent distance from us; but in addition it is shown how Mercury and Venus really circulate round the sun and thus sometimes in a position between the earth and the sun and at other times behind or on the other side of the sun.

This improved planetograph gives the correct as well as the apparent relation simply and clearly. It is a celestial globe, in reference to which the firmament itself is the globe and the artificial apparatus is only an index indicating the different points to be observed on the surface of the sphere. The rule for using all other celestial globes is as follows: "You must suppose that you are standing in the center of the globe looking outward to its surface." With this planetograph the observer really stands in the center, whence he has an unobstructed view of the surface—the firmament itself.

In practice the planetograph will be supplied with a stand, whereby it can always be so adjusted as to permit the diameter connecting both poles of the ecliptic to pass through the center of the chart and at right angles to its plane, thus leaving the chart in the plane of the ecliptic.

In observing the position of a planet measure the arc from the meridian down to the planet and not from the horizon upward.

The inferior planets, Mercury and Venus, will always appear on or near the ecliptic, and the symbols should be placed like those of the superior planets on the edge of the chart; but it should be noticed that in their western or retrograde motion these planets pass between the sun and the earth in the direction of the arrows.

We claim as our invention—

1. In a zodiac-chart, the combination of two disks *a b*, of different sizes pivoted together centrally, the smaller one upon or in front of the other and representing the relative positions of the earth and sun, and provided with a dial of terrestrial time, the other provided with representations of the signs of the zodiac, a dial of celestial longitude and the months of the year, and a set of detachable tags to be fastened to it to represent the positions of the various planets.

2. In a zodiac-chart the combination of two disks *a b*, of different sizes pivoted together centrally, the smaller one upon or in front of the other and representing the relative positions of the earth and sun, and provided with a dial of terrestrial time, the other provided with representations of the signs of the zodiac, a dial of celestial longitude and the months of the year, and a set of detachable tags to be fastened to it to represent the positions of the planets, and also a calendar-hand.

3. In a zodiac-chart, a revolving disk provided with representations of the earth in the center and the sun revolving around the earth and carrying with it the orbits of the inferior planets, approximately as these orbits present themselves to observers on the earth, in combination with another revolving disk provided with representations of the signs of the zodiac, a dial of celestial longitude and the months of the year, and a set of detachable tags adapted to be fastened to it to represent the positions of the various planets, said disks pivoted together centrally the former upon or in front of the latter substantially as described.

Signed at Chicago, in the county of Cook and State of Illinois, this 30th day of July, A. D. 1895, by JOSUA LINDAHL, and at Soldiers' Home, Los Angeles county, California, this 5th day of August, 1895, by CALEB LINDAHL.

JOSUA LINDAHL.
CALEB LINDAHL.

Witnesses to signature of Josua Lindahl:
E. W. BROMAN,
SIMON EDSTROM.

Witnesses to signature of Caleb Lindahl:
GEORGE DAVIS,
GEO. F. LORD.