

No. 619,886.

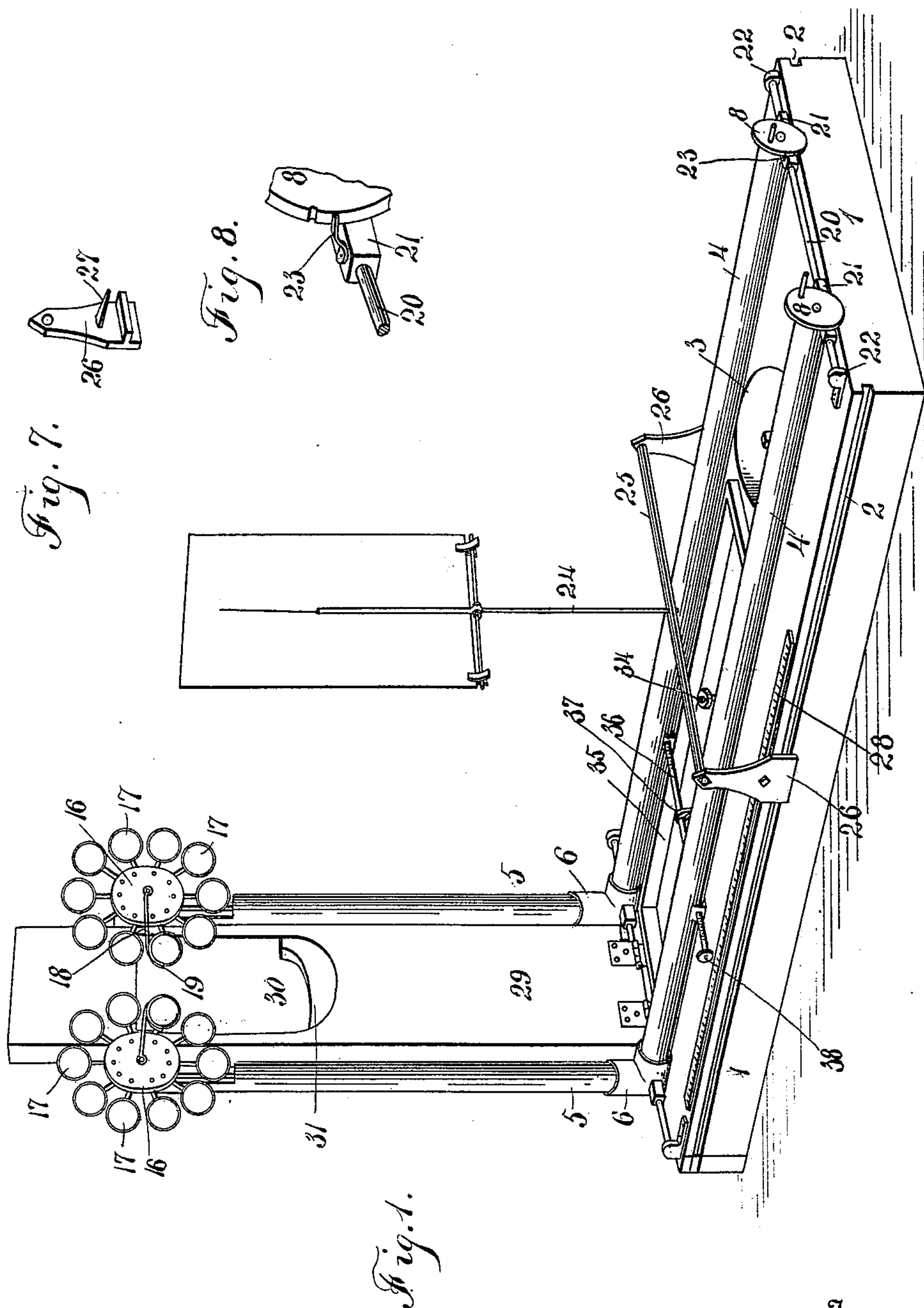
Patented Feb. 21, 1899.

F. HAMILTON.  
OPTOMETER.

(Application filed Aug. 14, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
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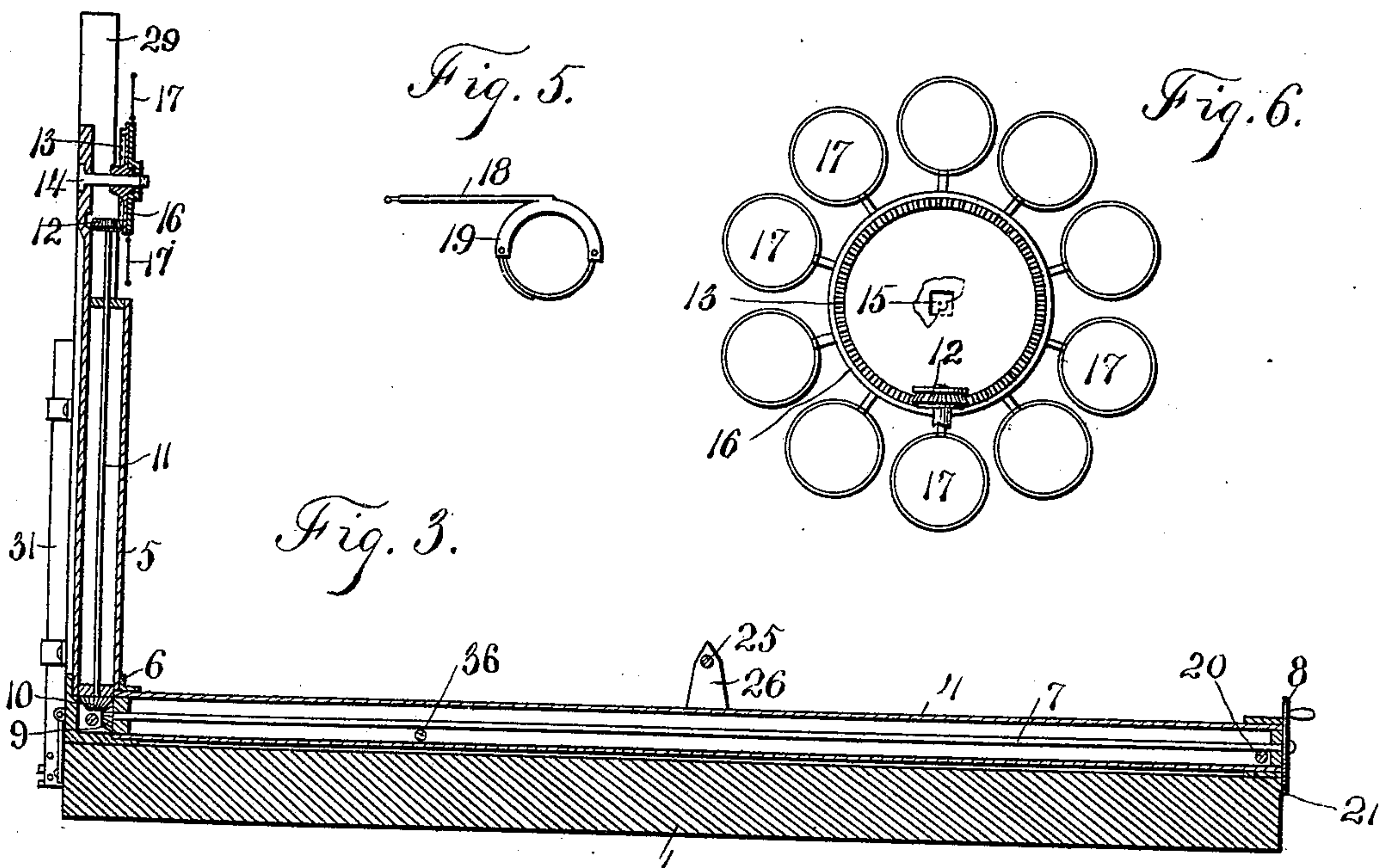
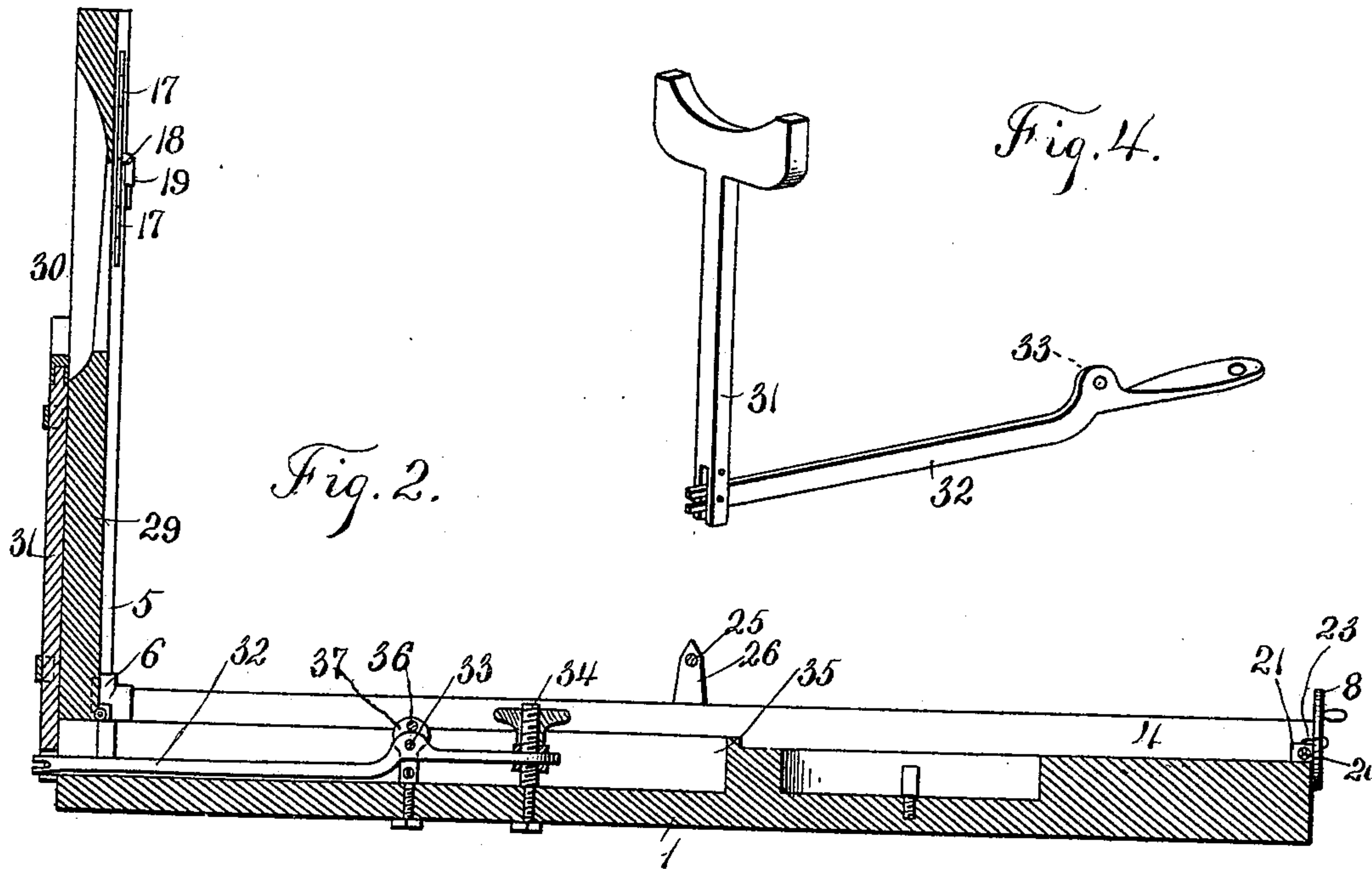
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# UNITED STATES PATENT OFFICE.

FRED HAMILTON, OF OWEGO, NEW YORK.

## OPTOMETER.

SPECIFICATION forming part of Letters Patent No. 619,886, dated February 21, 1899.

Application filed August 14, 1897. Serial No. 648,301. (No model.)

*To all whom it may concern:*

Be it known that I, FRED HAMILTON, of Owego, in the county of Tioga and State of New York, have invented certain new and useful Improvements in Optometers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in optometers or machines for performing retinoscopic work; and it consists in the novel combination and arrangement of simple parts that will be hereinafter fully set forth.

The object of the invention is to provide a device of the character described that will be comparatively cheap to manufacture, simple in construction, durable, and efficient in operation.

A further object is to provide an optometer for retinoscopic work that will enable the examiner or observer to be independent of the patient throughout the entire examination, and, further, to improve devices of this character generally.

Further objects and advantages of the invention will become apparent in the course of the following description, and the points of novelty will be particularly set forth in the claims.

I am enabled to accomplish the objects of my invention by the simple means illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of my improved device, the parts thereof assembled in position for use. Fig. 2 represents a central longitudinal section of the same. Fig. 3 is a similar section through one of the disks and vertical and horizontal tubes at the side of the machine, showing the mechanism for revolving the disks. Fig. 4 is an enlarged detail perspective view of the chin-rest and lever for elevating and lowering the same. Fig. 5 is a detail side elevation of one of the lens-cells. Fig. 6 is a front elevation of one of the lens-disks. Fig. 7 is a detailed perspective view of a portion of the observation-card-guiding mechanism; and Fig. 8 is a similar view of an enlarged detail, showing the means for rotating the horizontal rods.

Referring to the drawings, the numeral 1 indicates a suitable base, which is constructed of any suitable material and provided upon its sides with longitudinally-extending grooves or guideways 2 and a circular recess at its center, as indicated by the numeral 3, the purpose of which will presently become apparent.

The numeral 4 indicates two tubes, which are secured to the base in a manner that will be hereinafter described. I provide at the front of the machine two vertically-extending tubular arms 5, the lower ends of which are preferably externally screw-threaded and adapted to be screwed into the short internally screw-threaded vertical arms 6, provided at the front ends of the tubes 4.

The numeral 7 indicates two shafts, which extend longitudinally through the tubes 4 and are provided at their rear ends with disks 8 and at their front ends with small miter gear-wheels 9, which are adapted to mesh with similar gear-wheels 10 on the lower ends of the vertical shafts 11, which extend through the vertical tubular arms 5 and are provided at their upper end with miter gear-wheels 12, adapted to mesh with teeth formed upon a disk 13, loosely mounted upon short horizontally-extending stationary shafts or studs 14, which are suitably supported at the top of the vertical arms 5. Each of the disks 13 is provided with a square flange surrounding the shaft or stud 14, which extends into a square recess or aperture in one of the lens disks or carriers 16, also loosely mounted on the stud or shaft 14, so that the disk and lens carrier rotate together. Each lens disk or carrier is provided with a radial series of lenses 17. To the outer end of each of the stationary shafts or studs 14 is secured an arm 18, the outer end of which is provided with a lens-cell which will be held in such position as to register with one of the outer lenses of the radial series carried by its adjacent lens-carrier. These arms 18 also prevent the disk 13 and lens-carrier 16 from slipping off of the ends of the stationary studs or shafts 14.

The numeral 20 indicates a rod which extends transversely across the rear of the base of the machine, passing through perforated lugs 21, secured to the under sides of the tubes 4, the said rod 20 being secured to the



frame at its ends by brackets 22. Mounted upon these lugs and adapted to bear lightly upon the peripheries of the disks 8 are two springs 23, the purpose of which is to determine when the lens-disks have made a complete revolution, the said disks being provided with shallow notches into which the said springs enter.

The numeral 24 indicates a card-support which is composed of the transverse bar 25, provided at its ends with two ears 26, which extend downwardly and are bent at right angles, entering the groove or guideway 2. Said ears are provided with pointers or index-fingers 27, which are adapted to move over graduated scales 28, secured to the sides of the machine when the card-holder is moved to or from the disks to ascertain with accuracy the distance between the lenses and the observation-card.

Hinged to the forward end of the base is a standard 29, which is provided in its upper portion with an observation-opening 30. Secured to the front of this standard is a chin-rest 31, which has its lower end connected to the forward end of a lever 32, which extends partially throughout the length of the machine and is fulcrumed, as indicated by the numeral 33. I preferably provide a short standard 34, which is adapted to enter the bore of an operating button or handle, which has its lower portion secured to the short arm of the lever 32, which lever is adapted to be operated to raise or lower the chin-rest.

35 indicates a lens-tray, in this instance in the form of a recess in the base, located between the horizontal tubes, and the circular recess 3, in rear of the said tray or recess 35, may also be used for the reception of lenses or other implements used in testing the eyes.

As a means for adjusting the horizontal and vertical rods 4 and 5 laterally to ascertain the pupillary distances I provide an oppositely-screw-threaded rod 36, which extends through an ear 37 at the center of the base, said rod being provided at its opposite ends with mill-heads, as indicated by the numeral 38, by which the rod is readily rotated by the fingers.

The operation of my improved device is as follows: It will be apparent that when the disks at the rear of the machine are rotated the longitudinal rods in the tubes will be rotated, causing the vertical rods 11 at the front of the machine to be rotated through the medium of the miter-gears, said vertical rods in turn causing the disks 13 to be rotated, thus rotating the disks and lenses thereon, bringing them successively in front of the eyes of the patient and opposite the lenses in the cells supported upon the laterally-extending arms 18. When it is desired to raise or lower the chin-rest, the lever connected with the bottom thereof is rocked up or down.

It will be observed that the device herein described is cheap and simple in construction and that the examiner or observer can oper-

ate the mechanism from the rear of the machine throughout the entire examination.

I do not desire to be understood as limiting myself to the precise construction shown in the drawings, as many modifications will suggest themselves and be made without in any way departing from the spirit of the invention.

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

1. In an optometer, the combination with the base, of a pair of laterally-movable supports at one end, a revoluble lens-carrier mounted on each of said supports, a pair of independent actuating-shafts extending from each of said supports to the other end of the base, each of said shafts being operatively connected at one end with one of said carriers for revolving the same and provided at its opposite end with an operating device and means for adjusting said supports and shafts laterally toward and from each other, substantially as described.

2. In an optometer, the combination with the base, of a pair of laterally-movable supports at one end, a revoluble lens-carrier mounted on each of said supports, a pair of independent actuating-shafts extending from each of said supports to the other end of the base, each of said shafts being operatively connected at one end with one of said carriers for revolving the same, and provided at its opposite end with an operating device and means for adjusting said standards and shafts laterally toward and from each other, and a card-support mounted on said base between the said carriers and said shaft-operating devices, and adjustable longitudinally of said shafts, substantially as described.

3. In an optometer, the combination with the base, provided with a transverse guide adjacent to each end, of a pair of revoluble lens-carriers, independent tubular supports for the same, mounted on one of said guides, tubular casings extending from said supports to the other end of said base, and engaging the other transverse guide on said base, operating devices at the ends of said casings for rotating said carriers, connections between said operating devices and the carriers, extending through said tubular casings and supports, and means for adjusting said supports and casings laterally, substantially as described.

4. In an optometer, the combination with the lens-carriers, of a vertically-movable chin-rest, the operating-lever for raising and lowering the same, and the adjusting-screw, engaging said lever, substantially as described.

5. In a device of the character described, the combination with a suitable base, of a standard hinged or otherwise secured to one end thereof and provided with an observation-opening therethrough, two rods suitably supported on the sides of the base and provided at their rear ends with means for rotating



them, and upon their front ends with miter gear-wheels, two vertical rods supported at the front of the machine and provided at their upper and lower ends with miter gear-wheels, 5 the wheels on the lower end being adapted to mesh with the gear-wheels on the horizontal shafts or rods, short horizontal arms suitably supported above the base, lens-disks rotatably secured to said arms and provided with 10 teeth adapted to mesh with the gear-wheels upon the upper ends of the vertical shafts for the purpose specified, radially-arranged lenses upon the lens-disks, and means for adjusting the lens-disks laterally, substantially 15 as described.

6. In a device of the character described, the combination with a suitable base, of a standard hinged to the front end thereof and provided with an observation-opening there- 20 through, the horizontal and vertical rods supported upon the base and gear as described, disks provided with radially-arranged lenses, short laterally-extending interior arms provided at their ends with lens-cells adapted to 25 support said lens in the front of the radially-arranged lens, a vertically-adjustable chin-rest secured to the front of a hinged standard, a lever fulcrumed upon the base and having operative connection with the chin-

rest whereby the same is raised or lowered, 30 a horizontal adjustable card-support mounted upon the base, a graduated scale or scales upon the base, a pointer or index finger or fingers carried by the card-support adapted to run upon a scale or scales, whereby the dis- 35 tance between the card and the lens is accurately ascertained, substantially as described.

7. In a device of the character described, the combination with the base of the transverse rods suitably supported in proximity 40 to the ends of said base, the horizontal and vertical tubes inclosing the horizontal and vertical rods described being supported by said transverse rods and laterally adjustable thereon, a transverse shaft extending through 45 the internal screw-threaded lugs on the tubes whereby said tubes are adjusted laterally to draw said tubes together or cause the same to separate as the case may be, substantially 50 as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRED HAMILTON.

Witnesses:

FRED C. HILL,  
H. J. SMITH.