

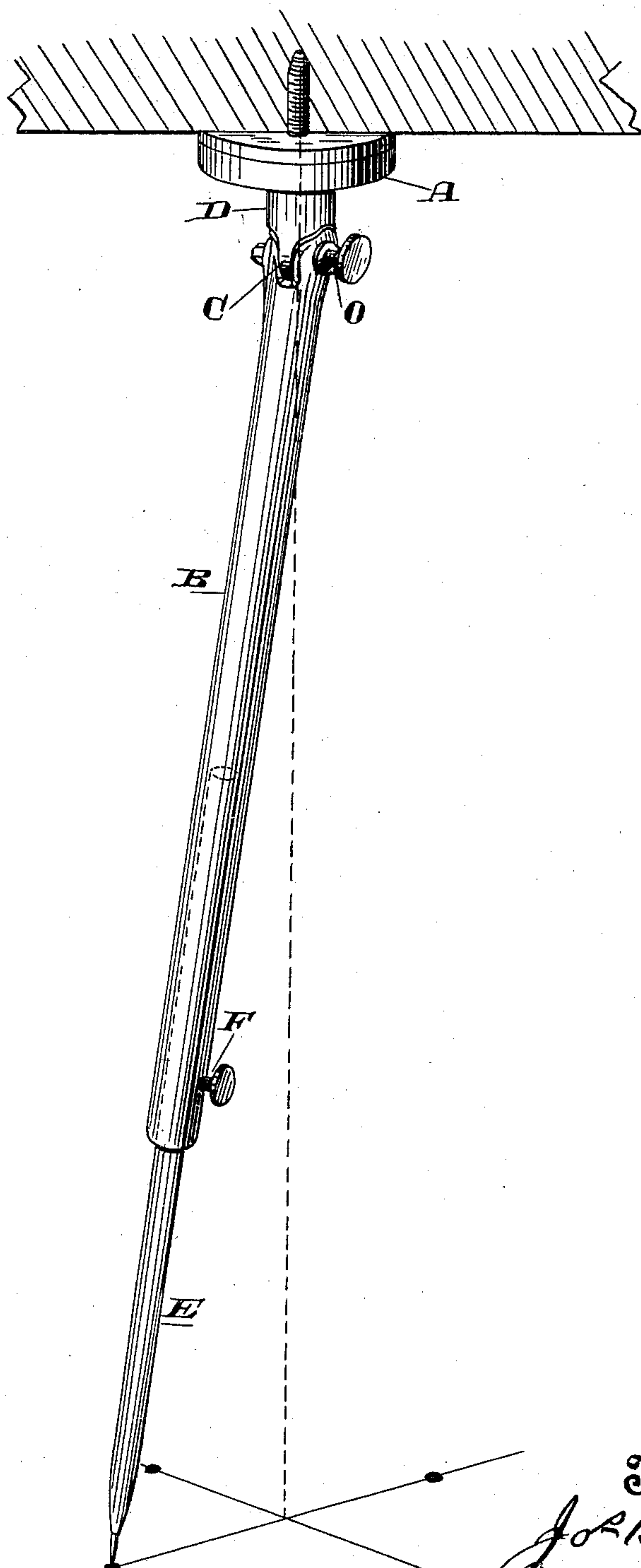
(No Model.)

J. BEYERLE.

DEVICE FOR OBTAINING VERTICAL LINES.

No. 375,795.

Patented Jan. 3, 1888.



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# UNITED STATES PATENT OFFICE

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## DEVICE FOR OBTAINING VERTICAL LINES.

SPECIFICATION forming part of Letters Patent No. 375,795, dated January 3, 1888.

Application filed February 10, 1887. Serial No. 227,213. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH BEYERLE, of Vallejo, Solano county, State of California, have invented an Improvement in Devices for Obtaining Vertical Lines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device for obtaining lines which shall be perpendicular to the deck of a vessel; and it consists in the improved device which I shall hereinafter fully describe and claim.

Referring to the accompanying drawing for a more complete explanation of my invention, the figure is a view of my device, showing its operation.

A is a plate, which is faced, preferably, true upon both sides and is made of any suitable or desired diameter for the work to be done. This plate has a central screw or other fastening by which it may be attached beneath the level of a surveying-instrument or other surface. From the lower part of this plate a leg, B, extends, and is connected with it by means of a universal or other joint, so that it can be turned about beneath the plate. A clamp or set-screw, O, serves to hold it at any desired angle with the plate. In the present case I have shown the upper end of the leg as hinged at C to a short projection, D, which turns upon a vertical axis beneath the plate. These two joints allow the leg to be moved to any desired position and angle. From the lower end of the leg, which is made hollow, an extension, E, projects, and this extension allows me to adjust the device to suit any desired height from the point where the plate A is fixed to the surface beneath. The desired length having been determined, the extension is fixed by a set-screw, F.

This device is especially useful in obtaining vertical lines in any place where a plumb-bob or level cannot be used or applied—as upon a vessel which may be in motion or standing at an angle—when it is desired to find the exact position for the placing of stanchions or other work. In order to do this the plate A is fixed to a beam or the deck above, the center being known. The extension being drawn out to

the proper length, and the arm B being turned to an angle with the vertical line through the plate, three or more points are made by the end of the extension, and lines drawn through these points will find the center directly beneath the point where the plate A is attached. If it be found that the deck or surface below is not exactly level, the extension-leg is turned until the point touches the highest portion of the surface below, and is then fixed by a set-screw. In this way it may be employed to find the center of bed-plates or other machinery on board a vessel, where it would be impossible to use an ordinary plumb-bob, because the vessel might be standing at an angle or in some position considerably out of level.

By using a straight-edge this device in such a case will take the place of a plumb-bob where the latter could not be used on account of the high wind, and it can also be used to make a survey in cities, where it is impossible to bring the instrument directly over the line on account of walls, and for many other purposes.

The principal use of my device is, as before stated, upon vessels and in places where the relative position or parallelism of one floor or deck to the one below must be determined. If a vessel is having the stanchions set between decks, it is necessary to place them in what would be a vertical line with the keel if the vessel was exactly on an even keel. This is rarely the case, however, whether the vessel is in the water or in a dock; but as the decks and beams have been originally put in at right angles with the keel and parallel with each other, it is easy to use these beams or decks as a base to which my device is attached.

Let it be supposed that the vessel's decks are inclined three or four degrees from a horizontal plane. It would be manifestly impossible to use a level to determine the points which are exactly in line below the timbers of the deck above, either for the purpose of setting stanchions or to place machinery properly. It is in such a place that my device is used. The plate A is secured to the lower surface of the timber or deck above. The extensible leg with the universal joint is thus



5 moved around in a circle, its point touching  
the deck below at three or more points, which  
are marked, and by drawing connecting-lines  
through these points the center between them  
is determined. This center will be exactly in  
the proper line beneath the center of the  
plate A and just where the stanchion must be  
placed. Of course it is not vertical by a level  
on a plumb-bob, because of the vessel lying at  
10 an angle, but it will be exactly in the proper  
line with relation to the keel. When the plate  
A is attached to the plate of a surveyor's level,  
it must be exactly level when the instrument  
is level, no matter what is the character of the  
15 surface beneath. By using a straight-edge  
upon this surface below the point of the ex-  
tensible leg may be made to indicate a suffi-  
cient number of points, as before described,  
which must be in exactly the same horizontal  
20 plane, and the central point between them will  
be exactly beneath the center of the instrument.

This device has nothing to do with the tri-  
pod of any instrument, and only appears with

it when used upon such instruments as are  
supported upon tripods. It is used, as de- 25  
scribed, on shipboard without any tripod  
whatever.

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

A device for finding a point which shall be 30  
in a line perpendicular to a table or surface  
and passing through a given point thereon,  
consisting of a plate attachable to said table  
or surface, a rotary shank or spindle pivoted 35  
with a universal joint to said plate, and an  
extensible leg jointed to the spindle and pro-  
vided with a locking-screw by which it is fixed  
at any desired angle with said plate, substan-  
tially as herein described. 40

In witness whereof I have hereunto set my  
hand.

JOSEPH BEYERLE.

Witnesses:

S. H. NOURSE,  
H. C. LEE.