

No. 845,730.

PATENTED FEB. 26, 1907.

D. T. MARSHALL.  
COPYING MACHINE.  
APPLICATION FILED OCT. 17, 1906.

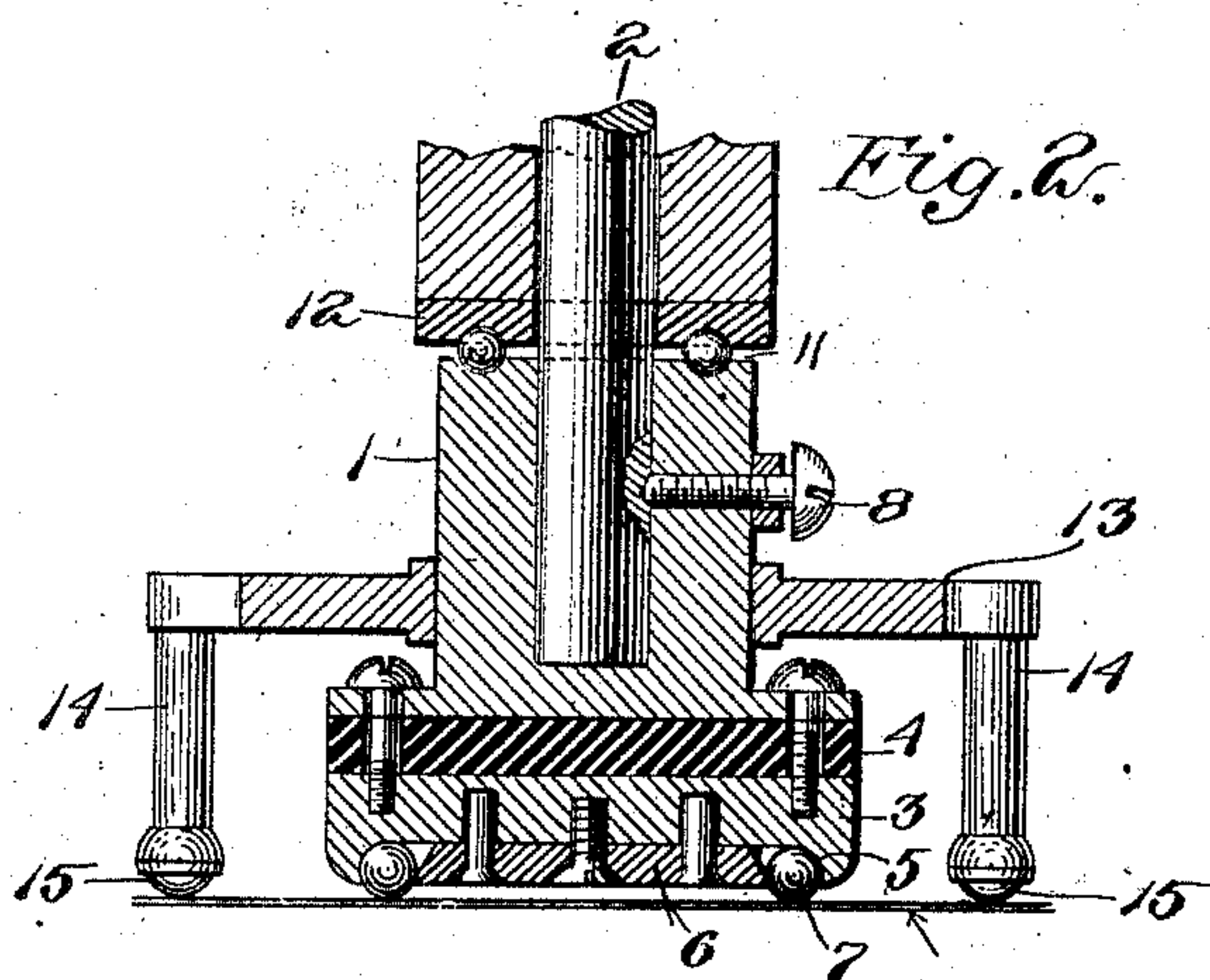
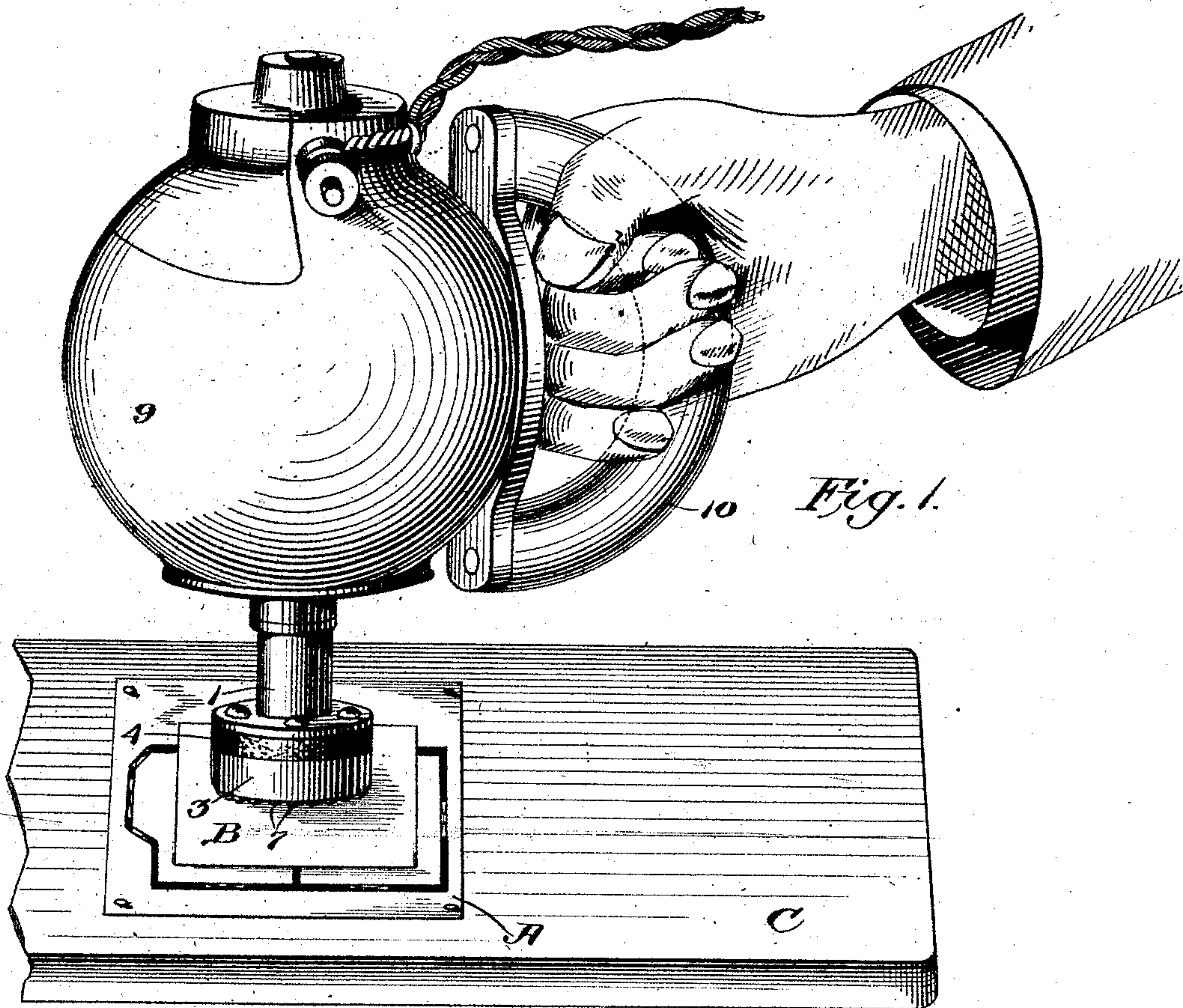
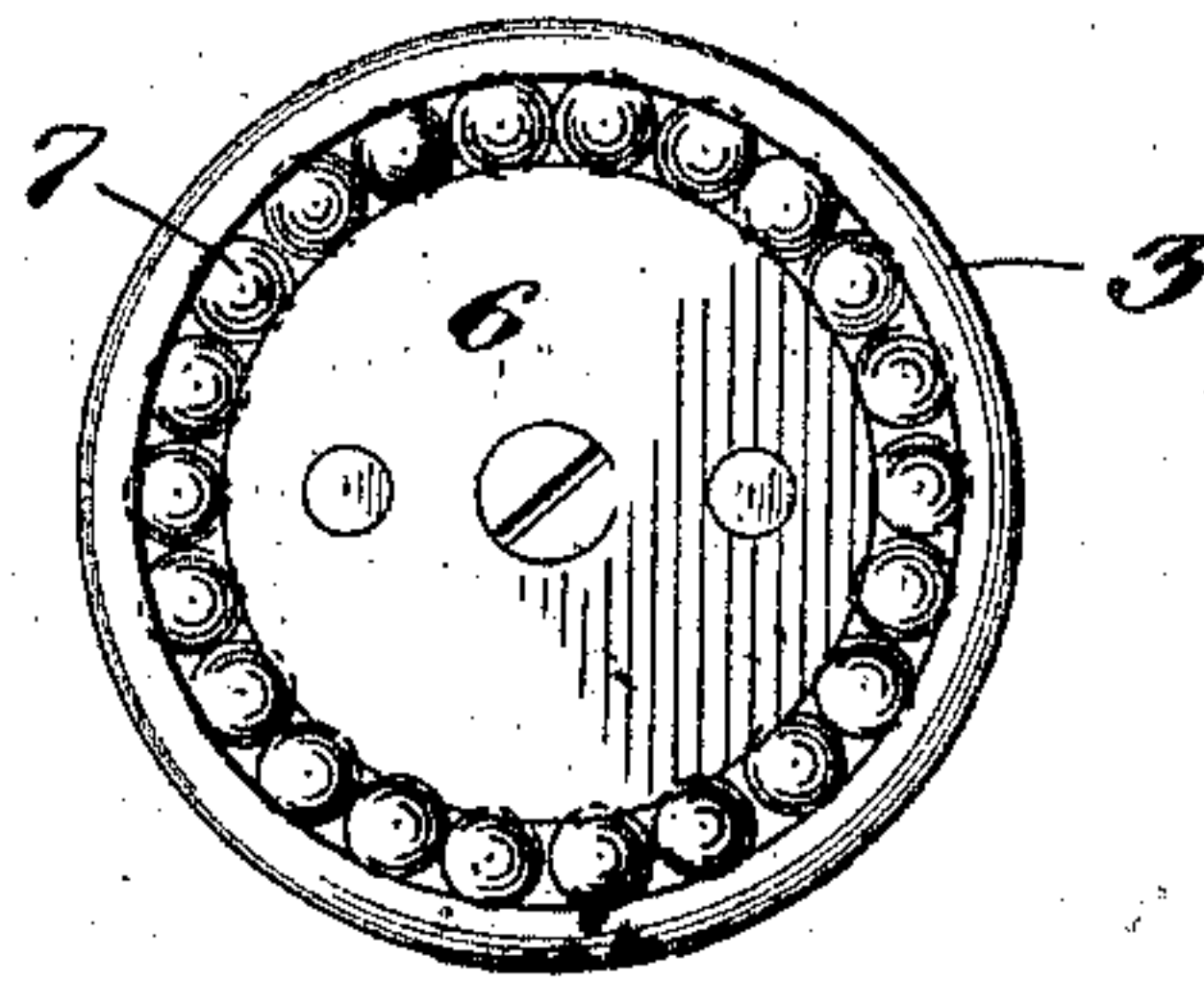


Fig. 3.



Witnesses  
Edward Rowland  
Katherine A. Dugan

David T. Marshall Inventor  
By his Attorney Ira L. Fish



# UNITED STATES PATENT OFFICE.

DAVID T. MARSHALL, OF NEW YORK, N. Y., ASSIGNOR TO NORMAN MARSHALL, OF NEWTON, MASSACHUSETTS.

## COPYING-MACHINE.

No. 845,730.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed October 17, 1906. Serial No. 339,288.

*To all whom it may concern:*

Be it known that I, DAVID T. MARSHALL, a citizen of the United States, and a resident of New York, county of New York, State of New York, have invented certain new and useful Improvements in Copying-Machines, of which the following is a specification.

The invention relates to a copying or transferring device for use in making a facsimile copy of drawings, designs, pictures, or the like.

The device comprises a rotary head which is so supported and driven that it may be manually manipulated, and this head is provided with a pressure-surface which may be passed over and pressed against the surface of the sheet or material to or from which an impression is to be taken. The engaging surface is of an antifriction character and is preferably composed of a series of rotary devices—such, for instance, as balls—which will roll over the surface against which they are pressed.

In utilizing the device to transfer a drawing or sketch from one sheet to another, for instance, the sheets are placed face to face with the surface of the drawing against the surface to which it is to be transferred. The pressure-surface of the rotating head is then passed over the sheets while being pressed against them. The progressive application of pressure to the different parts of the contacting sheets by the traveling pressure-surface as it is moved over the sheets causes an impression of the drawing to be transferred to the surface of the blank sheet. In the same way copies of designs or pictures either in black or colors may be made upon blank surfaces pressed against the surface of the design or picture by the traveling pressure-surface of the head.

This device may be used with advantage and profit in making copies of architectural or machine drawings in repeating designs, and, in fact, wherever it is desired to make facsimile copies of drawings, printed impressions, or the like.

The rotary head may be mounted in any suitable carrying device by which it may be manipulated in passing the pressure-surface over the surface of the sheet or article to which or from which the impression is to be transferred. In embodying the invention in a simple and efficient form of device I prefer,

however, to employ an electric motor as the driving mechanism for the rotary head and to secure the head upon the shaft of the motor, the motor being of such a size and character that it may be readily handled and moved about by the operator.

For the purpose of illustration I have shown in the accompanying drawings a device embodying the various features of my invention in the form in which I prefer to use them.

In the drawings, Figure 1 is a perspective view showing the device and indicating the manner of its use. Fig. 2 is a full-size sectional view taken through the axis of the rotary head and showing an alining stand mounted on the head, and Fig. 3 is a face view of the rotary head.

As shown in the accompanying drawings, the rotary head comprises a flanged collar 1, which is secured to the end of the shaft 2, and a disk 3, secured to the flanged end of the collar and separated therefrom by a disk 4, of yielding material, such as rubber. The face of the disk 3 is recessed to form one side 5 of an annular raceway, the other side of which is formed by the periphery of a disk 6, which is secured in the recess in the disk 3. Within the annular raceway formed between the surface 5 and the periphery of the disk 6 a series of balls 7 are mounted, which project beyond the face of the disks 3 and 6 and form an antifriction pressure-surface for the head.

The head is secured to the end of the shaft 2 by means of a set-screw 8. The shaft 2 is the shaft of an electric motor, the casing of which is indicated at 9. The motor-casing is provided with a handle 10, by which the motor and attached rotary head may be handled and manipulated in using the device.

During the use of the device the weight of the motor and casing is supported from the rotary head on the end of the motor-shaft, and a series of balls 11 are interposed between the upper end of the collar 1 of the head and a bearing-plate 12 on the lower end of the casing, so that the head may run freely while supporting the weight of the motor-casing.

The manner of using the device for copying or transferring a design or drawing from one sheet to another is indicated in Fig. 1. In this view an architectural drawing is indicated at A, and the sheet to which it is de-



sired to transfer a part of this drawing is indicated at B. The drawing A is secured upon a drawing-board or table C, and the sheet B is placed over that part of the drawing which it is desired to copy or transfer to the sheet B, the sheet being held or secured in any suitable manner. The pressure-surface, made up of the balls 7, is placed upon the sheet B or an additional sheet placed over it, and while the weight of the device is supported upon this pressure surface the device is moved so as to carry the rotating head over the sheet B, bringing the balls into contact with those parts of the sheet B to which it is desired to transfer a copy of the drawing on the sheet A. The rapid rolling of the balls over the surface of the sheet B while pressed against the sheet by the weight of the parts supported on the head causes the transfer-ink or pencil-lines from the drawing on the sheet A to be transferred to the sheet B. By simply passing the device over the paper once a copy may be made which is a perfect facsimile in every detail of the drawing against which the sheet B is pressed.

During the manipulation of the device any variation in the position of the motor-shaft from the perpendicular will be compensated for by the yielding of the disk 4, so that the pressure-surface of the head is kept in proper alinement with the surface of the paper B.

The proper alinement of the pressure-surface of the head with the surface of the sheet or material over which it is being passed may be maintained by providing a guiding-frame, such as indicated at 13 in Fig. 2. This guiding-frame may be in the form of a metal plate provided with four lugs, as indicated at 14, and may be supported by means of ball-casters 15 of common construction, so that the frame will readily travel in any direction over the surface to which the rotary head is applied. This head is provided with a cylindrical opening fitting the collar 1 and tends to position and maintain the head with the pressure-surface in the plane of the surface to which the head is applied and to maintain the motor-shaft at right angles to this plane. The weight of the frame also aids in holding the sheet, such as sheet B in Fig. 1, in place.

While it is preferred to employ an electric motor as the driving mechanism for the rotary head and to mount the head directly upon the motor-shaft and to employ metallic balls as the pressure-surface and to arrange these balls in the manner indicated, these specific forms and arrangements are not essential to the broader features of my invention, and other forms of driving mechanism

and other forms and arrangements of rotary heads and other forms and arrangements of rotary devices may be employed.

Without attempting to point out in detail the various forms and arrangements in which the features of my invention may be embodied, what I claim, and desire to secure by Letters Patent, is—

1. A copying device comprising a rotary head and an antifriction pressure-surface carried thereby and adapted to be passed over the surface of the sheet to or from which the transfer is to be made.

2. A copying device comprising a rotary head, an annular raceway therein and a series of balls in the raceway and projecting beyond the face of the head.

3. A copying device comprising a rotary disk, an annular raceway in the face of the disk and a series of balls in the raceway projecting beyond the face of the disk.

4. A copying device comprising a shaft, driving mechanism therefor, a head secured to the shaft and an antifriction pressure-surface on the head.

5. A copying device comprising a shaft, driving mechanism therefor, a head secured to the shaft, a raceway in the head and a series of balls in the raceway projecting beyond the surface of the head.

6. A copying device comprising a motor adapted for manual manipulation, a rotary head connected with the motor and provided with an antifriction pressure-surface adapted to be passed over the surface of the sheet to or from which the transfer is to be made.

7. A copying device comprising a motor adapted for manual manipulation, a rotary head connected with the motor, an annular raceway in face of the head, balls in the raceway projecting beyond the face of the head.

8. A copying device comprising an electric motor adapted for manual manipulation, a head on the motor-shaft, an annular raceway in the face of the head, and a series of balls in the raceway.

9. A copying device comprising a motor adapted for manual manipulation, a head on the motor-shaft comprising two parts separated by an elastic disk, and a series of balls mounted in the head and projecting beyond the surface thereof.

In witness whereof I have hereunto set my hand this 8th day of October, 1906.

DAVID T. MARSHALL.

In presence of—  
FELIX COEN,  
IRA L. FISH.