

UNITED STATES PATENT OFFICE

2,357,809

ELECTROPHOTOGRAPHIC APPARATUS

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Application November 16, 1940, Serial No. 365,888

20 Claims. (Cl. 95—11)

This invention relates to photographic devices and particularly to devices for use in electrophotography.

An object of the invention is to improve devices for use in electrophotography, particularly electrophoto reproducing and copying equipment.

Another object is to produce an electrophoto copying machine which is substantially automatic in operation.

Further objects are to improve various parts of electrophoto reproducing apparatus.

Other objects of the invention will be apparent from the following description and accompanying drawings taken in connection with the appended claims.

The invention comprises the features of construction, combination of elements, arrangement of parts, and methods of manufacture and operation referred to above or which will be brought out and exemplified in the disclosure hereinafter set forth, including the illustrations in the drawings.

In the drawings:

Figure 1 is a top view of a copying machine embodying features of the present invention, part of the top casing being cut away;

Figure 2 is a vertical section on the line 2—2 of Figure 1;

Figure 3 is a vertical section on the line 3—3 of Figure 2;

Figure 4 is a diagram of the electric circuit for the machine of Figures 1 to 3;

Figure 5 is a vertical section of a modified copying machine according to the invention;

Figure 6 illustrates a circuit therefor;

Figure 7 shows a modified charging device;

Figure 8 illustrates a belt discharge attachment;

Figure 9 represents a modified transfer mechanism; and

Figures 10 and 11 show special forms of electrophoto plates.

In my co-pending application Serial Number 265,925, filed April 4, 1939, now Patent No. 2,297,691 of October 6, 1942, is described a method of photography which may be termed "electrophotography" and which in its preferred embodiment comprises charging the surface of a layer of photo-conductive insulating material supported on a conductive backing with an electric charge, then exposing the layer to a light image to discharge the charge in the illuminated areas and leave an "electrostatic latent image" on the layer corresponding to the light image. The latent image is subsequently developed by

applying finely divided electrostatically attractable material, such as powder, to the surface where it is retained in the charged areas by the charge thereby producing a visible deposited image. The deposited image may then be transferred to a paper sheet.

The present invention relates to the machines and devices for carrying out such a process and contemplates a substantially automatic machine for performing the necessary functions in sequence. The invention also relates to improved parts and devices for use in the process.

While a preferred embodiment of the invention is described herein, it is contemplated that considerable variation may be made in the method of procedure and the construction of parts without departing from the spirit of the invention. In the following description and in the claims, parts will be identified by specific names for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring to the drawings, Figures 1 to 3 illustrate an automatic copying machine for making single copies of original records such as tracings of drawings, films, typewritten letters and generally anything drawn, written or printed on transparent or translucent sheets.

The machine comprises a sheet metal frame including a bottom plate 20 and a pair of spaced parallel side walls 21 and 22 from which the operating parts are supported.

The photosensitive plate comprising a sheet of metal foil or metallized paper 23 having a layer 24 of photo-conductive insulating material (for example, sulfur or anthracene) adhering to its outside surface is clamped over the outer surface of a metal drum 25 secured to an axial drive shaft 26 which is pivoted in bearings 27 mounted in the two side walls 21 and 22. Foil 23 extends about one-third of the distance around the drum and is clamped at its ends under metal strips 28 in longitudinal slots in the drum surface.

Drive shaft 26 carries a large gear wheel 29 which is driven by a worm 30 on the shaft of controlled speed electric motor 31 mounted on the outside of side wall 21. Means are provided for starting and stopping the motor so as to rotate drum 25 through one revolution at a time from the starting position shown, as will be described later. The drum rotates in a clockwise direction as seen in Figure 2.

A roller 32 covered with a brush or plush cover 33 is mounted on a drive shaft 34 pivoted in bear-

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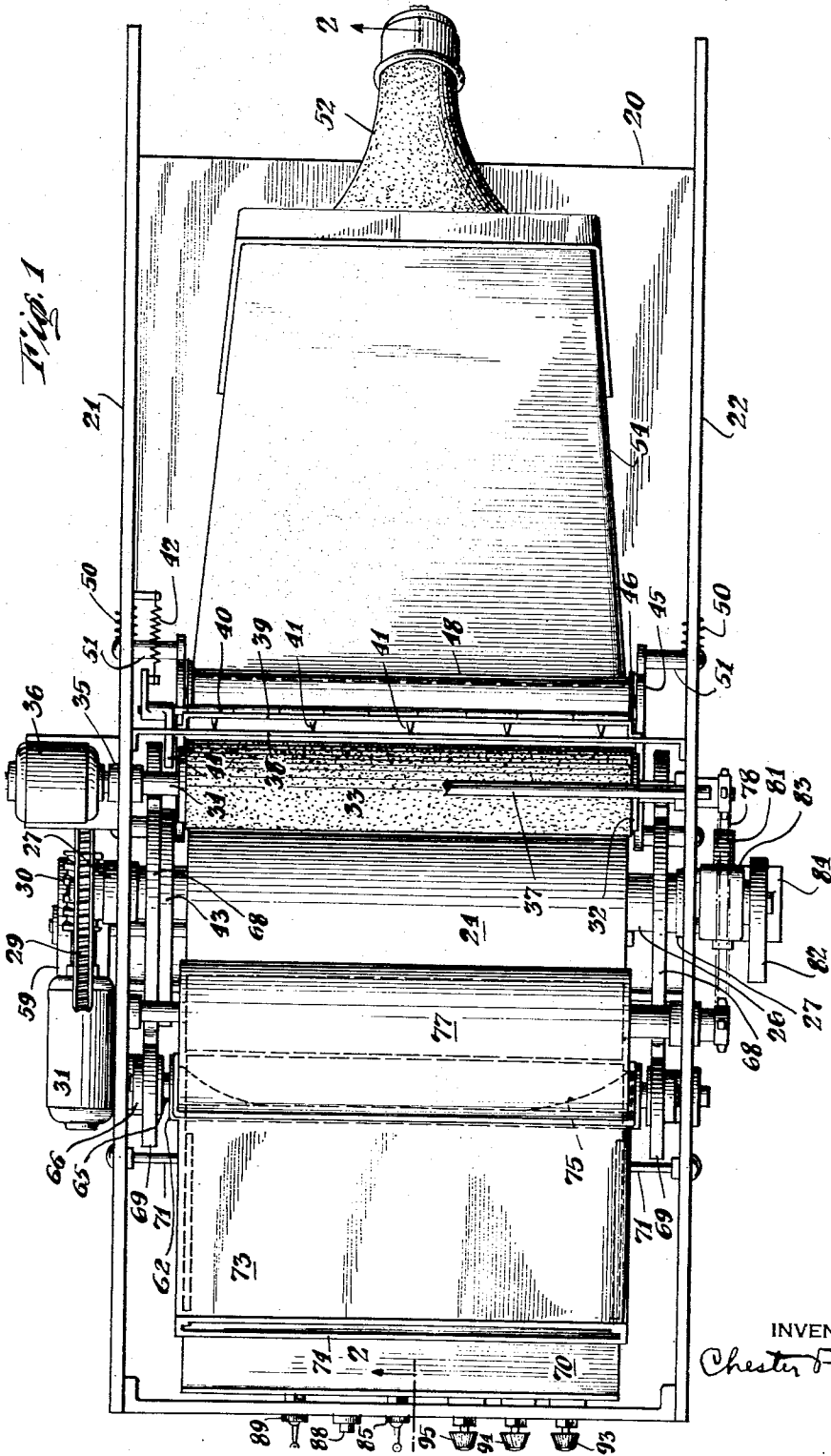
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ELECTRO-PHOTOGRAPHIC APPARATUS

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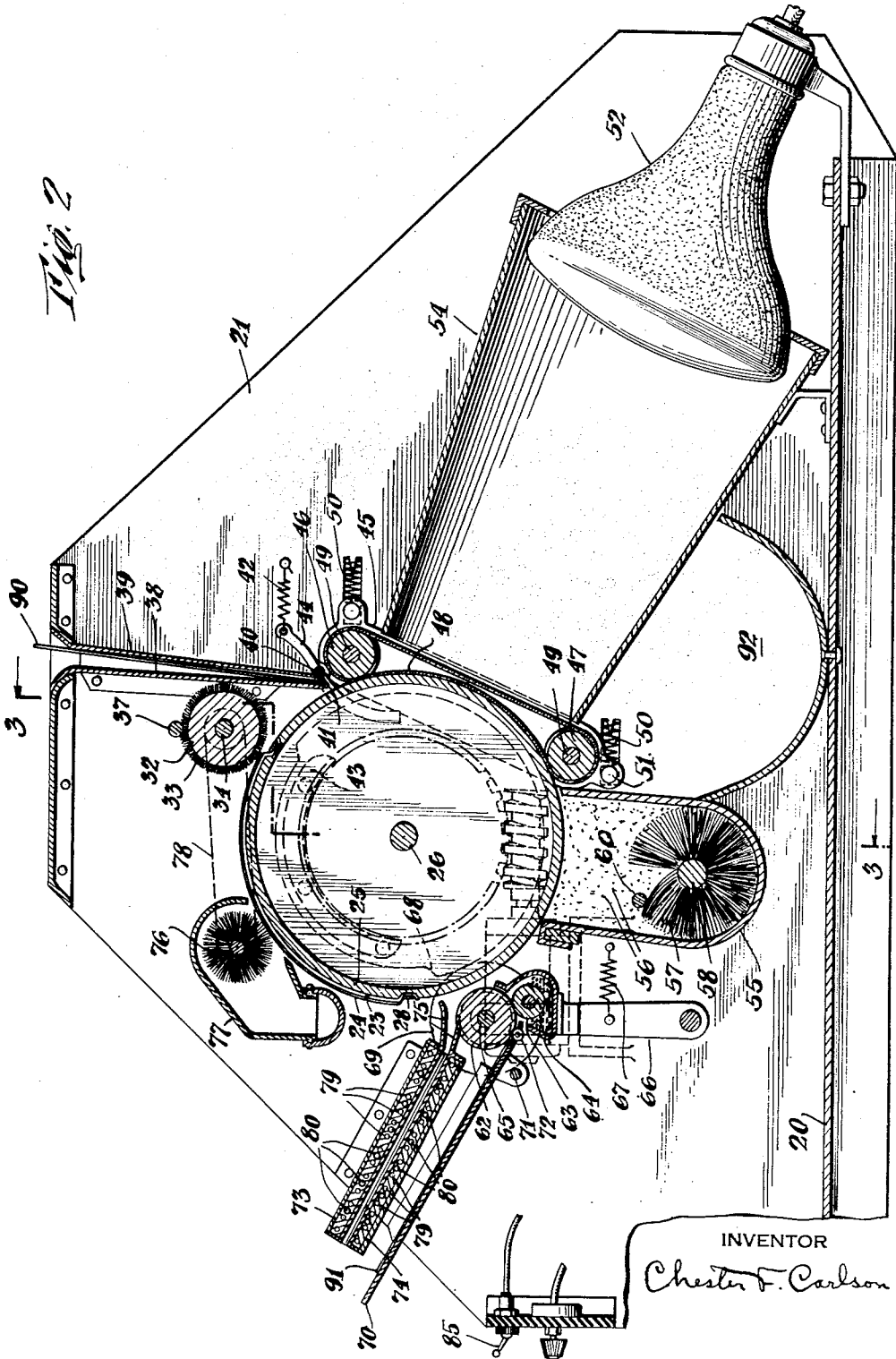
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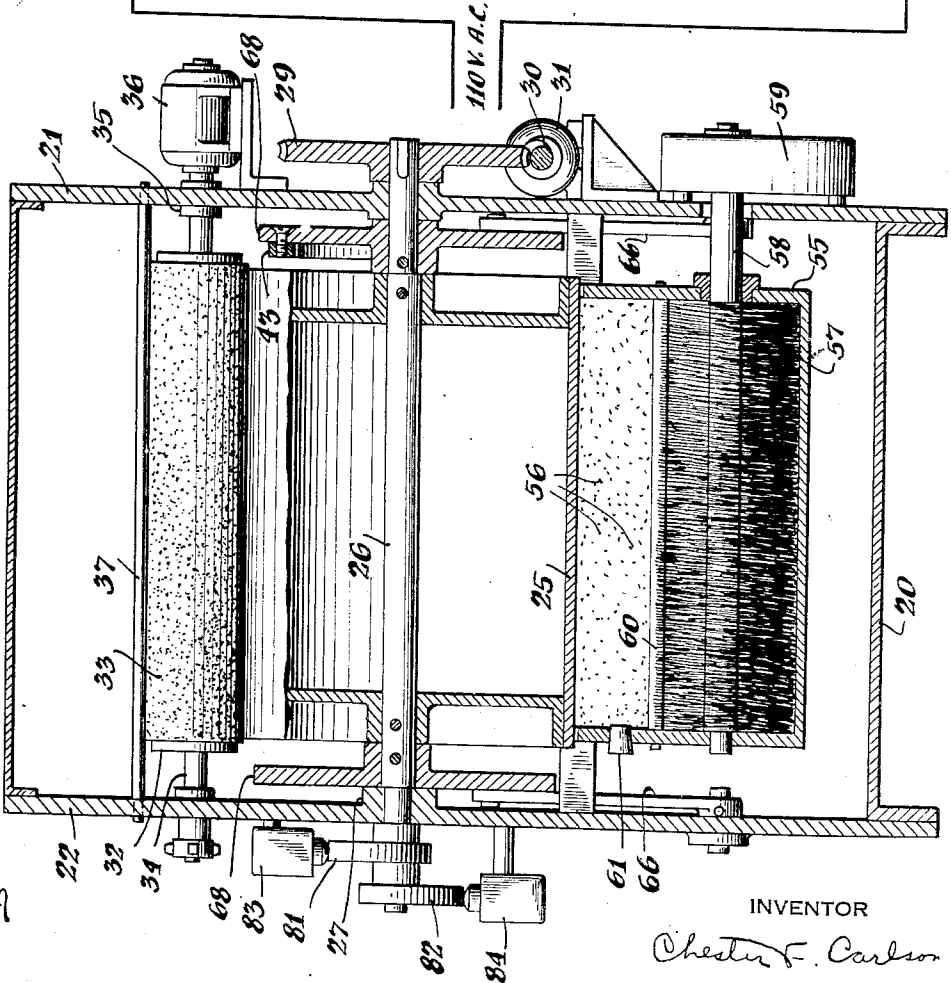
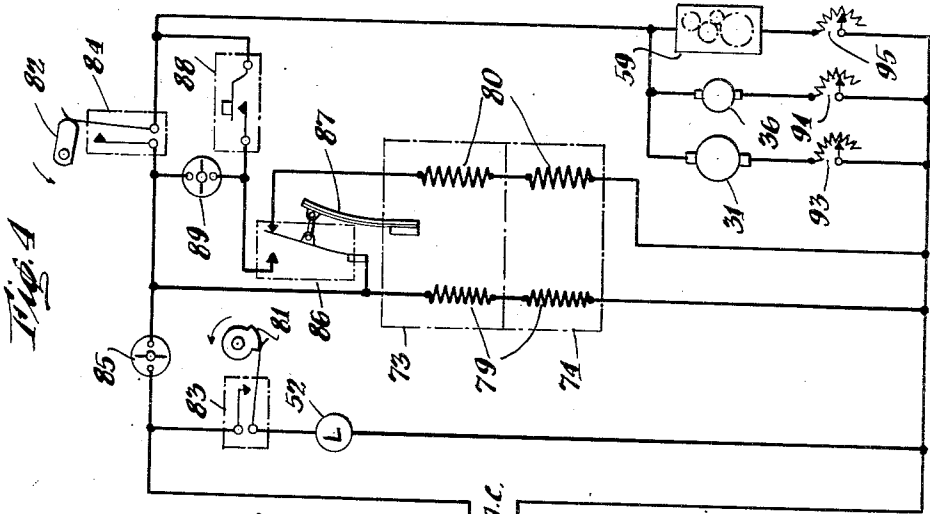


Fig. 3

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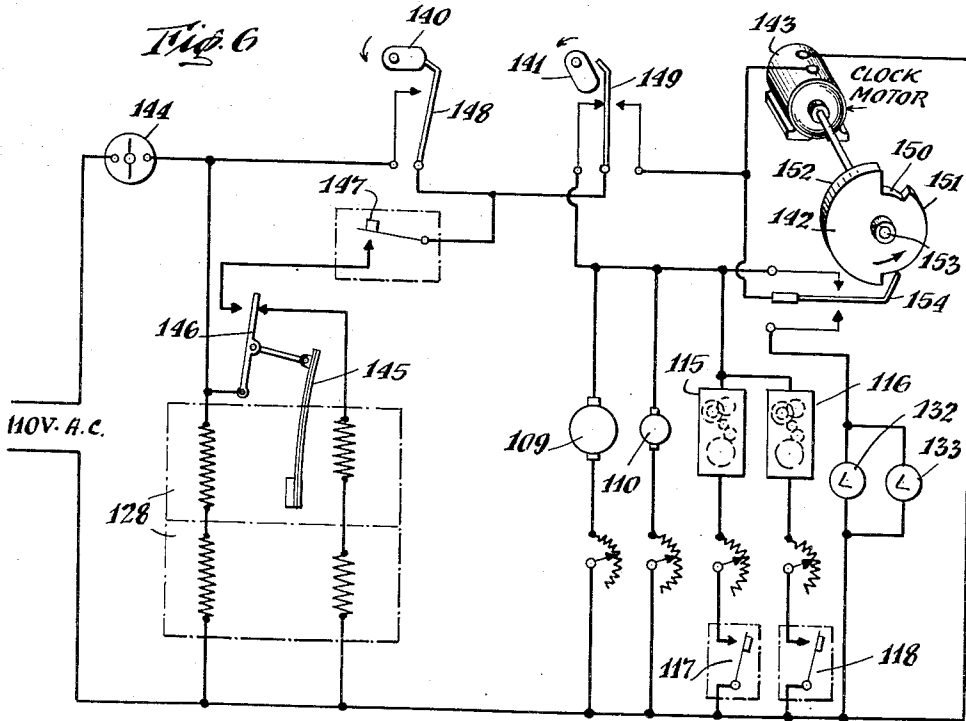
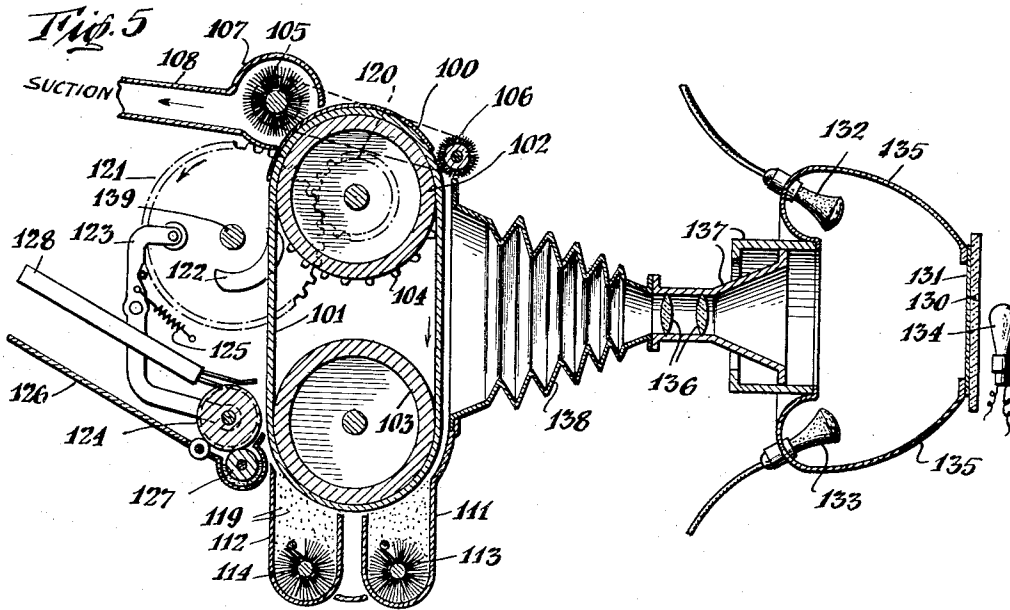
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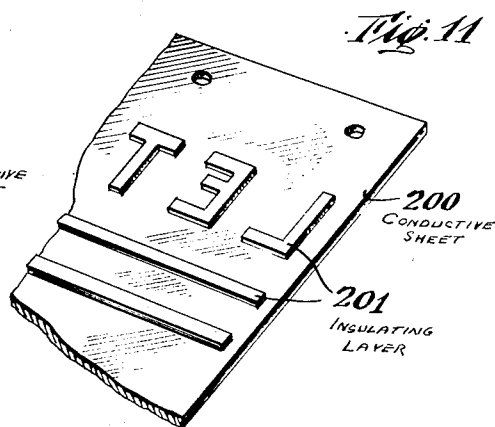
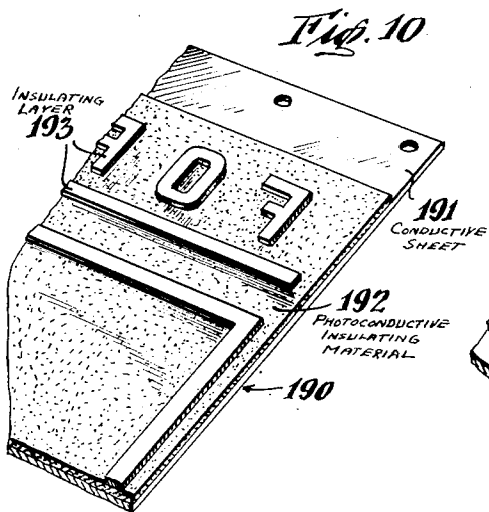
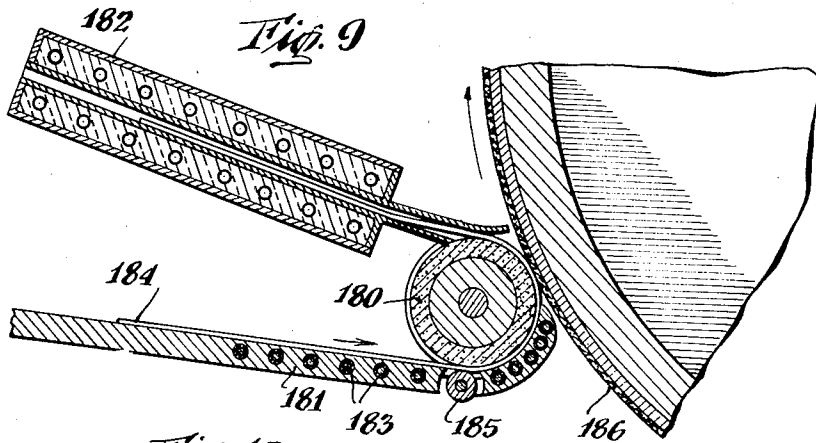
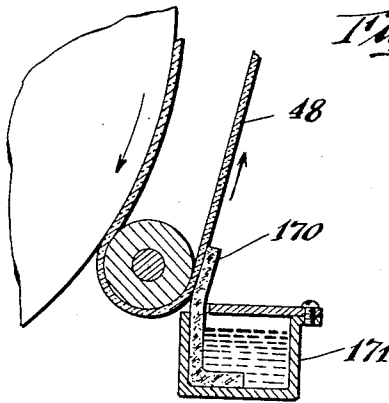
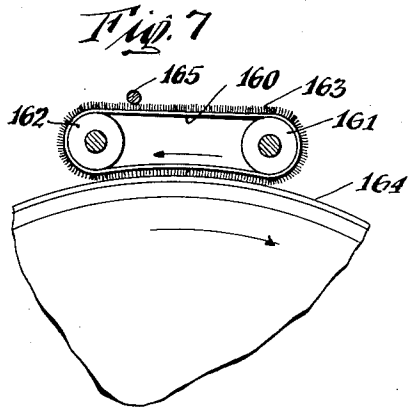
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