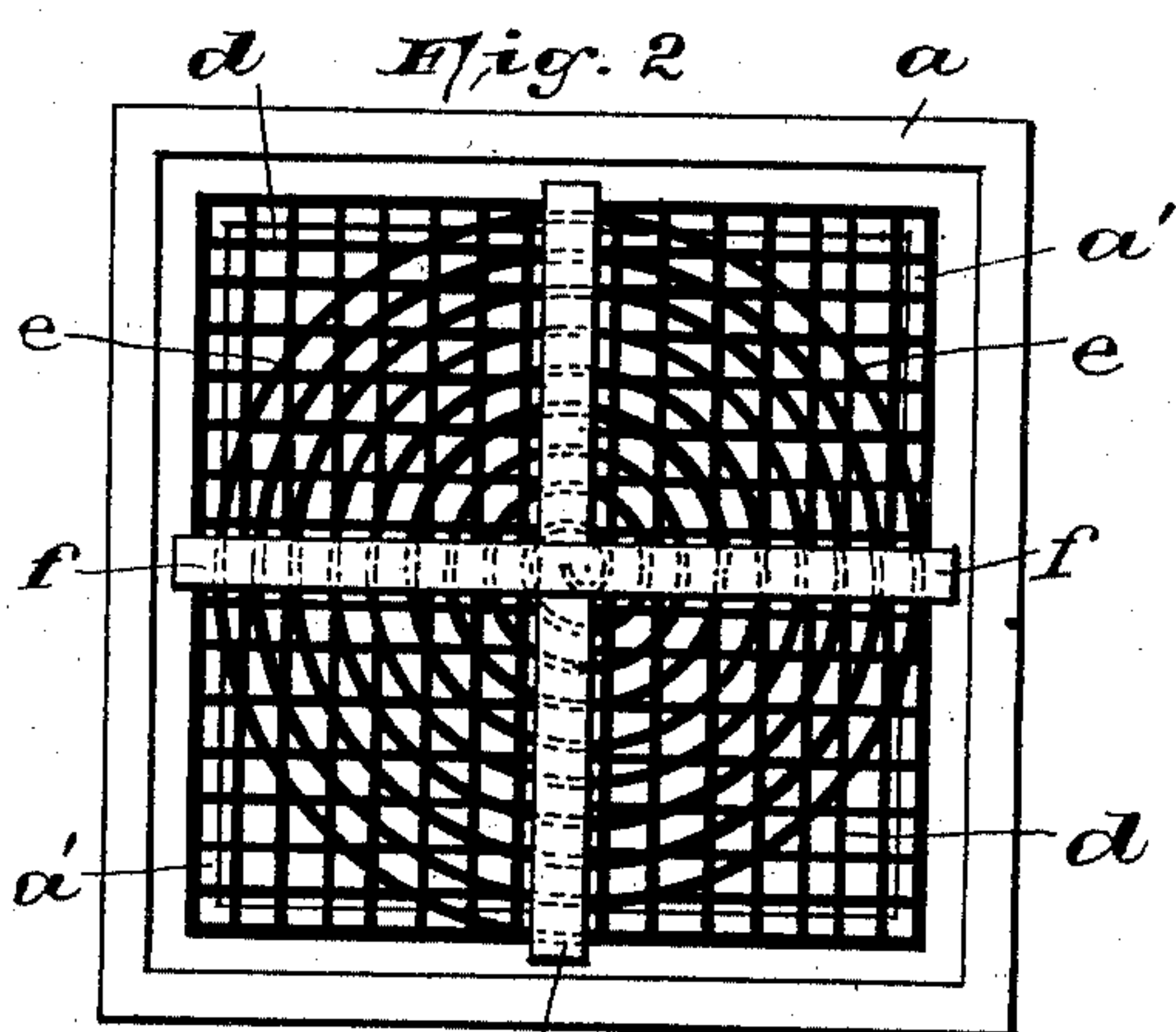
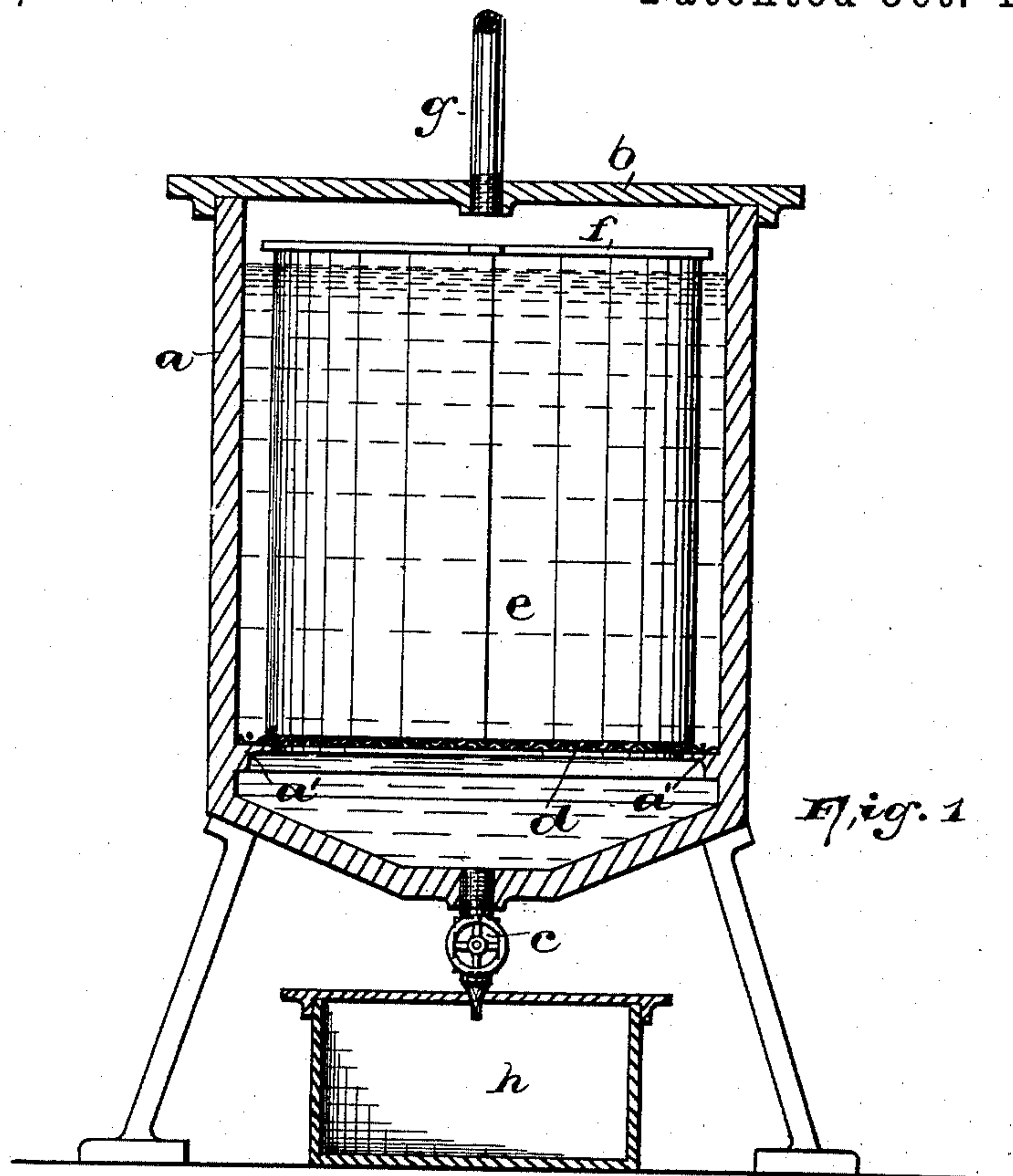


(No Model.)

E. N. TODD.  
APPARATUS FOR THE MANUFACTURE OF TRANSPARENT SHEETS  
OF PYROXYLINE.

No. 483,701.

Patented Oct. 4, 1892.



WITNESSES:

Wm. H. Campfield, Jr.  
Chas. P. Crocker.



Fig. 3

INVENTOR:

Edmund N. Todd.

BY Fred C. Fraentzel, ATT'Y.



# UNITED STATES PATENT OFFICE.

EDMUND N. TODD, OF NEWARK, NEW JERSEY.

APPARATUS FOR THE MANUFACTURE OF TRANSPARENT SHEETS OF PYROXYLINE.

SPECIFICATION forming part of Letters Patent No. 483,701, dated October 4, 1892.

Application filed December 9, 1890. Serial No. 374,023. (No model.)

*To all whom it may concern:*

Be it known that I, EDMUND N. TODD, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for the Manufacture of Transparent Sheets of Pyroxyline; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The present invention relates to improvements in an apparatus for the manufacture of thin, transparent, and flexible sheets of nitro-cellulose and other compounds of pyroxyline.

The invention relates more particularly to the improved form of plates employed, which are spirally wound, instead of the straight plates used in my process of manufacture of such sheets of nitro-cellulose, &c., described in my patent issued May 27, 1890, and numbered 428,654.

By the use of my improved plates or coils I am enabled to produce perfect and flexible sheets of nitro-cellulose of any desired length, which is of the greatest importance when such sheets are to be used for photographic purposes. By this arrangement the sheet, which is of much greater length, is also of uniform thickness throughout, which is very essential, at the same time being free from air-bubbles, which render the sheets of little value. In order to produce such sheets, I propose to employ a varnish or thick collodion or solution of pyroxyline or nitro-cellulose, which consists of soluble pyroxyline or nitro-cellulose dissolved in the various of the well-known solvents mixed with the various well-known menstrua.

The improved apparatus which I desire to use in the manufacture of thin, flexible, and transparent sheets of nitro-cellulose or pyroxyline for photographic purposes is illustrated in the accompanying sheet of drawings, in which similar letters of reference are employed to indicate corresponding parts in each of the several views.

In the drawings, Figure 1 is a vertical section of the apparatus. Fig. 2 is a top view of the same with the cover removed, both views illustrating the manner of supporting the spirally-shaped plates or coils. Fig. 3 is a vertical section of the upper part of said plate, illustrating the manner of placing a frame thereon provided with downwardly-projecting teats or lugs for holding and separating the spiral surfaces of the plate or coil, whereby the proper spaces are maintained between the surfaces.

In the views, *a* is a tank or receptacle of any desired construction, provided at the top thereof with a removable cover *b* and in its bottom, which is preferably inclined, as shown, with a spigot or valve *c*. Within said tank or receptacle, near the bottom thereof, is placed or secured upon suitable shoulders *a'*, and which may be secured in any other convenient manner, a partition *d* of wire-netting, in which the meshes are arranged far enough apart so as not to obstruct the flow of the dissolved solution of pyroxyline or nitro-cellulose through the same. Upon this partition *d* is placed a spirally-formed plate or coil *e*, which is preferably made of thin metal plated with silver, for such plates are not destroyed by the chemical action of the solvents employed, and, furthermore, the sheet of nitro-cellulose or pyroxyline can be readily removed from such silver-plated plates and without any blemishes whatever. Of course, if desirable, the plate *e* can be suspended within the tank *a* in any other convenient manner, as will be understood.

As is clearly illustrated in Figs. 1, 2, and 3, when the plate *e* has been placed upon the partition *d*, in order to keep the spiral surfaces of the said plate the proper distances apart and to prevent the capillary attraction of the solution with the surfaces of the plate from drawing the said surfaces toward one another, I have placed upon the upper part of the plate *e* a frame *f*, made of cross-pieces secured together and provided with downwardly-projecting lugs *f'*, which engage with the upper edges of the spiral plate and thereby holds said spiral surfaces of the plate in their proper positions. When the spirally-formed plate or coil *e* has been placed within the receptacle or tank *a*, the solution of py-



roxyline or nitro-cellulose or other like solution is poured into the receptacle until the plate *e* is almost entirely immersed in the solution of collodion or varnish, and the same  
 5 is then allowed to remain quiet until all the air has escaped and all air-bubbles have disappeared and the liquid solution remains quiet. The cover *b* is then placed upon the receptacle and the liquid is allowed to remain  
 10 at rest for a time. As will be noticed from Fig. 1, the cover *b* is provided with an outlet or pipe *g*, through which all disagreeable odors and gases and fumes are passed off without endangering the health of the oper-  
 15 ator. When the liquid collodion or varnish or solution of pyroxyline has remained within the tank the required time to thoroughly form an even coating upon the spiral surfaces of the plate *e*, the spigot or valve in the  
 20 bottom is opened and the liquid is allowed to flow slowly into a receptacle *h*, placed beneath the spigot, where the solution is stored until required for the next process of again coating the plate *e*. When the liquid solution has been  
 25 gradually withdrawn until the tank has been emptied, I accomplish, as a new result, the production of a thin and even coating on the plate, which coating is free from any blemishes or air-bubbles, the solvents, as the solution is  
 30 being gradually withdrawn and the level of the solution slowly becoming lower and lower in that small part of the solution adhering to both surfaces of the plate *e* evaporating and thereby leaving two very thin films of nitro-  
 35 cellulose adhering to the surfaces of the plate, which as they become exposed dry quickly and evenly. When all the liquid has been drawn off from the receptacle or tank, the coated plate of nitro-cellulose or pyroxyline is  
 40 allowed to remain within the receptacle for a time until the coating has become thoroughly dry, free from dust, thereby resulting in the production of two very long, even, and perfect films of nitro-cellulose or pyroxyline on said  
 45 spiral plate *e*. These films are removed from the spiral plate or coil when the latter has been taken from the receptacle *a* by scratch-

ing or scraping the upper and lower edges of the plate with a knife or other sharp tool and placing the plate successively into hot and  
 50 cold water, or vice versa, whereby said plate is expanded and contracted, and the films being loose at both ends of the plate, drop therefrom in two long and perfect sheets. By this device perfect sheets of any length and width  
 55 can be made with ease. When the films of nitro-cellulose or pyroxyline have been removed from the plate *e*, the latter is again returned to the tank and is ready for the next process. Of course it will be evident that the  
 60 construction of the apparatus may be varied without departing from the scope of the present invention, and I therefore do not wish to be understood as limiting myself strictly to the construction herein shown, and the plate  
 65 *e* can be plated with any desirable metal suitable for this purpose, or may be made of any metal or glass.

Having thus described my invention, what I claim is—

1. The herein-described apparatus for the manufacture of thin transparent sheets of nitro-cellulose or pyroxyline, which consists of a suitable tank provided with a spigot or valve having a wire-netting partition and a  
 75 spirally-formed plate or coil arranged thereon upon which said sheets are formed in a thin and evenly-distributed film, as and for the purposes set forth.

2. The herein-described apparatus for the  
 80 manufacture of thin sheets of nitro-cellulose or pyroxyline, which consists of a suitable tank provided with means for drawing the solution therefrom and a spirally-formed plate or coil upon which said sheets are formed in  
 85 a thin and evenly-distributed film, as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 10th day of November, 1890.

EDMUND N. TODD.

Witnesses:

FREDK. C. FRAENTZEL,  
 WM. H. CANFIELD, Jr.