

C. REVERDYS.
ETCHING APPARATUS.
APPLICATION FILED JAN. 20, 1908.

924,934.

Patented June 15, 1909.

2 SHEETS—SHEET 1.

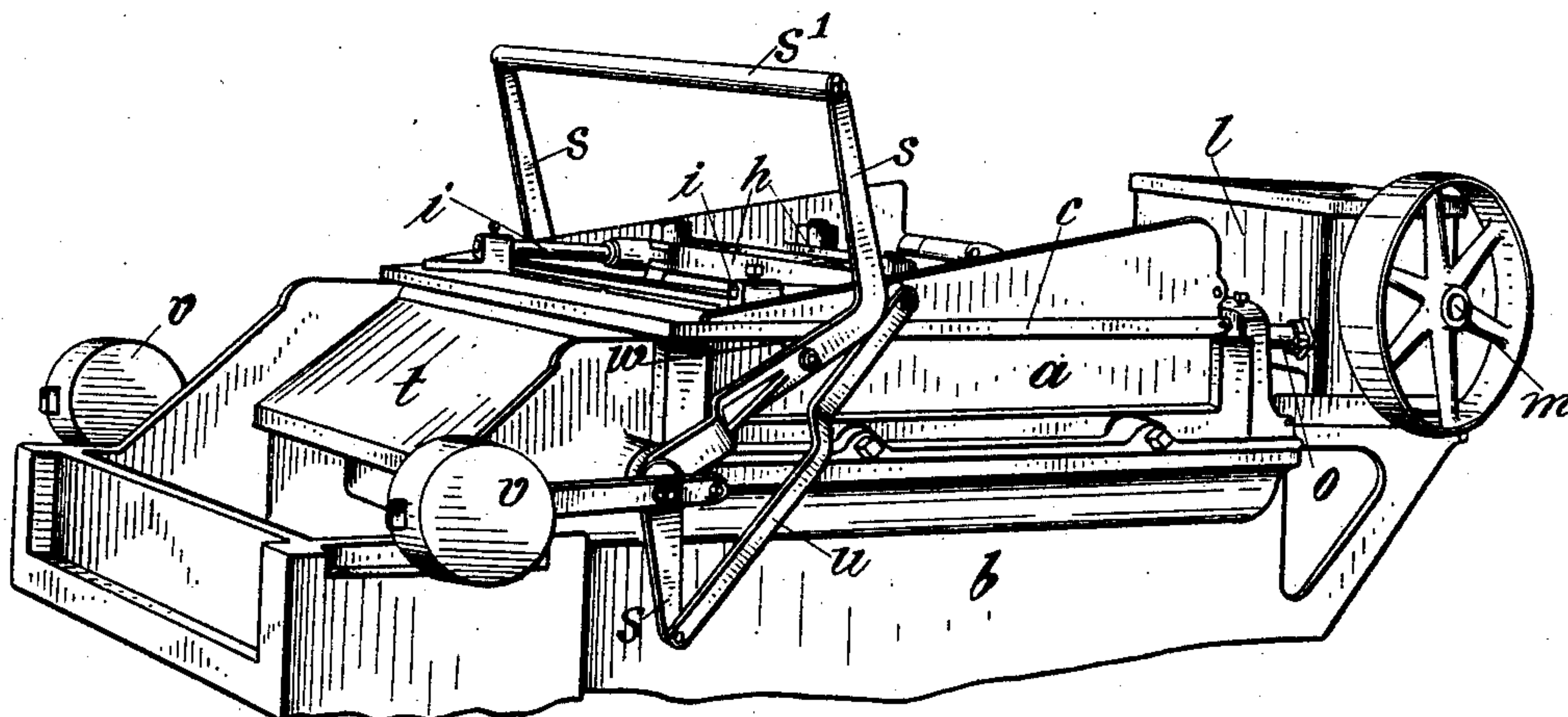


Fig. 1.

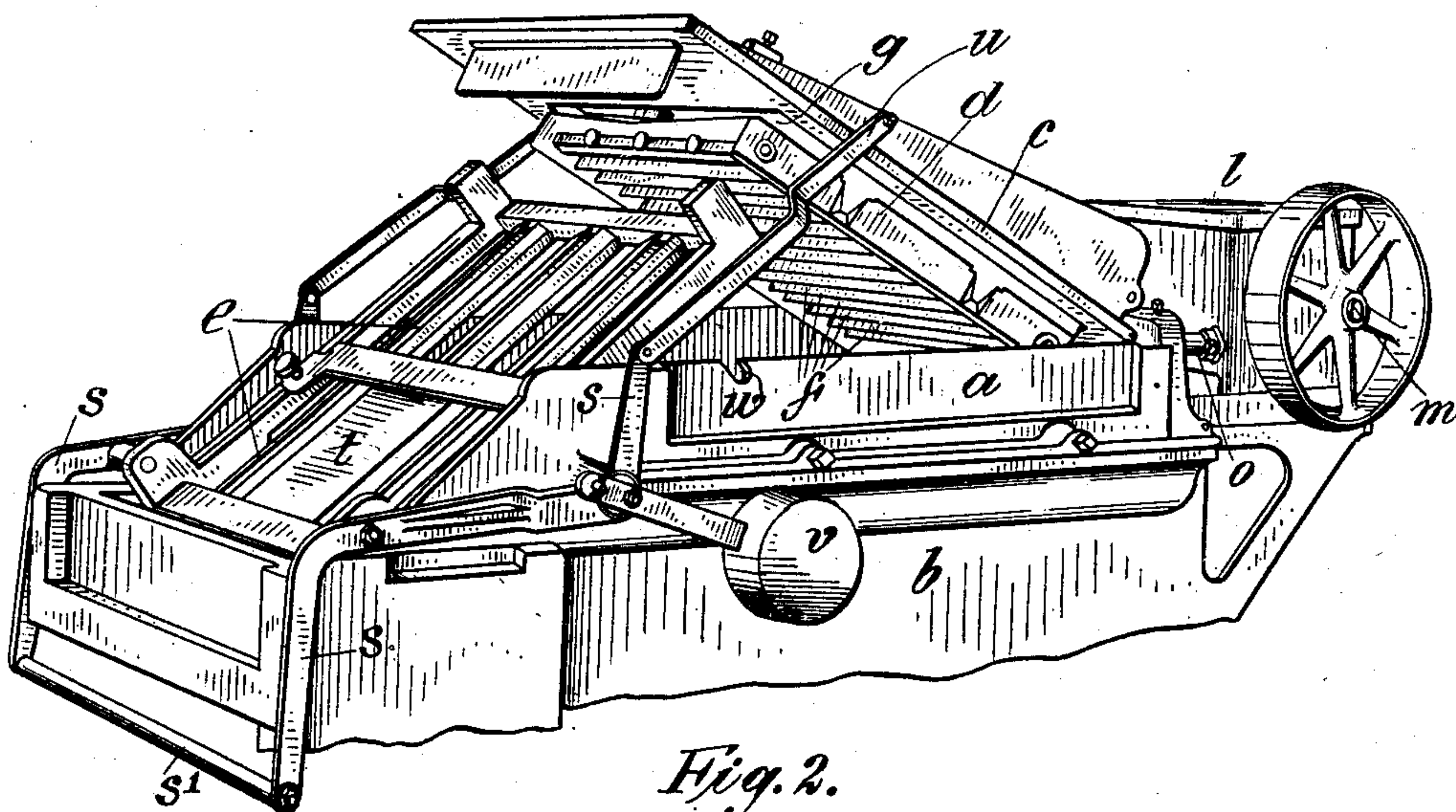


Fig. 2.

Witnesses
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By his Attorneys
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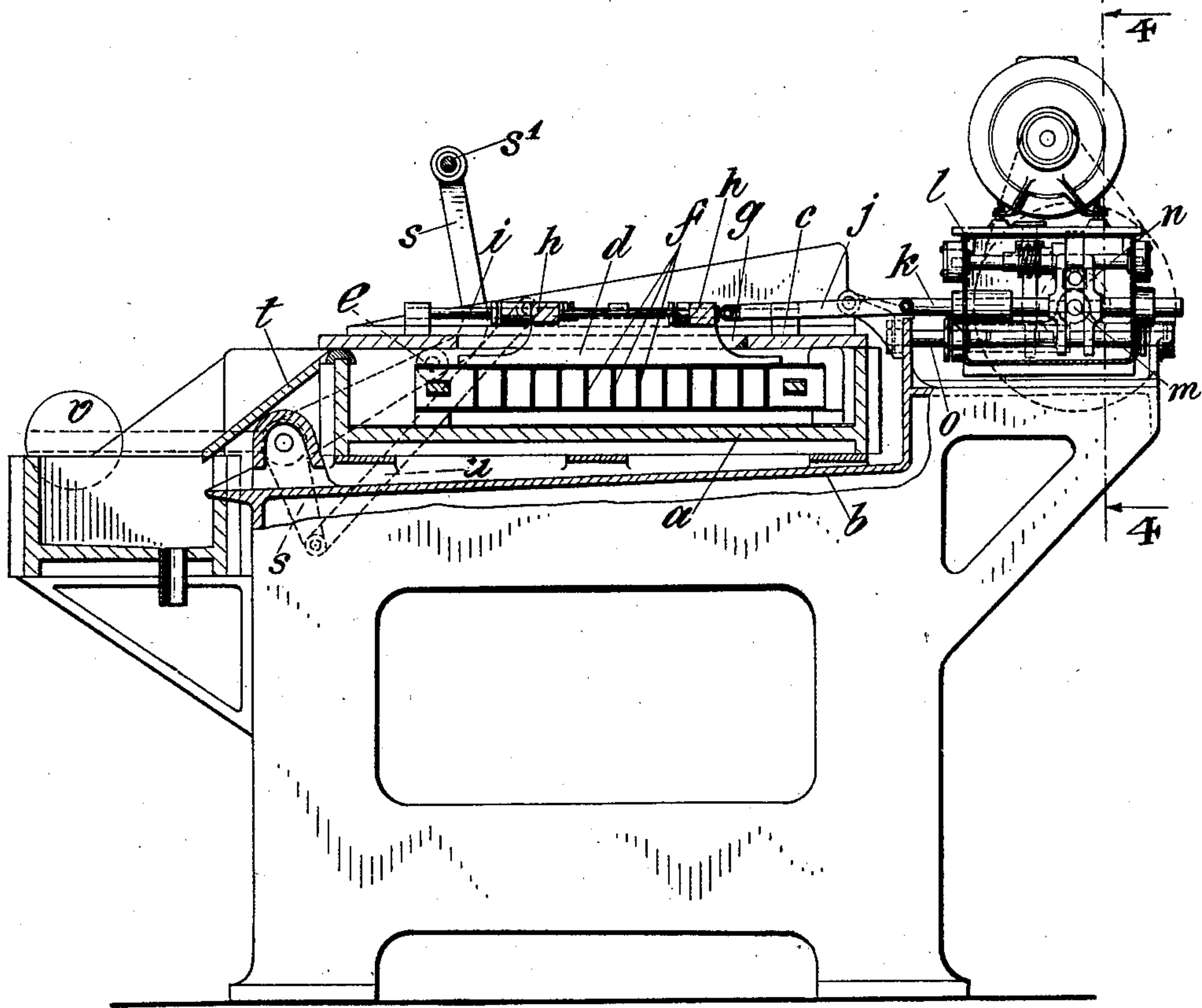


Fig. 3.

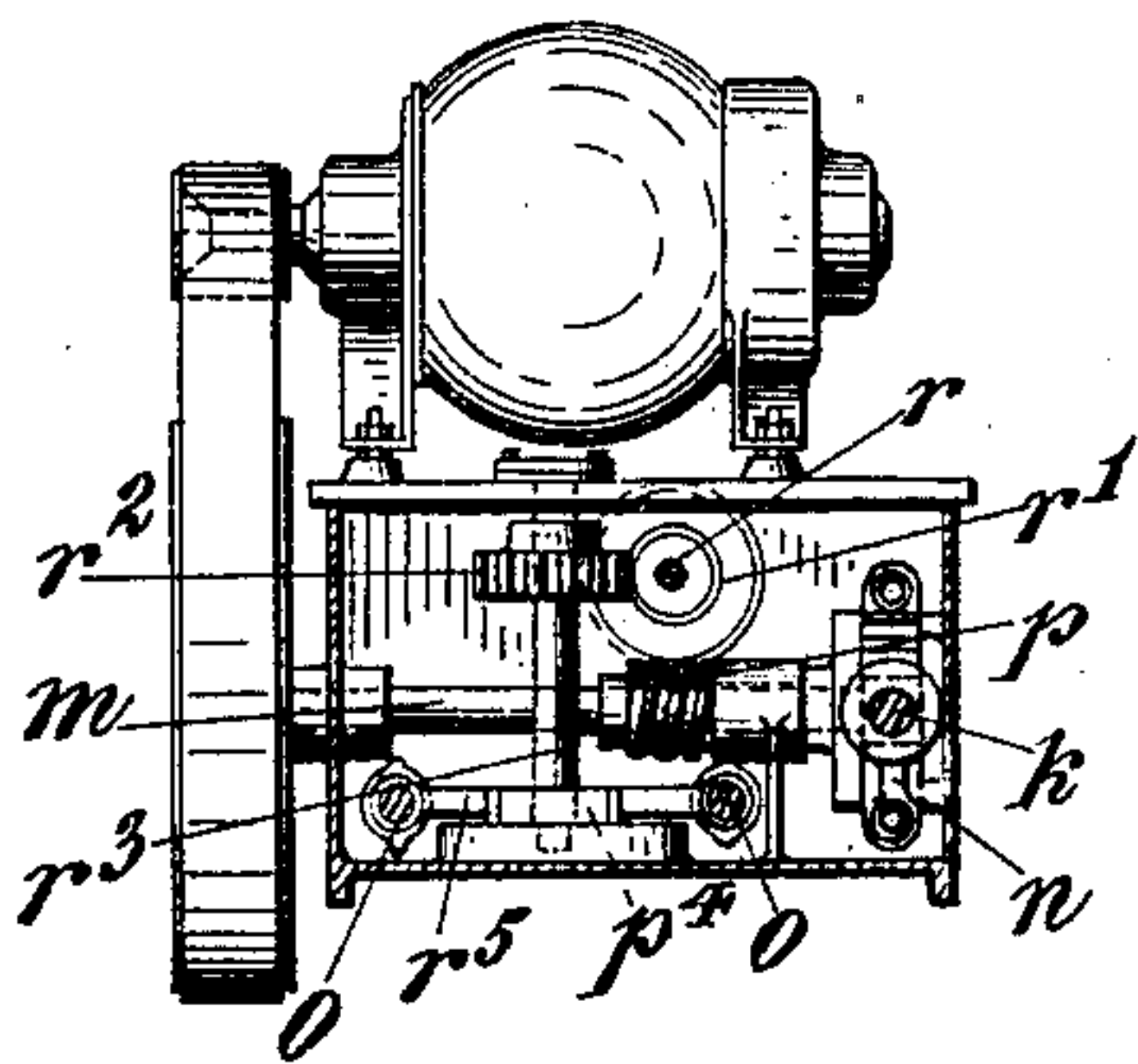


Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES REVERDYS, OF NEW YORK, N. Y., ASSIGNOR TO F. WESEL MANUFACTURING COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

ETCHING APPARATUS.

No. 924,934.

Specification of Letters Patent.

Patented June 15, 1909.

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To all whom it may concern:

Be it known that I, CHARLES REVERDYS, a subject of the King of Bavaria, and at the present time a resident of the borough of Brooklyn, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Etching Apparatus, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The invention relates to improvements in etching apparatuses and in particular to apparatuses of this sort which are adapted to contain an etching bath, such as a bath of dilute nitric acid, for the purpose of reacting upon a metallic plate to produce the figures or designs to be etched. In apparatuses of this sort, for the purpose of applying the bath properly and uniformly to all parts of the plate in order to produce an even etching thereon, it has been proposed to employ an agitator having ribs or vanes formed of thin plates which project downwardly in the bath and are reciprocated back and forth directly over the plate or plates which are being etched by the bath. It has been found however that at the points where each rib or vane stops in the reciprocation of the agitator, there is produced upon the underlying plate a corresponding portion which is improperly etched and which serves to destroy the uniformity of etching over the entire plate. To overcome this difficulty the present improvements provide for a movement of the agitator in addition to its former reciprocatory one so that upon successive strokes of the agitator the ribs or vanes stop in different positions over the plate. This new movement may be one of slow reciprocation so that the real or resultant movement of the agitator is compounded of two reciprocatory movements. In this way there are no definite points of rest for the ribs or vanes of the agitator, so far as the plate is concerned, and hence the etching is uniformly produced over the entire plate.

Another object of the invention is to provide improved means for manipulating the apparatus whereby a plate may be inserted and withdrawn therefrom with the utmost convenience and despatch and with a relatively small amount of work on the part of the attendant who is running the machine. The improvements in this respect consist in providing operative connections between

the cover for the etching bath receptacle and the plate carrier and of providing a particular form of lever through which the raising and lowering of the cover and the lifting in and out of the plate carrier may be effected. All of these improvements will be more particularly referred to hereinafter and in connection with the accompanying drawings in which,

Figure 1 is a perspective view of an etching apparatus embodying the improvements, the lower part of the supporting frame being broken off. Fig. 2 is a similar view with the cover raised and the plate carrier withdrawn from the receptacle which contains the etching bath and resting upon an inclined support in front of the receptacle. Fig. 3 is a view, partly in longitudinal section and partly in elevation, on an enlarged scale, and, Fig. 4 is a sectional view, the section being taken upon a plane indicated by the line 4—4 in Fig. 3.

The receptacle *a* which contains the etching bath is supported upon a suitable base or frame *b*. The cover *c* of the receptacle is hinged near the rear end of the receptacle and is provided with a reciprocating portion *d* which, when the cover is down and the plate carrier *e* is in its position within the receptacle (Fig. 3), moves back and forth over the plate carrier and the plate or plates secured thereto, thus serving as an agitator to stir up the bath and to keep it applied at all times over the entire plate. In the present case this agitator is provided with ribs or vanes *f* consisting of thin plates which project downwardly from the agitator with their lower edges very near the plate carrier; the upper part of the agitator extends upwardly through an opening *g* in the cover and is secured to cross pieces *h* carried by rods *i* which are supported for free longitudinal movement upon the top of the cover. Such movement is imparted to the rods through a link *j* which is connected to a reciprocating rod *k* supported for free longitudinal movement in the ends of a gear box *l*. The rod *k* is reciprocated from the driving shaft *m* through the interposition of a crank-pin and cross-head connection *n* as clearly shown in Figs. 3 and 4.

Upon the assumption that during the etching process the carrier *e* which holds the plate or plates being etched, remains stationary, the reciprocation of the agitator, as was just

described, will cause the vanes *f* to stop at particular points in each stroke of the agitator so that each of these vanes may be said to have two positions of rest. In order to
 5 avoid any positions of rest for the vanes, so far as the plate or plates to be etched are concerned, or rather, to avoid the effect produced by the constant starting and stopping of the vanes at particular points upon the
 10 plates, either the plate carrier itself is arranged to be moved during the etching process or the agitator is made to have a compound motion.

As illustrated in drawings, the plate carrier during the etching process is stationary,
 15 and means are provided to give the agitator a movement of slow reciprocation in addition to its former movement of relatively fast reciprocation. For this purpose, suitable reduction gearing is provided between the
 20 driving shaft *m* and rods *o* secured, one on each side, to the receptacle *a* at its rear end. Such reduction gearing is located in the gear box *l* and may comprise (Figs. 3 and 4) a
 25 worm *p* upon the driving shaft *m* meshing with a worm gear secured upon a shaft *r* suitably journaled in the gear box. Upon the shaft *r* is another worm *r'* which meshes with another worm gear *r''* upon a shaft *r'''*
 30 also suitably journaled in the gear box. This shaft is provided with a cam *p''* which operates between a cross-head *r''''* secured to the two stationary rods *o*. The rods *o* being secured to the receptacle *a* or what is the
 35 same thing to the stationary frame of the apparatus, it will be clear that as the driving shaft revolves, the gear box, which is freely supported upon a table-like portion which projects from the rear end of the apparatus,
 40 will be moved backward and forward upon this table-like portion, such movement being comparatively slow. This, as will be clear, will cause the reciprocating rod *k* to have a similar motion which, added to its other
 45 component of motion will cause a resultant or compound motion to be transmitted to the agitator so that the latter has a movement which is made up of a relatively fast reciprocatory movement and a relatively
 50 slow reciprocatory movement. It will be clear that the same result could be accomplished by making the gear box stationary upon the frame and by providing some means to move the plate carrier during the etching
 55 process, but the arrangement shown and described herein seems preferable from the standpoint of construction.

The other improvements which have already been referred to as constituting a
 60 part of the present invention pertain to the means for manipulating the cover of the receptacle and the lifting in and out of the plate carrier. It is extremely convenient to have these parts so related that the attendant who
 65 is in charge of the apparatus may conven-

iently and with expedition attend to such manual operations as are required in introducing a plate to be etched and in withdrawing it from the etching bath after it has been
 70 duly acted upon. For this purpose and in accordance with the invention, the cover and plate carrier are operatively connected so that as the cover is raised the plate carrier is simultaneously withdrawn from within the receptacle and vice versa. Moreover, some such
 75 means as a single lever is provided to effect both of these operations. Referring to the drawings it will be seen that this lever, in the present case, really consists of a bell crank *s* pivoted at each side of the machine and con-
 80 nected by a cross piece *s'*. Between two corresponding arms of the bell cranks and pivotally secured to said arms at its forward end is the plate carrier the rear end of which is free. When the parts are in the position illustrated
 85 in Fig. 2, the plate carrier rests upon an inclined support *t* upon the front of the apparatus with its lower end just above a dripping trough *y* and when the cross piece is raised from the position here illustrated it will be
 90 obvious at a glance that the plate carrier will be lifted and its free end lowered and moved into the receptacle. The other two arms of the bell cranks are each provided with a link
 95 *u* which connects them respectively with the cover so that when the bell cranks are moved in one direction the cover will be brought down upon the receptacle and vice versa when the bell cranks are moved into the other
 100 direction. Moreover, counterweights *v* may be provided to lessen the effort upon the part of the attendant in moving the bell cranks in either direction. When the cover is down upon the receptacle and the plate carrier is in
 105 its position within the receptacle, the pivots by means of which the plate carrier is secured to the bell cranks will rest in recesses *w* in the top of the receptacle on either side thereof.

It will be clear that the improvements may be embodied in other constructions than that
 110 shown and described herein and that many changes may be made in such constructions without avoiding the spirit of the invention.

I claim as my invention:—

1. In an etching apparatus or the like, the
 115 combination of means to hold or contain a plate to be etched, an agitator for the etching bath, and means to impart to the agitator a movement of reciprocation and an additional movement for the purpose specified. 120

2. In an etching apparatus or the like, the combination of means to hold or contain a plate to be etched, an agitator for the etching bath, and means to impart to the agitator a movement compounded of a relatively fast
 125 reciprocation and a relatively slow reciprocation.

3. In an etching apparatus or the like, the combination of means to hold or contain a
 130 plate to be etched, an agitator for the etching

bath, means to drive the agitator, and means to move the driving means as the agitator is being driven.

4. In an etching apparatus or the like, the combination of means to hold or contain a plate to be etched, an agitator for the etching bath, means to reciprocate the agitator, and means to reciprocate the driving means independently at the same time.

5. In an etching apparatus or the like, the combination of means to hold or contain a plate to be etched, an agitator for the etching bath, means to reciprocate the agitator relatively fast, and means to reciprocate the driving means relatively slowly.

6. In an etching apparatus or the like, the combination of a receptacle for the etching bath, an agitator for the bath, a gear box, a driving shaft, and means in the gear box through which the agitator and gear box are independently reciprocated.

7. In an etching apparatus or the like, the combination of a receptacle for the etching bath, an agitator for the bath, a driving shaft a reciprocating rod to drive the agitator, a fixed rod on which the gear box reciprocates, and gearing between the shaft and the fixed rod to reduce the speed of reciprocation of the gear box.

8. In an etching apparatus or the like, the combination of a receptacle for the etching bath, a cover, a plate carrier, a lever, and operative connections between the lever on the one hand and the cover and plate carrier on the other hand whereby when the cover is raised the carrier is lifted out from the receptacle and vice versa.

9. In an etching apparatus or the like, the combination of a receptacle for the etching bath, a cover, a plate carrier, a bell crank lever, a link connecting one arm of the bell crank lever with the cover, and means to connect the other arm of the lever with the carrier whereby the cover is raised and the carrier is lifted at the same time from the receptacle and vice versa by moving the lever.

10. In an etching apparatus or the like, the combination of a receptacle for the etching bath, a cover hinged near the rear end of the receptacle, a lever pivoted near the for-

ward end of the receptacle, a plate carrier the forward end of which is secured to the lever and the rear end of which is free, and operative connections between the lever and the cover.

11. In an etching apparatus or the like, the combination of a receptacle for the bath, a cover hinged near the rear end of the receptacle, a lever pivoted near the forward end of the receptacle, a plate carrier the forward end of which is secured to the lever the other end being free, an inclined support for the plate carrier in front of the receptacle, and means to connect the cover and lever whereby when the cover is raised the carrier is lifted out from the receptacle and vice versa.

12. In an etching apparatus or the like, the combination of a receptacle for the etching bath, a cover hinged to the receptacle near its rear end, a bell crank lever pivoted near the forward end of the receptacle, a plate carrier secured near its forward end to one arm of the bell crank lever the other end of the plate carrier being free, an inclined support for the plate carrier in front of the receptacle, a dripping trough in front of the receptacle, and a link connecting the other arm of the bell crank lever and the cover whereby when the cover is raised the carrier is lifted out from the receptacle and onto the support and vice versa.

13. In an etching apparatus or the like, the combination of a receptacle, a bell crank lever pivoted on each side of the receptacle near the front thereof, a cross piece connecting the bell crank levers, a plate carrier secured between corresponding arms of the two bell crank levers, and a link on each side of the apparatus connecting the other corresponding arms of the two bell crank levers with the cover whereby when the cover is raised the carrier is lifted out from the receptacle and vice versa.

This specification signed and witnessed this 28th day of November, A. D., 1907.

CHARLES REVERDYS.

Signed in the presence of—

LUCIUS E. MARNEY,
AMBROSE L. O'SHEA.