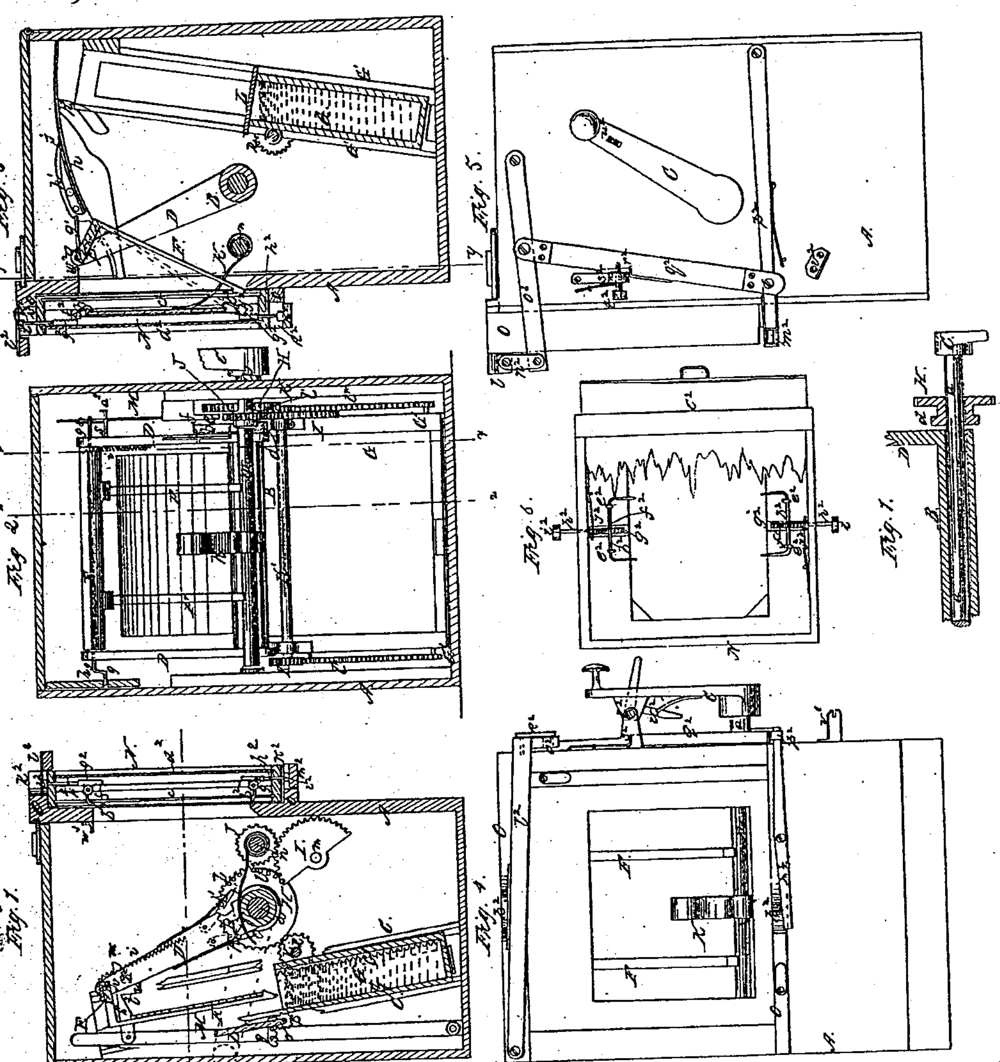
W. Jr. & A. L. Hudson,

Photographic Bath.

No. 51,834. Patented Jan. 2, 1866.



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UNITED STATES PATENT OFFICE.

WM. HUDSON, JR., AND AUGUSTUS L. HUDSON, OF HINGHAM, MASS.

PHOTOGRAPHIC SENSITIZING-BOX.

Specification forming part of Letters Patent No. **51,834**, dated January 2, 1866.

To all whom it may concern:

Be it known that we, WILLIAM HUDSON, Jr., and AUGUSTUS L. HUDSON, of Hingham, in the county of Plymouth and State of Massachusetts, have invented a new and Improved Sensitizing-Box; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a transverse vertical section of this invention, the plane of section being indicated by the line *x x*, Fig. 2. Fig. 2 is a longitudinal vertical section of the same, the line *y y*, Fig. 3, indicating the plane of section. Fig. 3 is a transverse vertical section of the same, taken in the plane indicated by the line *z z*, Fig. 2. Fig. 4 is a front elevation of the same, the shield having been removed. Fig. 5 is a side elevation of the same. Fig. 6 is an inside view of the shield detached. Fig. 7 is a detached horizontal section of the rock-shaft, which serves to impart motion.

Similar letters of reference indicate like parts.

This invention relates to an apparatus by which the operation of sensitizing a plate of glass or other material can be effected entirely by mechanical means and without holding the plate in the hands or touching it from the time it is introduced into the apparatus until it is removed from the plate-holder after the picture has been taken. The plate, on being introduced into the apparatus, is placed on a pair of hooked arms or dippers, which extend from a rock-shaft to which an oscillating motion is imparted by a suitable hand-lever, said motion being regulated by a series of gear-wheels and cam-grooves in such a manner that when the dippers, with the plate, approach the cistern containing the nitrate of silver or other sensitizing solution, the cover of said cistern turns back automatically, and as soon as the dippers, with the plate, have reached the proper position over the cistern their motion ceases and the cistern rises, and thereby the plate is dipped into the solution, and can be kept therein the desired length of time, and by lowering the cistern the plate can be left to drain. After the operation of sensitizing has thus been accomplished the handle is turned back and the plate is carried forward and delivered into the shield. The shield is provided with spring-catches, which are set at the beginning of the operation, and when the plate has entered the shield, by the handle coming in contact with an adjustable stop, said spring-catches are sprung and caused to hold the plate securely in place. By closing the shield and removing it from the sensitizing-box the plate can be introduced into the camera and exposed to the light without ever touching it with the hands or fingers.

The mechanism whereby the motion of the various parts is controlled will be presently described with reference to the drawings.

A represents a box, made of wood or any other suitable material, square, oblong, or in any desirable form or shape. The sides of this box form the bearings for a shaft, B, to which an oscillating motion is imparted by a suitable handle, C. From the rock-shaft B rise two arms, D, which form the bearings for the rocking head E, from which the dippers F extend. The arms D are firmly connected to the shaft B, which turns loosely in its bearings, and the handle C is mounted on the outer end of a sleeve or cap, *a*, which is fitted on the gudgeon of the rock-shaft, as shown particularly in Fig. 7. The sleeve is rendered rigid with the shaft B at the proper intervals by means of two spring-dogs, *b b'*, which are secured to the opposite edges of one of the arms D, and which drop behind shoulders *c c'* in the circumference of a disk, *d*, which is mounted on the inner end of the sleeve. If the sleeve is turned in the direction of the arrow marked on it in Fig. 1, the shoulder *c'* bears against the spring-dog *b'* and the shaft B is compelled to revolve in the same direction until a pin, *e'*, which projects from the dog *b'*, comes in contact with a stationary abutment, *f*, and thereby the dog is raised to the position shown in Fig. 1, and the shaft is free to turn in the direction of the arrow independent of the sleeve B. When the sleeve is turned in the opposite direction of the arrow until the shaft is brought in the position shown in Fig. 3, a pin projecting from the dog *b*, by coming in contact with the abutment *f*, throws said dog out of gear with the shoulder *c*, and the sleeve remains stationary while the shaft continues to turn. The object of this independent motion of the sleeve in either direction will be presently explained.

The rocking head E, from which the dip-

pers F extend, turns on gudgeons *g*, which have their bearings in the outer ends of the arms D. One of these gudgeons extends through its arms and forms a crank, *g'*, the end of which catches in a cam-groove, *h h'*, in the side of the box A, as seen particularly in Fig. 3. A spring, *i*, applied to the head E, has a tendency to throw the end of the crank *g'* up and keep the same in contact with the upper side of the cam-groove. By this arrangement the dippers F assume the required position automatically, and if the shaft B has arrived in the position shown in Fig. 1 the dippers remain stationary, pointing in the direction of the cistern G, whereas, when the shaft B has arrived in the position shown in Fig. 3, the dippers, after having deposited the plate in the shield, drop back from the position shown in dotted lines to that shown in full outlines. This backward motion is effected by the form of the cam-groove *h'*, which branches off from the groove *h*, and in moving back from the position shown in Fig. 3 to that shown in Fig. 1 the end of the crank *g'* passes through the groove *h'* until it strikes a flat spring, *j*, which, being forced open, allows the same to pass from the groove *h'* into the groove *h*. On the forward motion, however, the end of the crank is prevented, by the spring *j*, from passing from the groove *h* into the groove *h'* until the same arrives in the position shown in Fig. 3.

The cistern G is fitted in between suitable guides G' in a slightly-inclined position, (although its position might be vertical, if desired,) and a rising-and-falling motion is imparted to it by means of pinions *k*, which are mounted on a shaft, *k'*, and gear in toothed racks *l**, secured to the sides of the cistern guide-bars or frame G'. The shaft *k'* has its bearings in the sides of the box A, and derives its motion from a toothed segment, H, which is mounted on the sleeve *a*, as shown particularly in Fig. 1. This segment is provided with two sets of teeth, *l* and *l'*, one set, *l*, on its circumference and one set, *l'*, on its inner side.

If the sleeve *a* or the handle C is turned in the direction of the arrow marked thereon in Fig. 1, the cistern remains stationary until the shaft B has arrived in this position shown in said figure. At this point the dog *b'* is thrown out of gear with the shoulder *c'*, and the teeth *l* on the circumference of the segment H commence to engage with the teeth of one of the pinions *k*, causing the shaft *k'* to revolve, and imparting to the cistern G a rising motion by means of the racks *l**, attached to the cistern-frame G'. By turning the handle C in the direction opposite the arrow marked on it in Fig. 1 the cistern is again lowered and the teeth *l* disengage from the pinion *k;* and if the shaft B has arrived in the position shown in Fig. 3 the dog *b* is thrown out of gear with the shoulder *c*, and the sleeve continues to turn independent of the shaft, and then the teeth *l'* in the side of the segment H begin to engage with the teeth of a segment, I, which has its bearings on a stud, *m*, secured in the side of the box, and which gears in a pinion, J, mounted on a shaft, *n*. This shaft has its bearings in the sides of the box A, and it bears a spring-pad, K, which forces the plate from the dippers into the shield, and holds the same after the dippers F have been retracted and until the spring-catches of the shield are sprung, as shown in Fig. 3.

The cistern G is intended to contain the nitrate of silver or other sensitizing solution; and in order to protect this solution against impurities which might drop into it, the cistern is provided with a cover, L. Before the cistern begins to rise the cover is opened automatically by the following mechanism: The cover is hung on gudgeons *o*, one of which bears a pinion, *p*, (see Fig. 1,) which gears in a toothed rack, *g*, attached to an oscillating lever, M. This lever has its fulcrum on a pivot, *r*, in a lug or bracket secured to the bottom of the box, and it is provided with a latch, *s*, which is hinged to it, as shown in Fig. 1. The lower edge of this latch forms a cam, which rests on a pin, *t*, secured in the side of one of the guide-bars G', and it is provided with a lip, *u*, notch *v*, and rounded nose *w*. When the arms D swing toward the back of the box, a pin, a^2, projecting from one of them, by coming in contact with the lip *u*, pushes the latch *s* and the lever M back and causes the cover L to open. This takes place before the dippers have assumed the position shown in Fig. 1 and before the cistern begins to rise. After the plate has been dipped the shaft B is turned in the direction opposite the arrow marked thereon in Fig. 1, and the pin a^2, by coming in contact with the inner edge of the nose *w*, closes the cover, and at the same time the latch moves forward, so that its lower edge, by sliding on the pin *t*, raises the same high enough to disengage the nose *w* from the pin a^2, and the forward motion of the arms D is not interrupted.

N is the shield, which is constructed, in the ordinary manner, of wood or any other suitable material. It is provided with two slides, c^2 d^2, between which the plate is received, and the plate is held in position by spring-catches b^2. These catches consist of wires having both ends bent at right angles, as shown in Fig. 6, and they are secured to the shield by means of loops or staples c^2. Pinions f^2, mounted on the wires d^2, gear into toothed racks g^2, which are guided in suitable grooves in the shield, and from which extend shanks h^2, surmounted by buttons i^2. Springs j^2 force the racks up, and have a tendency to keep the catches b^2 closed down upon the plate. By pressing on the buttons i^2 the pinions f^2 are turned and the catches are opened. The shield is placed between guide-bars O on the front side of the box, and said guide-bars are provided with cavities k^2, to receive the buttons i^2. After the shield has been adjusted in the proper position both buttons can be forced in-

ward simultaneously by the action of two levers, l^2 m^2, which are hinged to the outer edges of the guide-bars O. The lever l^2 connects, by a link, n^2, with a lever, o^2, which is pivoted to the side of the box, as shown in Fig. 5, and the end of the lever m^2 projects through a loop at the loose end of a lever, p^2, which is also pivoted to the side of the box, and connects with the lever o^2 by a rod, q^2. By this arrangement a pressure exerted on the lever o^2 acts simultaneously on both buttons i^2, and both spring-catches b^2 are opened simultaneously. The rod q^2 is provided with a notch, r^2, and the levers l^2 m^2 are depressed. A spring-dog, s^2, catches in said notch and holds said levers down and the catches b^2 open. The spring-dog s^2 is furnished with a set-screw, t^2, and if the handle C is brought forward it strikes against the point of said set-screw, and by releasing the dog s^2 causes the spring-catches b^2 to close.

The handle C is furnished with lever-catch u^2, and if said handle has been moved far enough round to raise the cistern to its full height the lever-catch drops into a notched bracket, v^2, and the apparatus is retained in position as long as may be required to sensitize the plate.

The operation is as follows: After the shield has been adjusted in its place the slide c^2 is drawn out and the levers l^2 m^2 are depressed, so as to open the spring-catches b^2. The handle C is turned until the crank g' of the head E stands opposite the opening h^* in the cam-groove. (See Fig. 3, where said cam-groove and opening are shown.) Then the dippers are raised, so that their points rest upon brackets w^2, secured to the inner surface of the front side of the box A. In this position the dippers are held, and the prepared or collodionized plate is gently adjusted thereon, so that the same is situated in the center and opposite the cavity in the shield which is intended to receive the plate. When this has been accomplished the dippers, together with the plate, are gently lowered, and the handle is turned in the direction of the arrow marked on the sleeve d in Fig. 1 until the lever-catch u^2 drops into the notch of v^2. By this motion the dippers, with the plate, are brought over the cistern, and the cistern is raised, so that the plate is submerged in the solution contained in said cistern. After a sufficient lapse of time the handle is turned forward, so as to lower the cistern, and the plate is left to drain, the drippings being collected in the cistern, and then the forward motion of the handle is continued until, by the action of the spring-pad K, the plate is pushed off from the dippers and held in the cavity of the shield, and finally, by the action of the handle against the set-screw t^2, the spring-catches b^2 in the shield are sprung, the handle is turned back, the slide c^2 is pushed in, and the operation of sensitizing the plate is accomplished.

In order to keep the plate properly in the ·dle on the dippers, suitable guide-strips may be attached to the edges of the openings in the front side of the box, and said edges are made tapering for the purpose of guiding the plate to the cavity in the shield if the same should have been displaced by the operation of dipping.

In order to simplify the construction, the toothed rack l^* may be secured to the cistern itself, thus dispensing with the frame G'.

We claim as new and desire to secure by Letters Patent—

1. The within-described method of sensitizing a plate, by placing the same on dippers, immersing it in the sensitizing solution, and securing it in the shield, all these operations being effected by mechanism substantially such as herein specified, or any equivalent thereof.

2. The dippers F, applied to a rocking head, E, in combination with the intermittently-oscillating sleeve B, cam-groove h, and shield N, all constructed and operating substantially as and for the purpose described.

3. The oscillating lever M and latch s, in combination with oscillating arms D, toothed rack q, pinion p, and hinged cover L, constructed and operating substantially as and for the purpose set forth.

4. Providing the cistern with a self-operating cover, substantially as and for the purpose specified.

5. Raising the cistern containing the sensitizing liquid against the plate to be sensitized, instead of dipping the plate into the liquid, by means substantially such as herein described, or any equivalent means.

6. The spring-pad K, applied in combination with the dippers F and shield N, substantially as and for the purpose described.

7. The spring-catches b^2 in the shield, in combination with buttons i^2, constructed and operating substantially as and for the purpose described.

8. The levers l^2 m^2 o^2 p^2 and connecting-rod q^2, applied in combination with the spring-catches b^2 in the shield, substantially as and for the purpose set forth.

9. The spring-dog s^2, in combination with the notch r^2 in the rod q^2, and with levers o^2 p^2 l^2 m^2 and spring-catches b^2 in the shield, all constructed and operating substantially as and for the purpose described.

10. The set-screw t^2 in the spring-dog s^2, applied in combination with the handle C, as described, so that the moment when the spring-catches b^2 are sprung can be regulated.

The above specification of our invention signed by us this 16th day of June, 1865.

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