

No. 709,079.

E. DÖNITZ.
PHOTOGRAPHIC SHUTTER.

Patented Sept. 16, 1902.

(Application filed Aug. 27, 1900.)

(No Model.)

3 Sheets—Sheet 1.

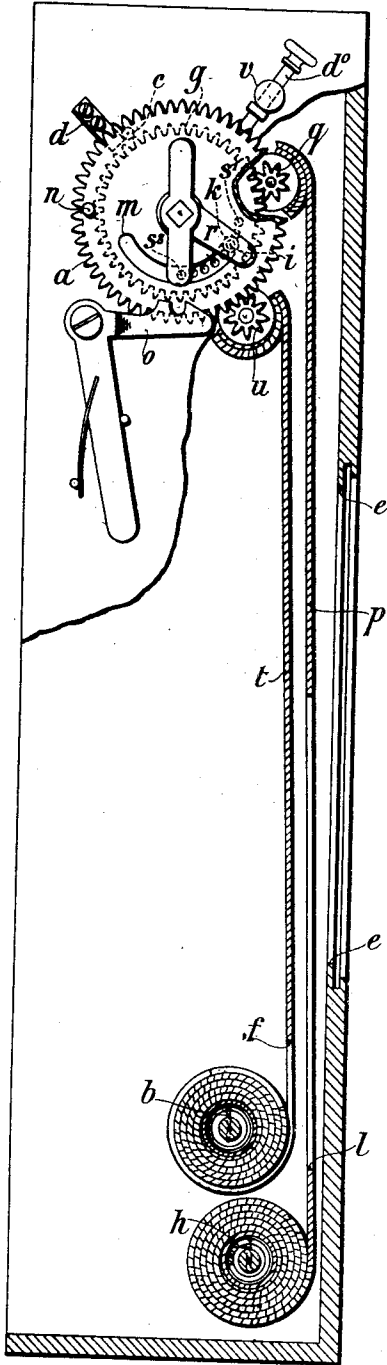


Fig. 1.

Paul Nügel
Carl Nügel

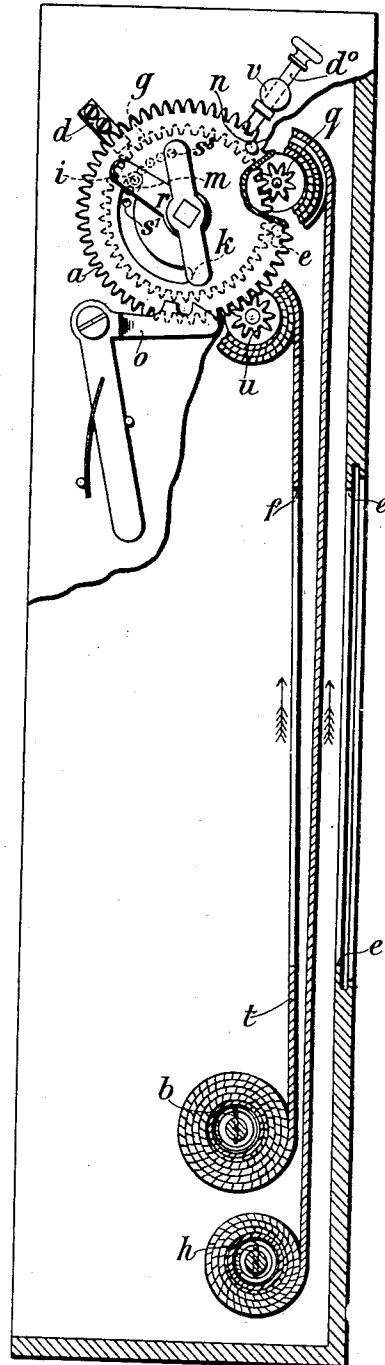


Fig. 2.

Inventor.
Emil Dönitz

No. 709,079.

Patented Sept. 16, 1902.

E. DÖNITZ.
PHOTOGRAPHIC SHUTTER.

(Application filed Aug. 27, 1900.)

(No Model.)

3 Sheets—Sheet 2.

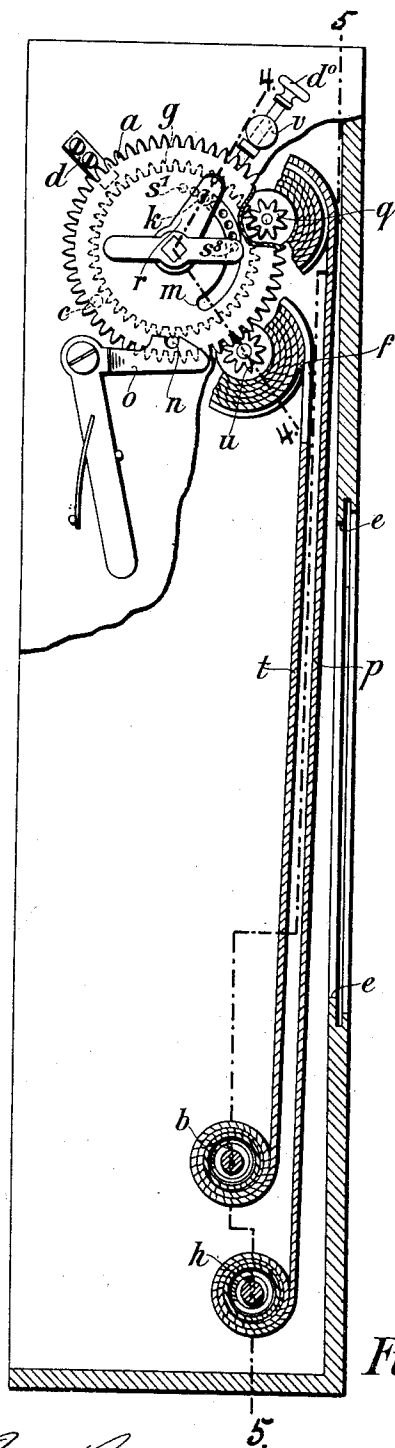


Fig. 3.

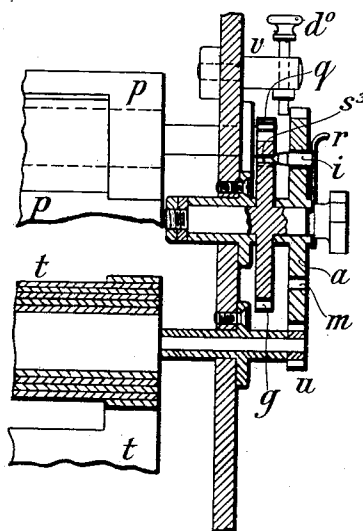


Fig. 4.

Paul Präger
Carl Natter

Inventor
Emil Dönitz

No. 709,079.

Patented-Sept. 16, 1902.

E. DÖNITZ.

PHOTOGRAPHIC SHUTTER.

(Application filed Aug. 27, 1900.)

(No Model.)

3 Sheets—Sheet 3.

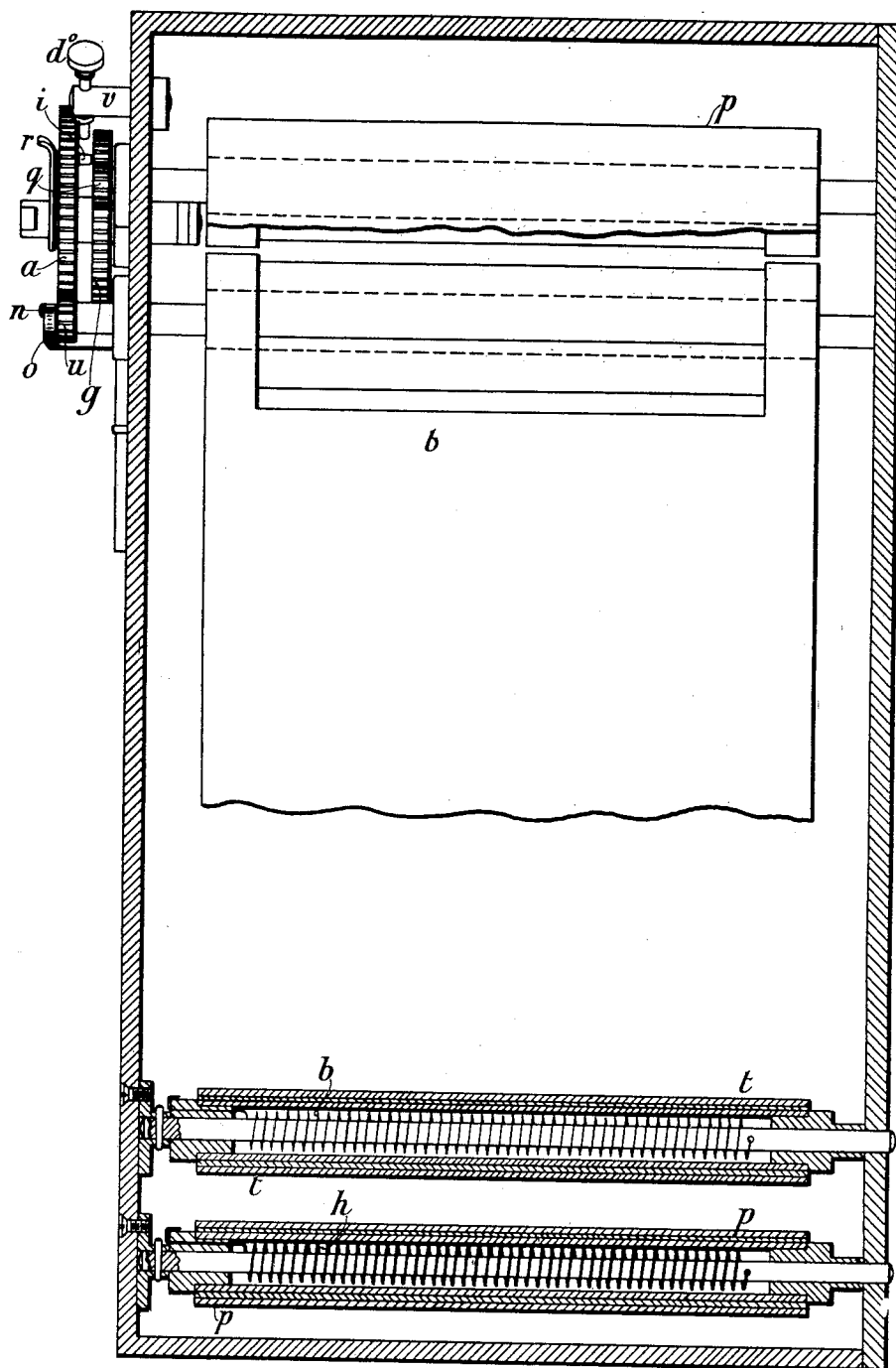


Fig. 5.

Paul Krüger
Oswald Näther

Inventor
Emil Dönitz

UNITED STATES PATENT OFFICE.

EMIL DÖNITZ, OF JENA, GERMANY, ASSIGNOR TO FIRM OF CARL ZEISS,
OF JENA, GERMANY.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 709,079, dated September 16, 1902.

Application filed August 27, 1900. Serial No. 28,124. (No model.)

To all whom it may concern:

Be it known that I, EMIL DÖNITZ, engineer, a subject of the Duke of Anhalt, residing at Carl Zeiss strasse, Jena, in the Grand Duchy of Saxe-Weimar, German Empire, have invented a new and useful Photographic Shutter, of which the following is a specification.

The invention relates to safety-shutters—that is to say, shutters which while they are being set have their opening closed, so as to prevent unintended exposure without the aid of the objective cover or other closing means; and it particularly relates to such safety-shutters in which two roller-blinds coöperate each by means of its edge opposite to the edge of the other blind to confine the width of the exposure-aperture when the shutter travels for exposure and to overlap each other when the shutter is being set.

The object of the improved double-blind shutter hereinafter described is to secure certainty of action by simplicity of the working means. With this view the most important feature of the invention is a set of stops by which the succession of the movements of both blinds is controlled.

Another feature of the improved shutter is that by altering the position of one of the said stops the width of the exposure-aperture of the shutter may be varied at will.

In the annexed drawings, Figure 1 shows a sectional elevation of a roller-blind shutter constructed according to the invention, the shutter being run down. Fig. 2 shows a similar view of the same shutter when half wound up. Fig. 3 shows a similar view of the same shutter when set ready for action. Fig. 4 shows a section through the same shutter on the line 4 4 in Fig. 3. Fig. 5 shows a section through the same shutter on the line 5 5 in Fig. 3.

The pinion *q*, belonging to the blind *p*, is engaged with a toothed wheel *g*, formed, as shown in Fig. 4, on an axle which carries also the handle and is journaled in the frame of the camera. A spring-plate *r*, rotatable on the same axle, has near its outer end and opposite to the wheel *g* a pin *i*, which projects into one of the holes *s* *s*⁸, provided in the wheel *g*. The spring-plate *r* can be lifted

upward, so as to remove the pin *i* from its hole, the handle being firmly held by the other hand, then rotated and again dropped, so as to insert the pin into another hole. A second toothed wheel *a* is loosely mounted upon the axle of wheel *g* between this wheel and the spring *r* and is in gear with the pinion *u* of the second blind *t*. The ends *m* and *k* of a circular slot cut into the wheel *a* for the pin *i* act as stops, which confine the trip of this pin. Wheel *a* carries a stud *c*, working in connection with the fixed bracket *d*. A second stud *n* on the wheel *a* is intended for the double purpose of first pushing aside when the shutter is being set the outer projection of the catch-lever *o* and then to be held between this outer and the inner projection of the said lever. A bolt *d*⁰, sliding in a fixed guide-piece *v*, when shifted endwise to a position opposite to that shown in the drawings may also instead of the bracket *d* serve to arrest wheel *a* by the stud *c*.

The operation is as follows: In order to rewind the shutter after exposure—that is to say, when the mechanism is in the position shown in Fig. 1—the handle is to be rotated in the direction indicated by an arrow in Fig. 2. The wheel *a* does not immediately participate in the movement, because the pin *i* moves away from the stop *k*, and therefore blind *p* only is at first drawn up. Immediately, however, the blind *p* has traveled a distance which is sufficient to change not only the exposure-aperture shown in Fig. 1, but even the maximum aperture, into a light-tight overlapping of both blinds the pin *i* on wheel *g* comes in contact with the stop *m*, and this causes wheel *a* to be carried along and results in the rolling up of blind *t* also. The shutter then passes the intermediate position shown in Fig. 2. Before wheel *a* has completed a revolution its stud *n* enters the space between the projections of catch *o* and is thereby arrested. The rotation of the handle is simultaneously obstructed by the pin *i* of wheel *g* meeting stop *m*. On releasing the handle the tension of blind *p*, produced by the spring *h*, causes a backward movement of wheel *g*, which terminates only when the pin *i* meets the stop *k*. Then the position

represented by Fig. 3 is reached, in which the width of the exposure-aperture is restored to that shown in Fig. 1 and whence the release of catch *o* will cause the simultaneous running down of both blinds. To prevent a variation of the aperture during exposure caused by an accidental relative dislocation of the blinds, the spring *h* is made more powerful than the spring *b*, so that the pin *i* on wheel *g*, on which latter the first-named spring acts, is positively held in contact with the stop *k* on wheel *a*. For the purpose of regulating the width of the exposure-aperture one seizes with one hand the handle, then raising with the other hand the spring-plate *r*, so as to remove the pin *i* from its hole, and rotating by means of the handle the wheel *g* one inserts the pin into, for instance, the hole *s'*. In that case the blind *p* would have been raised somewhat above the position shown in Fig. 1 and the least possible width of aperture would thereby have been produced. The hole *s* corresponds to the greatest possible width of aperture when the distance between the edges *f* and *l* is equal to the width of the opening *ee*. The relative position of the blinds given by the use of hole *s* is also serviceable for time exposures. For such an exposure the shutter regulated for full aperture is wound up as usual, and then the bolt *d*⁰ is brought from the position shown in the drawings into its inward position. Thereby the shutter after being released is stopped just when its aperture coincides with the opening *ee*, the bolt *d*⁰ then arresting the stud *c*. To complete exposure, bolt *d*⁰ is again retired, whereupon the shutter continues to run down. The action of stud *c* may be delegated to stud *n* by a corresponding change in the position of the bracket *d*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A safety-shutter consisting of two roller-blinds each wound upon a setting-roller at one end and upon an exposure-roller at the other end and having a transverse edge for forming the exposure-aperture, winding-springs connected with the exposure-rollers, pinions on the setting-rollers, toothed members engaging the pinions, one of which members is connected with a setting device and the other with a catching and releasing device, and a set of coöperative stops on the toothed members controlling the relative positions of these members, one of the two stops in contact during exposure being adjustable for the purpose of regulating the exposure-aperture.

2. A safety-shutter consisting of two roller-blinds each wound upon a setting-roller at one end and upon an exposure-roller at the other end and having a transverse edge for forming the exposure-aperture, winding-springs connected with the exposure-rollers, pinions on the setting-rollers, coaxial spur-wheels engaging the pinions, one of which spur-wheels is connected with a setting device and the other with a catching and releasing device, and a set of coöperative stops on the spur-wheels controlling the relative positions of these wheels, one of the two stops in contact during exposure being adjustable for the purpose of regulating the exposure-aperture.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EMIL DÖNITZ.

Witnesses:

CARL BRAUN,
PAUL KRÜGER.