

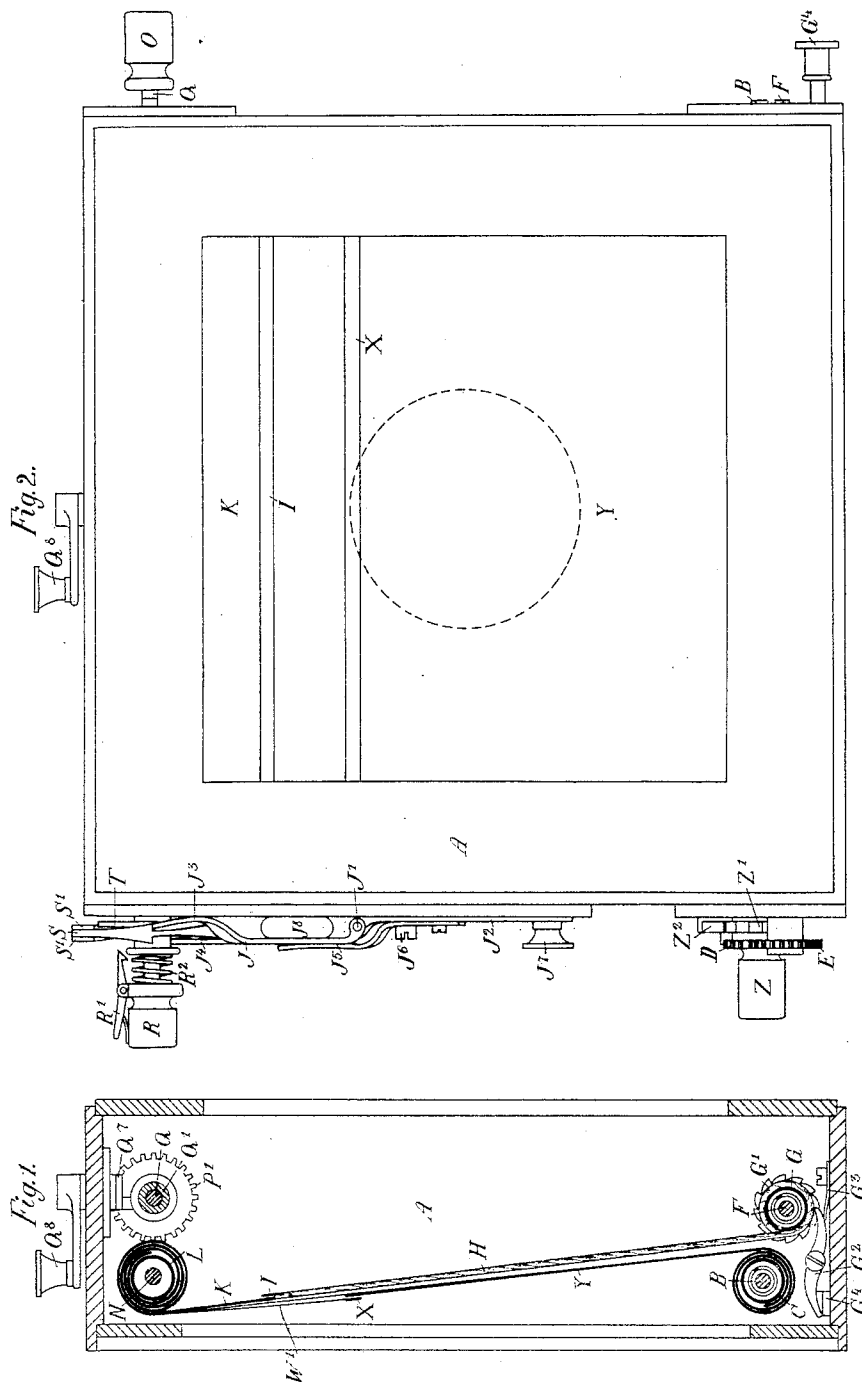
(No Model.)

3 Sheets—Sheet 1.

L. J. R. HOLST.
PHOTOGRAPHIC SHUTTER.

No. 542,764.

Patented July 16, 1895.



WITNESSES:

A. J. Birney
M. C. Massie

INVENTOR:

Lodewyk Jan Rytger Holst
By *Max Teng*
his attorney

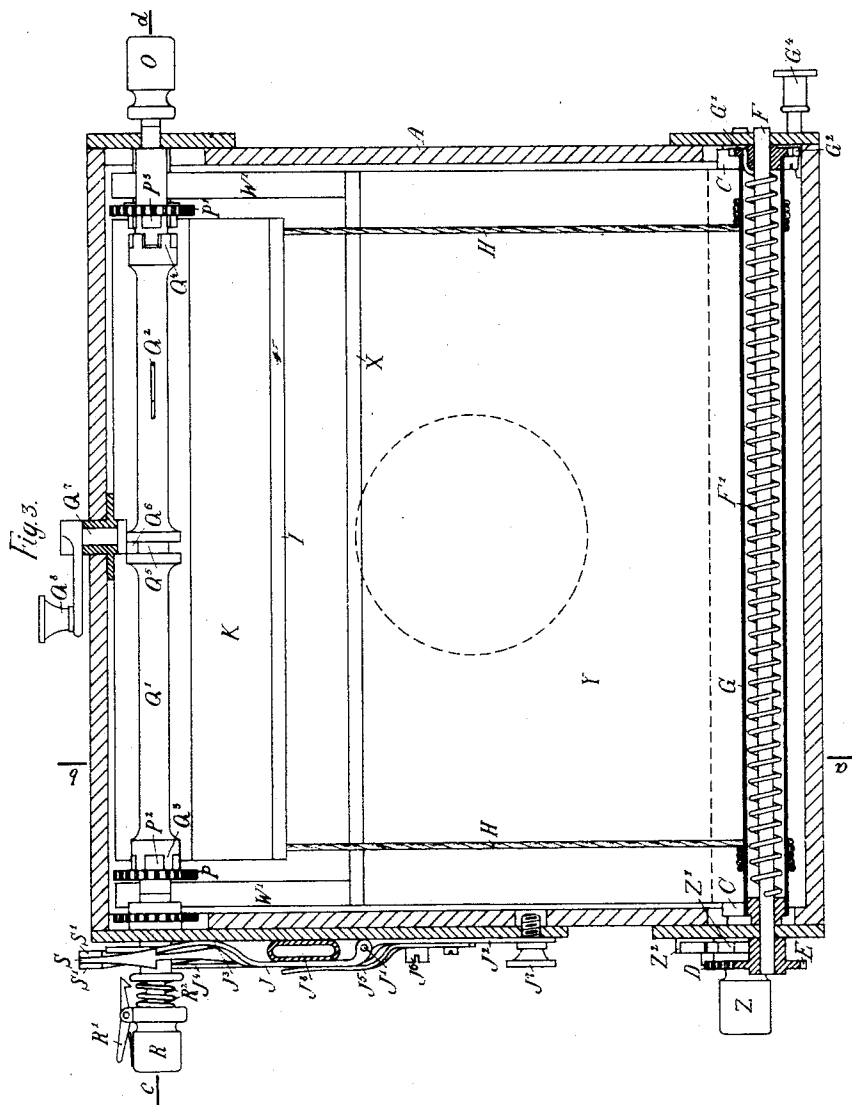
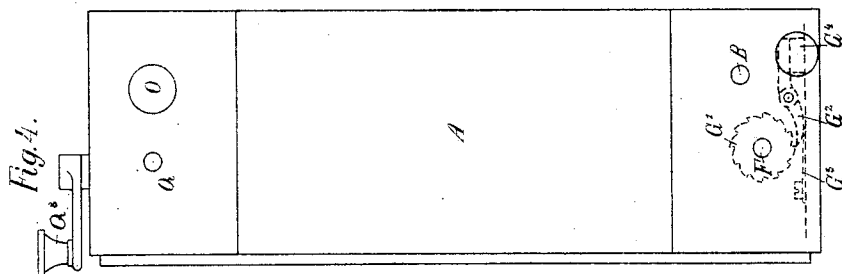
(No Model.)

3 Sheets—Sheet 2.

L. J. R. HOLST.
PHOTOGRAPHIC SHUTTER.

No. 542,764.

Patented July 16, 1895.



WITNESSES:

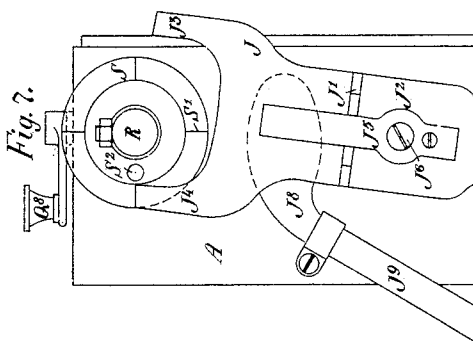
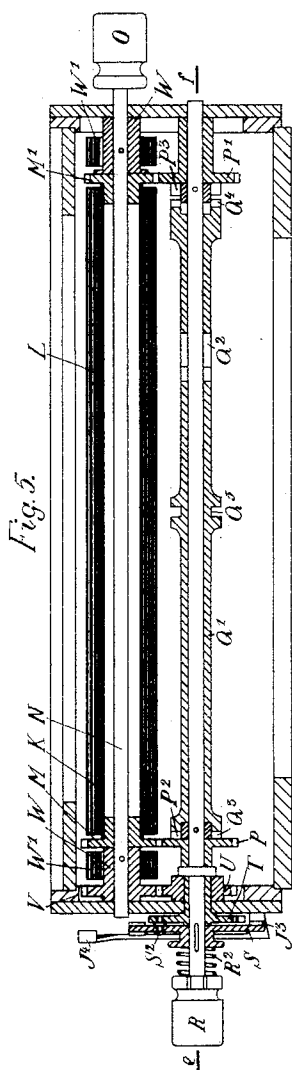
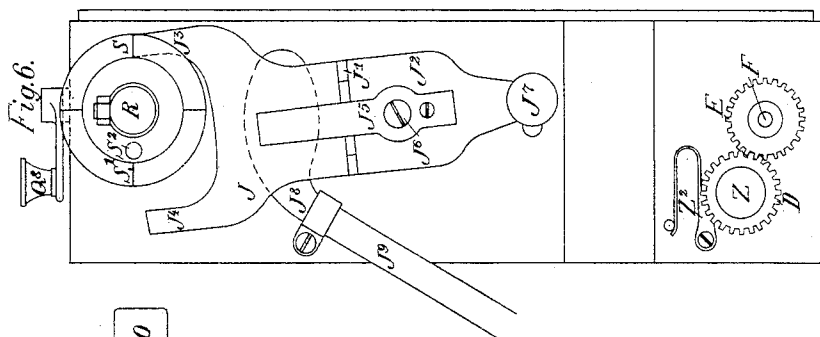
A. J. Boney
M. C. Massie.

INVENTOR.
Lodewyk Jan Rutgers Holst
by Max Burgin
His attorney

3 Sheets—Sheet 3.

No. 542,764.

Patented July 16, 1895.



WITNESSES:
A. J. Birney
M. C. Massie.

INVENTOR:
Lodewyk Jan Ruygjes Holst
by Wap Bengui
his attorney.

UNITED STATES PATENT OFFICE.

LODEWYK JAN RUTGER HOLST, OF AMSTERDAM, NETHERLANDS.

PHOTOGRAPHIC SHUTTER.

SPECIFICATION forming part of Letters Patent No. 542,764, dated July 16, 1895.

Application filed April 27, 1895. Serial No. 547,353. (No model.)

To all whom it may concern:

Be it known that I, LODEWYK JAN RUTGER HOLST, a citizen of the Kingdom of the Netherlands, residing at Amsterdam, Netherlands, have invented a new and useful Photographic-Camera Shutter, of which the following is a specification.

My invention relates to improvements in photographic-camera shutters; and the objects of my improvements are, first, to provide a curtain-shutter capable of giving both instantaneous and time exposures at pleasure without the slightest alteration at the camera; second, to arrange the curtain-shutter for easily altering the width of the slit for instantaneous exposures, and, third, to employ a device for causing the width of the said slit to either remain constant during the running off or to continually increase or decrease, respectively. I attain these objects by the mechanism illustrated in the accompanying three sheets of drawings, in which—

Figure 1 is a vertical cross-section of the apparatus, taken in the plane of the line *a b* in Fig. 3. Fig. 2 is a front view of the same. Fig. 3 is a vertical longitudinal section taken in the plane of the line *e f* in Fig. 5. Fig. 4 is a side view taken from the right hand in Fig. 2. Fig. 5 is a horizontal sectional view taken in the plane of the line *c d* in Fig. 3, and Figs. 6 and 7 are side views taken from the left hand in Fig. 2.

Similar letters refer to similar parts throughout the several views.

The curtain consists of two portions *Y* and *K*, which are made to run off either together for instantaneous exposures or one after the other for time exposures.

The frame *A* of the apparatus may be a part of the photographic camera, or it may be self-contained and arranged for inserting in the camera.

Near the bottom of the frame *A* two shafts *B* and *F*, Fig. 1, are placed, which carry the spring-barrels *C* and *G*, respectively. Outside the frame *A* two equal gear-wheels *D* and *E* are fixed to the shafts *B* and *F*, respectively, whereby these are put into gear with each other. One of these shafts—for example, the shaft *B*—carries on the side, where the gear-wheels *D* and *E* are placed, a knob *L* and a ratchet-wheel *L'*. On the

frame *A* a spring-pressed pawl *L²* is arranged, which engages with the ratchet-wheel *L'*. The spring-barrels *C* and *G* are loose on their shafts *B* and *F*, and the one ends of the inclosed spiral springs (see *F'* in Fig. 3) are fixed to the shafts, while the other ends are fixed to the barrels. Of course the spiral springs are so arranged that the two barrels *C* and *G* revolve in different senses, when the blind after setting is released. At the one barrel *G* the cords *H H* are fixed and at the other barrel *C* the first portion *Y* of the blind is secured.

Near the top of the frame *A* two shafts *N* and *Q* are placed. On the one shaft *N* are mounted fast two short drums *W W* and loose a long drum *L*. To the ends of the drum *L* are fixed the gear-wheels *M* and *M'*, Fig. 5, respectively. On the other shaft *Q* two loose gear-wheels *P* and *P'* are placed, which gear into the said gear-wheels *M* and *M'* and are provided with claws *P²* and *P³*. The two gear-wheels *P M* are alike, while the other two gear-wheels *P' M'* are different in diameter. Between the two gear-wheels *P P'* a movable sleeve *Q'*, having claws *Q³* and *Q⁴* at the ends, is put on the shaft *Q* and prevented by the key *Q²* from turning. In the top of the frame *A* a shaft *Q⁵*, carrying a crank *Q⁸* outside and an eccentric-pin *Q⁶* inside, is mounted. By turning the crank *Q⁸* from right to left the eccentric-pin *Q⁶*, engaging in the groove *Q⁵* of the sleeve *Q'*, is caused to shift the latter in the same direction, so that the claws *Q⁴* on the one side are put out of gear with those *P³* at the gear-wheel *P'*, while the claws *Q³* on the other side are put into gear with those *P²* at the gear-wheel *P*. This position of the sleeve *Q'* is shown in Figs. 3 and 5, in which case the gear-wheel *P* is coupled with the shaft *Q*. In a similar manner, by turning the crank *Q⁸* from left to right, the one gear-wheel *P* may be disconnected from the shaft *Q* and the other gear-wheel *P'* coupled to the same.

Outside the frame *A* a movable wheel *S*, having claws *S' S'* on both sides, is mounted on the shaft *Q* and is prevented by some means from turning—say by means of a feather, as shown in Fig. 5. Behind this claw-wheel *S* a loose disk *T*, having a long boss, is placed on the shaft *Q*, and inside the frame *A* a gear-wheel *U* is fastened on this boss.

To the one short drum W on the shaft N a gear-wheel V is fixed, which gears into the said gear-wheel U and has the same diameter as the latter. The disk T has several holes, into which a pin S², Figs. 6 and 7, on the claw-wheel S can engage. The two shafts N and Q have each at one end (on opposite sides) a knob O and R, respectively, for turning them with the fingers. Between the knob R and the claw-wheel S a spiral spring R² is inserted, which presses the claw-wheel S against the disk T. As soon as the pin S² of the claw-wheel S engages in one of the holes in the disk T the latter will be coupled through the claw-wheel S with the shaft Q. A catch R', pressed with a spring, is placed on the knob R for the purpose of holding the claw-wheel S on moving the latter out of gear with the disk T and keeping it off.

The first blind portion Y is secured to the barrel C below, as already explained, while the second portion K is fixed to the long drum L above. The first portion Y is stiffened at its edge by means of a bar X and is connected with the strips W' W', the ends of which are fastened on the short drums W W'. The second blind portion K is made narrower than the first one Y, so as to keep it free from the strips W' W'. Its edge is likewise stiffened by means of a bar I and is connected with the cords H H, fastened on the spring-barrel G.

On the outside of the frame A a fork J, Figs. 6 and 7, is placed, which can be turned on the bolt J⁶, and consists in the two parts J and J², linked together. The top part J is pressed by the spring J⁵ against the frame A. The fork J can be placed in either of two positions (shown in Figs. 6 and 7) and there secured by the screw J⁷. When the fork is in the position indicated by Fig. 7, its hook-shaped arm J⁴ engages with the outer claws S' of the wheel S, while when the fork is in the other position (indicated by Fig. 6) the bent arm J³ engages with the inner claws S². Between the fork J and the frame A a bulb J⁸ is placed, which, being in communication through the hose J⁹ with a hand-ball, can be inflated or blown up in a moment.

When the claw-wheel S is moved out of gear with the disk T, the shaft Q can be turned with the fingers at the knob R in either direction, whereby through the gear-wheels P M or P' M' the second blind portion K will be raised or let down. While the portion K is being raised, the tension of the spiral spring in the barrel G will be increased, so that the portion K will be immediately pulled down the moment the knob R is released.

When the shaft N is turned with the fingers at the knob O in one direction, the strips W' W' will be wound on the drums W W, so that they raise the first blind portion Y. Then the tension of the spiral spring in the barrel C will be likewise increased, so that in a similar manner as above the first blind portion Y will drop the moment the knob O is released.

The blind-shutter is put together in the

manner that, when the spiral springs in the two barrels C G are not stretched, the first blind portion Y is quite wound upon its barrel C and the second blind portion K also quite wound upon its drum L. Then the width of the slit between the edges I X of the two blind portions is the greatest and like the height of the sensitive plate. The apparatus may, however, be so put together that the width of the slit is smaller. The knob Z is now turned to wind the strips W' W' on the barrel C and to unwind the second blind portion K from its drum L and stretch it out, whereupon the blind-shutter is ready for service.

When setting the blind-shutter—i. e., raising both blind portions Y K—the barrels C G are revolved and thereby their spiral springs stretched, so that the latter are enabled to pull both blind portions down at once, when the blind is released. The knob Z may be still further turned to increase the tension of the barrel-springs and thereby to accelerate the downward motion of the blind portions. When the apparatus is not set, the barrel-springs have the same tension.

If it is desired to use the apparatus for an instantaneous exposure, but at the same time to make the slit narrower, the claw-wheel S is first put out of gear with the disk T, then the knob O turned to raise the first blind portion Y until the required width of the slit is attained, whereupon the claw-wheel S is engaged into the disk T. In this moment the spiral spring in the barrel C has, however, a greater tension than that in the other barrel G. The consequence of this is that on releasing the blind the barrel C does not stop yet, when the other barrel G has already unwound the second blind portion K from its drum L and stretched it out. The barrel C will continue its revolution and the strips W' W' on being wound thereon will move farther their drums W W, so that the long drum L, being connected with its shaft N through the gear-wheels V U and P M or P' M', will continue to revolve. Then it will again wind on the second blind portion K, but this time in the opposite sense. Thereby the sensitive plate would be again more or less exposed to the light, which of course is not intended. To prevent the second blind portion K from being again raised, the revolution of the barrel G in the opposite sense must be checked. For this reason a ratchet-wheel G' is fixed to the barrel G and a pawl G² placed on the frame A, also a spring G³ for pressing the pawl G² against the teeth of the ratchet-wheel G'. Then the barrel G will be stopped, after it has unwound the second blind portion K from its drum L.

For setting the blind-shutter the pawl G² must be first put out of gear with the ratchet-wheel G', and for this purpose a key G⁴ is employed, Fig. 4, which is pressed inward.

The blind-shutter is worked in the following manner: For an instantaneous exposure the fork J is brought into the position shown

in Fig. 7, so that the hook-shaped arm J^4 engages with the outer claws S' of the wheel S . Then the key G^4 is pressed inward and afterward the slit is made the required width, as described above, whereupon either of the two knobs O or R is turned to raise both blind portions $Y K$, so as to stretch out the first portion Y . The key G^4 is then withdrawn to release the pawl G^3 . At the proper moment the hand-ball is pressed to blow up the bulb J^8 , which in its turn moves the fork J off the frame A and disengages its arm J^4 from the claw-wheel S , so that the latter is released and both blind portions $Y K$ will drop. For the position of the movable sleeve Q' (shown in Figs. 3 and 5) and the wheels $M P$ and $U V$, having the same diameter, the width of the slit will remain constant during the running off. If, on the contrary, the shaft Q is disengaged from the gear-wheel P and coupled with the other gear-wheel P' , the width of the slit will continually increase, provided that the gear-wheel P' is smaller than the other wheel M' . If the gear-wheel P' be the larger wheel the width of the slit would continually decrease during the running off. In this case the sensitive plate will be less exposed for the sky than for the rest.

For a time exposure the fork J is brought into the other position, (shown in Fig. 6,) so that the bent arm J^3 engages with the inner claws of the wheel S , and the blind-shutter is set as described above. At the proper moment the hand-ball is pressed to blow up the bulb J^8 , which in its turn moves the fork J off the frame A and thereby shifts the claw-wheel S out of engagement with the disk T , so that the latter and through the gear-wheels $U V$ the shaft N are released. Then only the first blind portion Y will be pulled down—i. e., wound upon its barrel C —and the sensitive plate will be exposed. The catch R' , having meanwhile engaged the boss of the claw-wheel S and keeping the latter out of gear with the disk T , and the bulb J^8 being still blown up and holding the fork J constantly off the frame A , the shaft Q remains idle. When the exposure is finished the hand-ball is released, so that the air-pressure is removed from the bulb J^8 , when the spring J^5 presses the fork J again back on the frame A and disengages it from the claw-wheel S . The latter is then released and the second blind portion K will be pulled down and stretched out. The claw-wheel S on being released is still kept by the catch R' out of gear with the disk T to enable the shaft Q to turn freely.

The lengths of the blind portions $Y K$ are so determined that each of them is capable of covering the sensitive plate. The strips $W' W'$ and the cords $H H$, on the other hand, are so long as to allow of the greatest width of the slit, this being preferably equal to the height of the sensitive plate.

When it is desired, the blind-shutter described above may be simplified by omitting either the gear-wheels P and M or those P'

and M' , so as to make the slit between the two blind portions $Y K$ constant or variable, as the case may be. Then the one gear-wheel P or P' is fastened on the shaft Q , while the movable sleeve Q' and the shaft Q' , with the eccentric-pin Q^6 and the crank Q^8 , are left out.

Having fully described my invention, I declare that what I claim, and desire to secure by Letters Patent, is—

1. In a photographic-camera shutter, the combination of two separate blind portions $Y K$, with two shafts $B F$ placed on one side and working together by means of gear wheels $D E$, two loose spring barrels $C G$ on said shafts $B F$, the one C of which to wind on the first Y of said blind portions and the other G to wind on cords H and thereby to stretch out the second K of said blind portions, two shafts $N Q$ placed on the opposite side, having each a knob O and R respectively for turning them, a loose drum L on said shaft N and to wind on said second blind portion K , two fast drums W on both sides of said drum L on said shaft N and to wind on strips W' and thereby to stretch out said first blind portion Y , means for transmitting the motion of said shaft N to said drum L in such a manner that said drum L makes either the same revolution as said drums W or runs quicker or slower, whereby the slit for instantaneous exposures is made either constant or to decrease or increase respectively during running-off, a loose disk T on said shaft Q gearing with said shaft N by means of two equal gear-wheels $U V$ and having several holes, a movable claw wheel S on said shaft Q and having a pin S^2 to engage in either hole of said disk T , means for quickly releasing both said claw wheel S and said disk T , so that both blind portions $Y K$ run off for instantaneous exposures, and for quickly disengaging first said claw wheel S from said disk T to release the latter and releasing afterward said claw wheel S so that said blind portions $Y K$ run off one after the other for time exposures, substantially as set forth.

2. In a photographic-camera shutter, the combination of two separate blind portions $Y K$, with a frame A , two shafts $B F$ placed near one side of same, two loose spring barrels $C G$ on said shafts and revolving in opposite directions, the one C of said barrels to wind on the first Y of said blind portions and the other G to wind on cords H and thereby to stretch out the second K of said blind portions, means for checking said spring barrel G , after it has stretched out said second blind portion K , two equal gear wheels $D E$ fixed to said shafts $B F$ and gearing together, a knob Z fixed to one of said shafts for turning both shafts in opposite directions and thereby stretching the spiral springs inside said barrels $C G$, a ratchet wheel Z' fixed to one of said shafts $B F$ to check same, and a spring-pressed pawl Z^2 gearing thereto, substantially as set forth.

3. In a photographic-camera shutter, the

combination of two separate blind portions Y K, with two shafts B F, two loose spring barrels C G on same and revolving in opposite directions, the one C of said barrels to wind on the first Y of said blind portions and the other G to wind on cords H and thereby to stretch out the second K of said blind portions, a ratchet wheel G' fixed to said spring barrel G, a spring-pressed pawl G² adapted thereto to check said spring barrel G after it has stretched out said second blind portion K, and a key G⁴ for moving said pawl G² out of engagement with said ratchet wheel G' when setting the blind shutter, substantially as set forth.

4. In a photographic camera shutter, the combination of two separate blind portions Y K, with a frame A, two shafts N Q placed near one side of same and having each a knob O and R respectively for turning them, a loose drum L on said shaft N and to wind on the second K of said blind portions, two fast drums W on both sides of said drum L on said shaft N and to wind on strips W' and thereby to stretch out the first Y of said blind portions, two unequal gear wheels M M' fixed to the end of said drum L, two loose gear wheels P P' gearing thereto and mounted on said shaft Q and having claws P² P³, a movable sleeve Q' on said shaft Q and having at the ends claws Q³ Q⁴ capable of engaging with said claws P² P³ whereby one of said gear wheels P P' may be coupled with said shaft Q, so that for instantaneous exposures the slit is made either constant or to decrease or increase respectively during running-off, a shaft Q⁷ pivoted in said frame A, and eccentric pin Q⁶ fixed to said shaft Q⁷ an engaging in a groove at said sleeve Q', and a crank Q⁸ fixed to said shaft Q⁷ on the outside, so that by turning said crank Q⁷ the said sleeve Q' is shifted, substantially as set forth.

5. In a photographic camera shutter, the

combination of the two separate blind portions Y K, and the two shafts N Q, with a loose disk T on said shaft Q gearing with said shaft N by means of two equal gear wheels U V and having several holes, a movable claw wheel S on said shaft Q, having a pin S² to engage in either hole of said disk T, a spiral spring R² pressing said claw wheel S against said disk T, a spring-pressed catch R' for snatching said wheel S on moving the latter out of engagement with said disk T, means for quickly releasing said claw wheel S while it is engaged to said disk T, so that both shafts N Q revolve for instantaneous exposures and for quickly disengaging first said claw wheel S from said disk T to release the latter, so that said shaft N alone revolves, and releasing afterward said claw wheel S, while it is being snatched by said catch R', so that its shaft Q alone revolves for time exposures, substantially as set forth.

6. In a photographic camera shutter, the combination of the frame A, the two separate blind portions Y K, the disk T and the claw wheel S on the shaft N, having claws S' on both sides, with a fork J adapted to be placed in either of two positions and to engage with said claw wheel S either on the one or on the other side, a pocket J⁸ between said fork J and the frame wall, capable of being blown up and moving off said fork J, so as to either shift said claw wheel S out of engagement with said disk T or to release said wheel S, and a spring J⁵ to press said fork J back, so as to release said claw wheel S, after it has been shifted and snatched, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LODEWYK JAN RUTGER HOLST.

Witnesses:

AUGUST SIEGFRIED DOCER,
JOHAN CAREL ZIMMERMAN.