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No. 844,854.

PATENTED FEB. 19, 1907.

G. DIETZ.
PHOTOGRAPHIC SHUTTER.
APPLICATION FILED MAR. 21, 1906.

Fig:1.

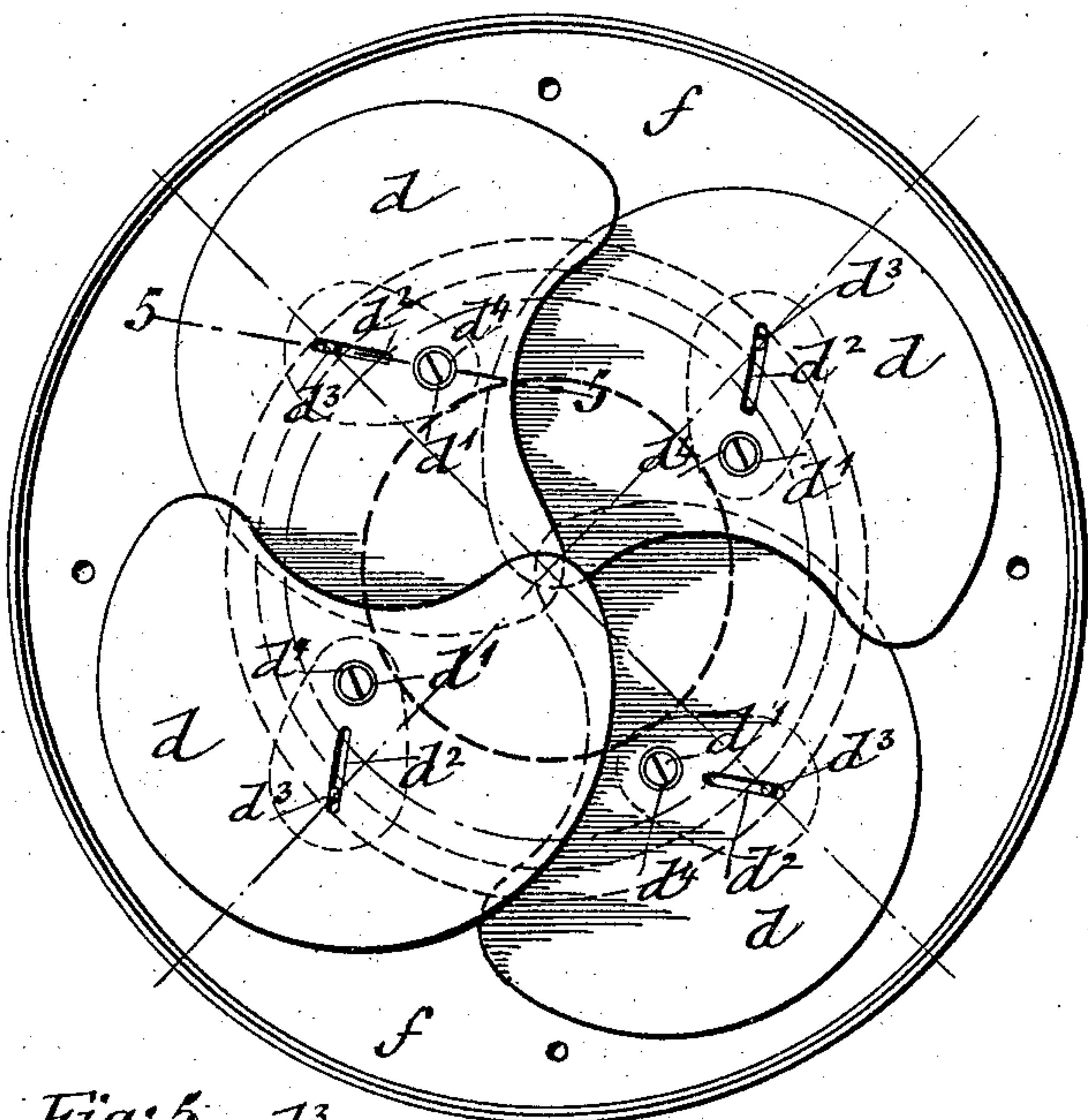


Fig: 3.

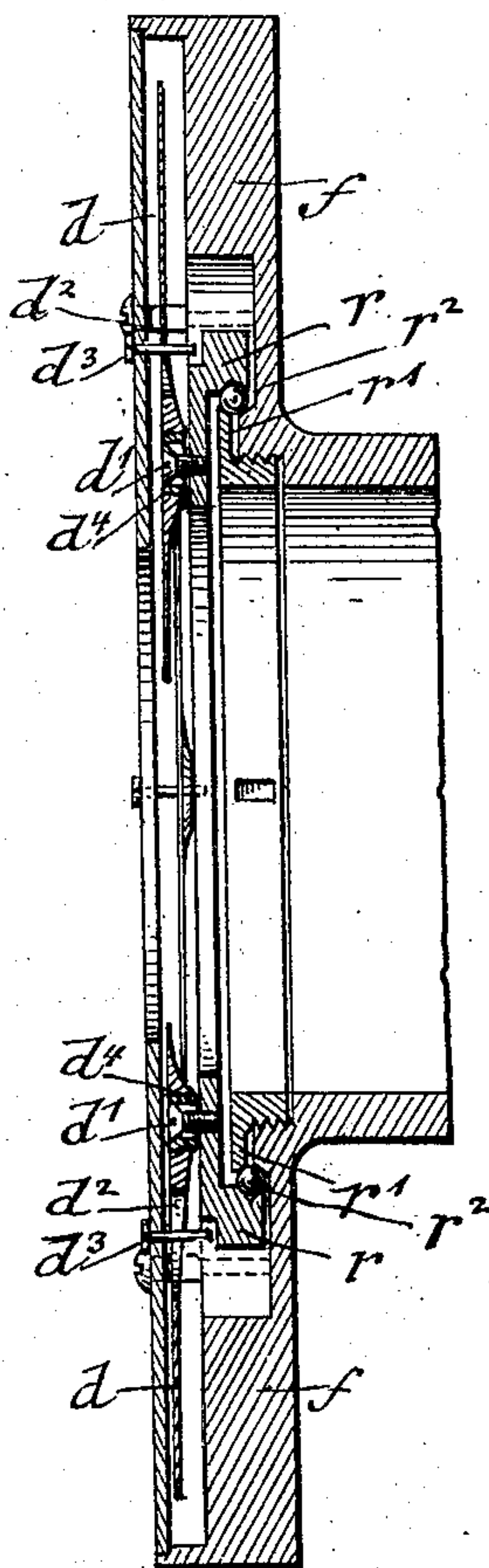


Fig. 5. A perspective view of a horizontal bar with a central pivot and two weights, labeled a , a^1 , a^2 , a^3 , a^4 , and a^x .

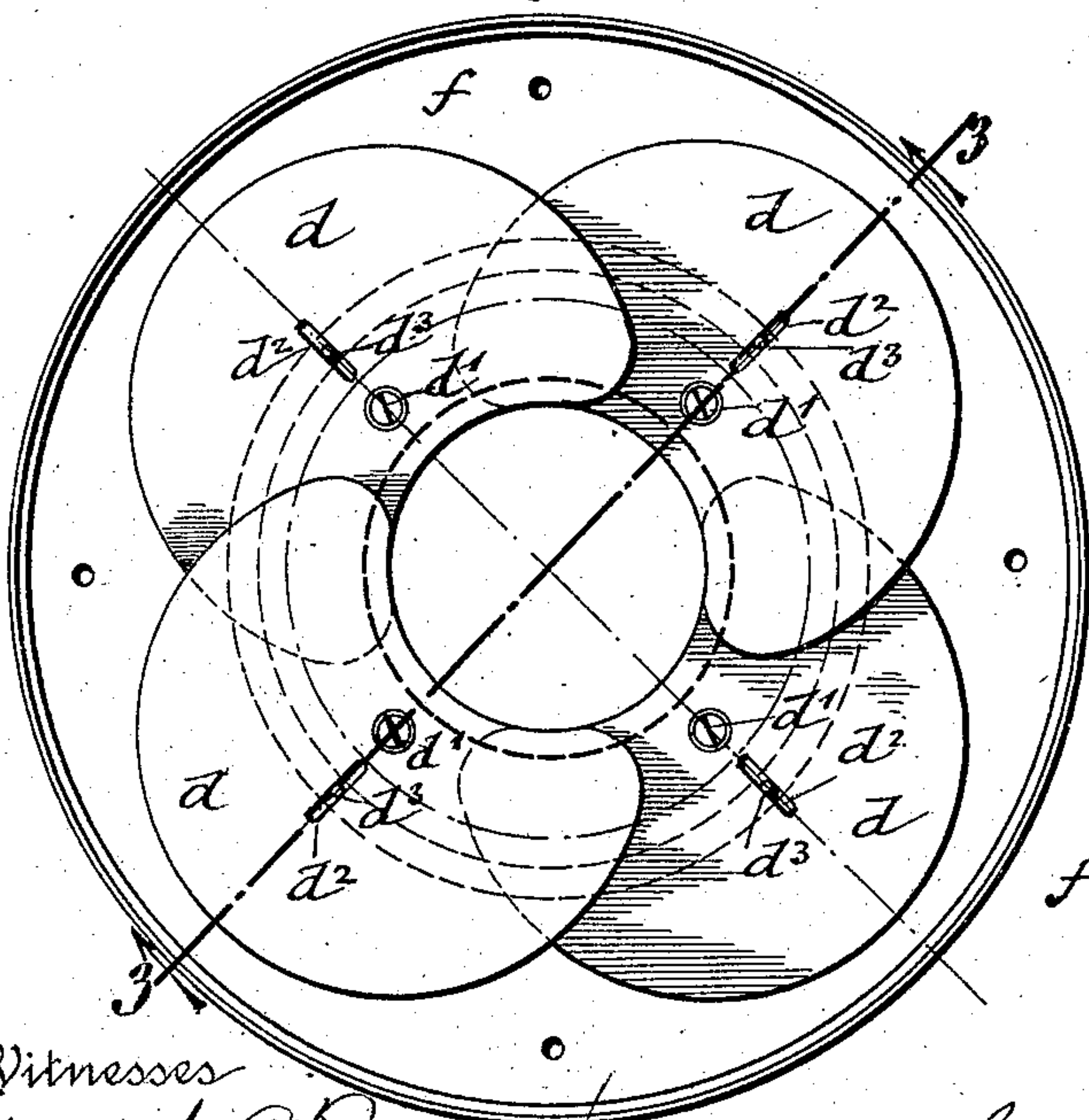
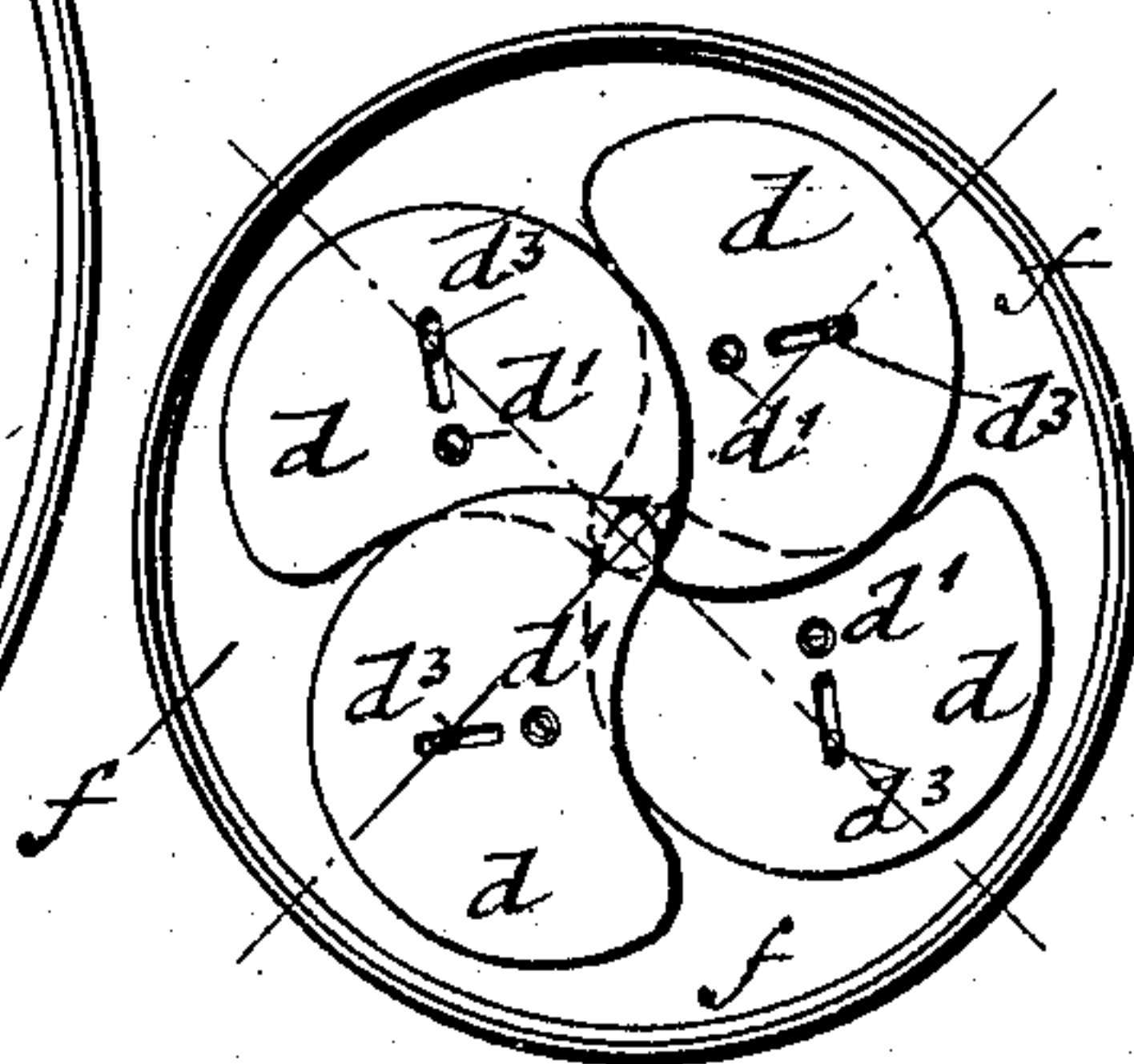


Fig: 4.



Witnesses
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UNITED STATES PATENT OFFICE.

GUSTAV DIETZ, OF YONKERS, NEW YORK.

PHOTOGRAPHIC SHUTTER.

No. 844,854.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed March 21, 1906. Serial No. 307,259.

To all whom it may concern:

Be it known that I, GUSTAV DIETZ, a citizen of the United States, residing in Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Photographic Shutters, of which the following is a specification.

This invention relates to an improved photographic shutter of that type in which a plurality of flies or wings is simultaneously operated by a suitable driving mechanism in such a manner that the making of instantaneous exposures is facilitated, an unimpeded motion of the flies produced, and flies of light yet durable construction are obtained; and for this purpose the invention consists of a photographic shutter in which a plurality of flies is pivoted to the driving mechanism and guided and turned around by means of stationary pins on the shutter-frame.

The invention consists, further, of a photographic shutter in which the plurality of flies is pivoted to and oscillated with the driving-ring in connection with stationary pins applied to the shutter-case, said pins engaging slots in the flies which are located in the center line of the flies; and the invention consists, lastly, of the construction of the flies themselves, as will be fully set forth herein-after and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a front elevation of my improved photographic shutter with the front plate removed and showing the flies in closed position. Fig. 2 is a similar elevation showing the flies in open position for time exposure. Fig. 3 is an enlarged transverse section on line 3 3, Fig. 2. Fig. 4 is a front elevation showing the flies in position after exposure at the end of their closing motion; and Fig. 5 is a vertical central section through one of the flies on line 5 5, Fig. 1.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

Referring to the drawings, *f* represents the ring-shaped case of a "between-lens shutter," and *d* the flies of the same. On a ring-shaped shoulder *r'* of the case is guided a driving-ring *r* by means of interposed anti-friction balls or rollers *r*². The driving-ring *r* is driven by any suitable mechanism, preferably the mechanism shown in the application for a United States patent heretofore filed by me on December 22, 1905, Serial No. 292,989. The driving-ring *r* is provided with

four steel pivots *d'*, which are arranged equidistantly from each other in a circle concentric with the axis of the shutter-case, said circle passing through the axes of said pivots. The pivot connection of the flies *d* with the pivots *d'* is located in the symmetrical center lines of the flies.

In line with the symmetrical center lines of the flies are arranged slots *d*², which are also located in line with the axes of the pivots *d'* and which are engaged by stationary pins *d*³, that are attached to the covering rear plate of the shutter-case. The inner curved edges of the flies form a circle when the flies are located in their intermediate position for time exposure, as shown in Fig. 2, while the outer contour of the flies is approximately that of an arc of a circle concentric with the centers of the pivots with the corners rounded off.

The flies themselves are constructed of thin sheets of hard rubber, which are reinforced by an elongated plate *d*^x, of celluloid, which increases in thickness toward the holes in which the steel pivots *d'* are located, said plates being thickest at the portion around the pivots. The pivot-opening in the flies is provided with a bushing *d*⁴, of suitable material, in which the heads of the pivots *d'* are located, the heads engaging the bushings and turning freely in the same. The reinforced flies combine great lightness with considerable durability. The fly movement caused by the driving-ring is a compound one. At the beginning of the fly movement the flies are started from their closed position by the rotation of the driving-ring and moved first in a nearly straight direction conforming to the circular movement of the driving-ring and center lines of the flies, while the second part of the continuous movement is a quick-turning movement of the flies produced by the retaining action of the stationary pins fastened to the plate of the shutter-case on the slotted portions of the flies, so as to produce while moving with the driving-ring a turning or throwing-over movement of the flies over the lens-opening, and the third part of the continuous movement of the flies, at the end of the motion of the driving-ring, is again a nearly straight-line movement in the direction of the center line of the flies caused by the guiding of the flies on the stationary pins and the motion of the driving-ring. The fly movement causes the corresponding end portion of each fly to

move from the center of the lens-opening for an exposure and then the closing of the lens-opening by bringing the other ends of the flies to the center of the lens-opening in overlapping position with each other, as shown in Fig. 4, so that the flies move from the closed starting position through an open position for exposure into the opposite closed position, the flies being returned during the next exposure to their former starting position. The advantage of this compound movement is that the force of the driving mechanism, acting by means of the driving-ring on the flies, starts the movement of the flies around the lens-opening in the direction of the center line of the flies and in line with the slots in the same, so that the contact-point of the driving force is placed on the strongest part of the flies. This starting movement permits of an acceleration of the driving movement to full speed before the flies open, while at the same time the throwing-over movement is gradually imparted to the flies and diminishes thereby the friction on the stationary pins by the resistance of which the flies are thrown over.

The throwing-over movement of the flies is of great speed and is caused by the passing of the pivoted central portions of the flies with the driving-ring over and past the center line of the lens-opening and stationary pins. Toward the end of the motion of the driving-ring the stationary pins have completed the throwing-over movement of the flies, and by stopping the driving-ring the movement of the flies is arrested, thus relieving the sides of the guide-slots of all strain. Lastly, the full leverage of the driving mechanism acts on the lower ends of the flies, which causes the uncovering and re-covering of the lens-opening, while the outer circumferential portions of the flies are moved very slowly in opposite direction to the driving-ring, which allows the full power of the spring to be used for uncovering and closing the lens-opening.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a photographic shutter, the combination with the shutter-case, of a driving-ring guided therein, flies carried by said ring, and means on said shutter-case to shift said flies successively to open and closed position during the movement of said driving-ring in one direction.

2. A photographic shutter comprising, in combination with the shutter-case, a driving-ring guided in the latter, flies pivoted to said ring, and stationary means on said shutter-case to shift said flies continuously in one direction to make the exposure when said driving-ring is moved in either direction, said flies being rotated oppositely to said driving-ring.

3. In a photographic shutter, the combination, with a shutter-case provided with a stationary guide-shoulder, of a driving-ring guided on said shoulder, said driving-ring moving in either direction during one exposure, a plurality of flies pivoted to said ring and provided with slots, and stationary pins on the shutter-case entering said slots for imparting rotary movement to said flies.

4. In a photographic shutter, the combination of a shutter-case, a driving-ring guided therein, flies pivoted to said driving-ring and provided with slots, and stationary pins on said shutter-case entering said slots and causing said flies to rotate continuously in one direction during the exposure when said driving-ring is moved in either direction.

5. In a photographic shutter, the combination, with a driving-ring, of flies pivoted thereto and provided with slots, and stationary pins entering said slots, said flies being in closed position at either end of their movement, but open during the intermediate part of such movement.

6. In a photographic shutter, a fly consisting of a thin layer of hard rubber, and a central reinforcing layer of celluloid.

7. In a photographic shutter, a fly constructed of a thin layer of hard rubber, and a central reinforcing portion of celluloid, said central portion having a pivot-opening and being made of increasing thickness toward said pivot-opening.

8. In a photographic shutter, a fly constructed of a thin layer of hard rubber and a reinforcing layer of celluloid, said reinforced portion having a pivot-opening and a slot in line with the center line of the fly and the center of the pivot-opening.

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

GUSTAV DIETZ.

Witnesses:

PAUL GOEPEL,
HENRY J. SUHRBIER.