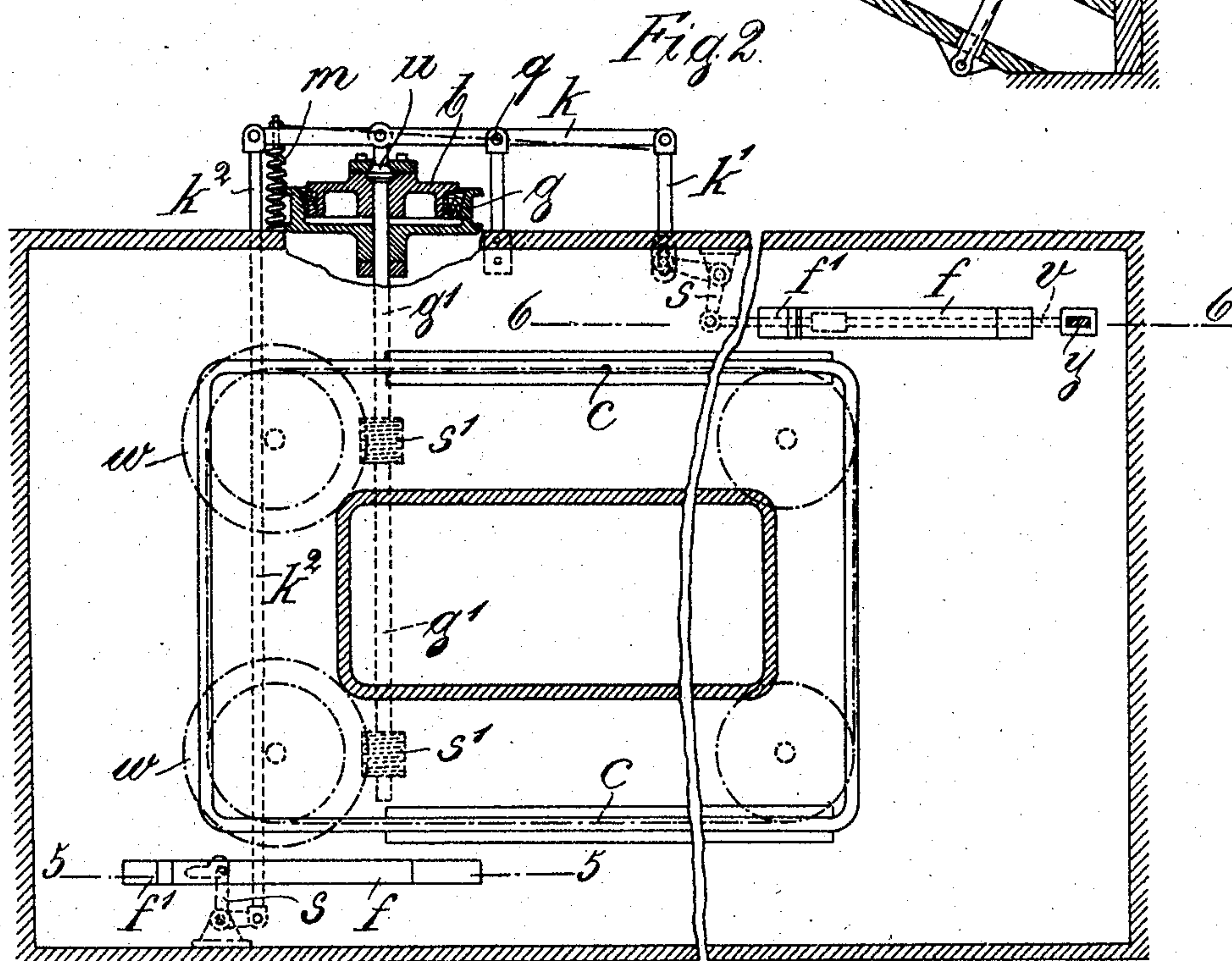
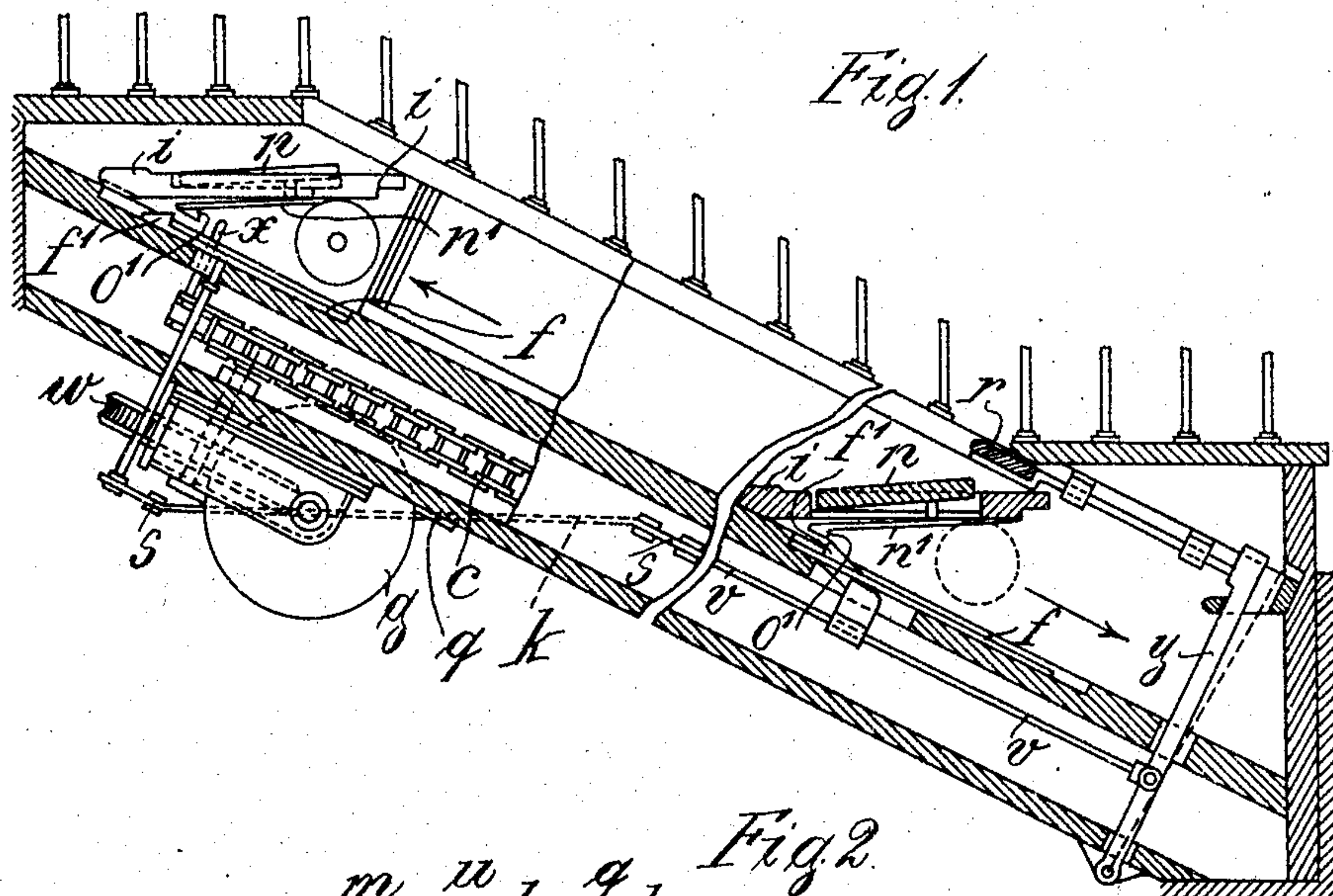


No. 781,023.

PATENTED JAN. 31, 1905.

C. G. RODECK.
TRAVELING STAIRWAY.
APPLICATION FILED MAY 2, 1903.

2 SHEETS—SHEET 1.



Witnesses:
Carl Ruff,
Emil Kaiser.

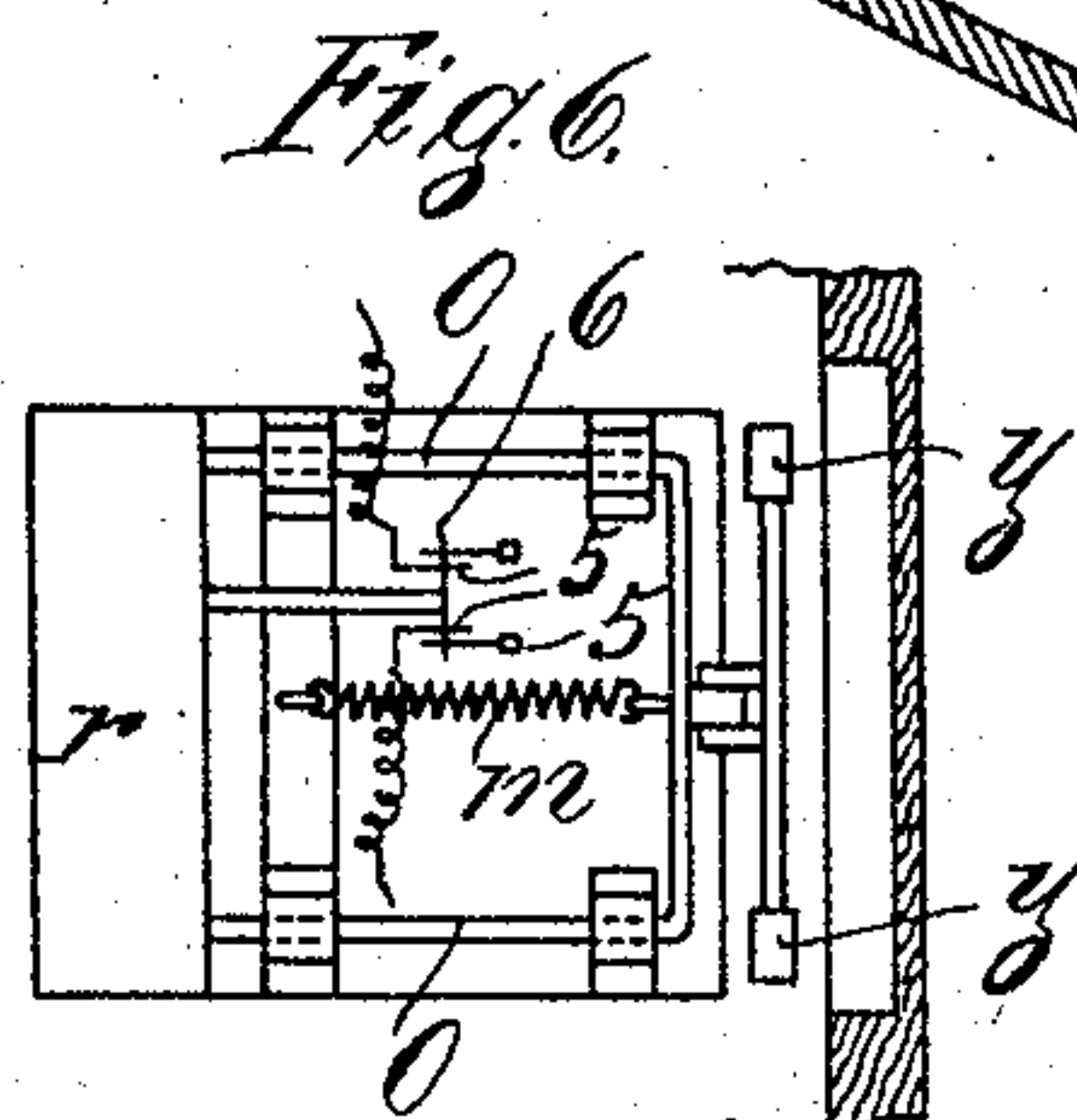
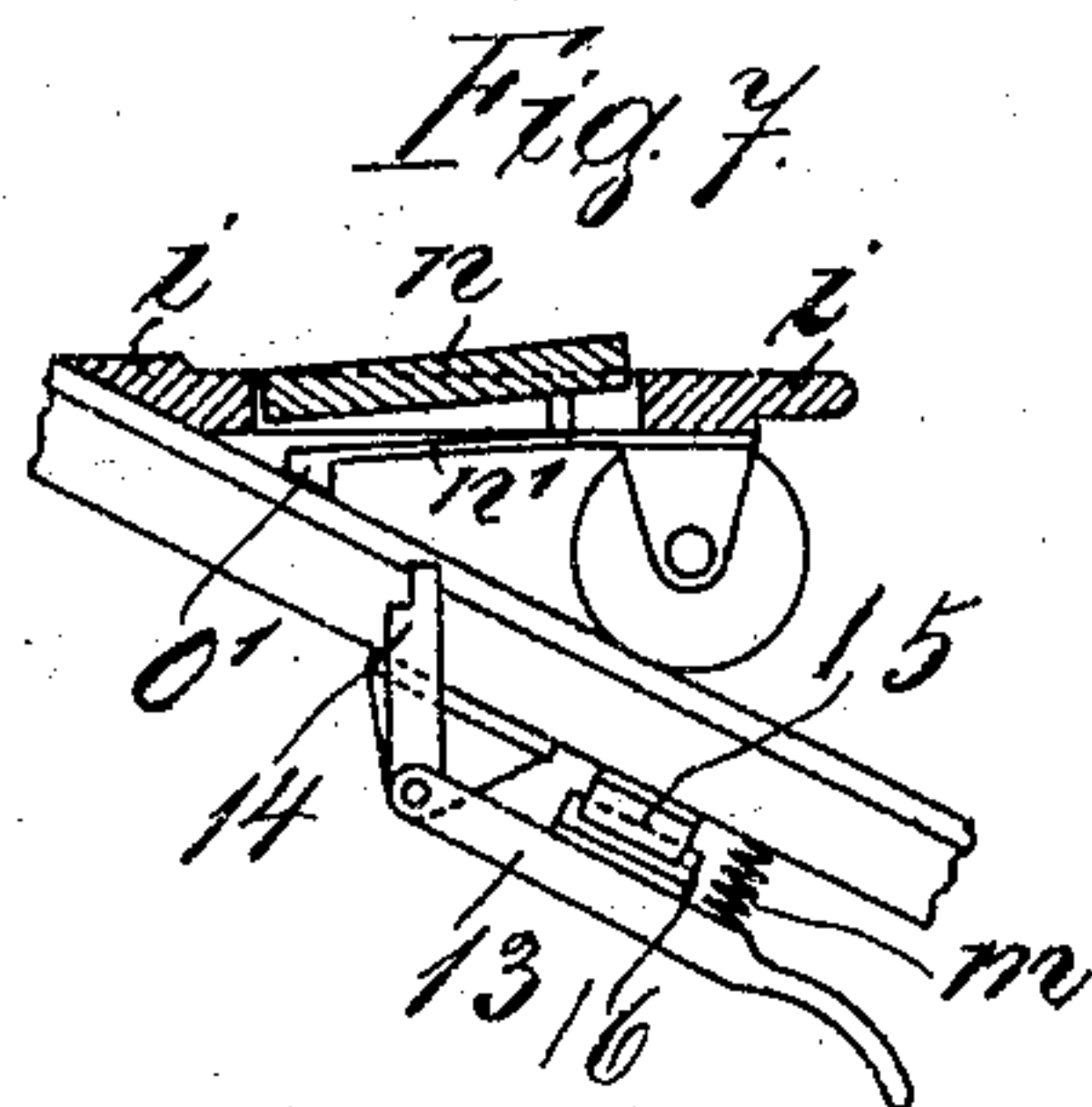
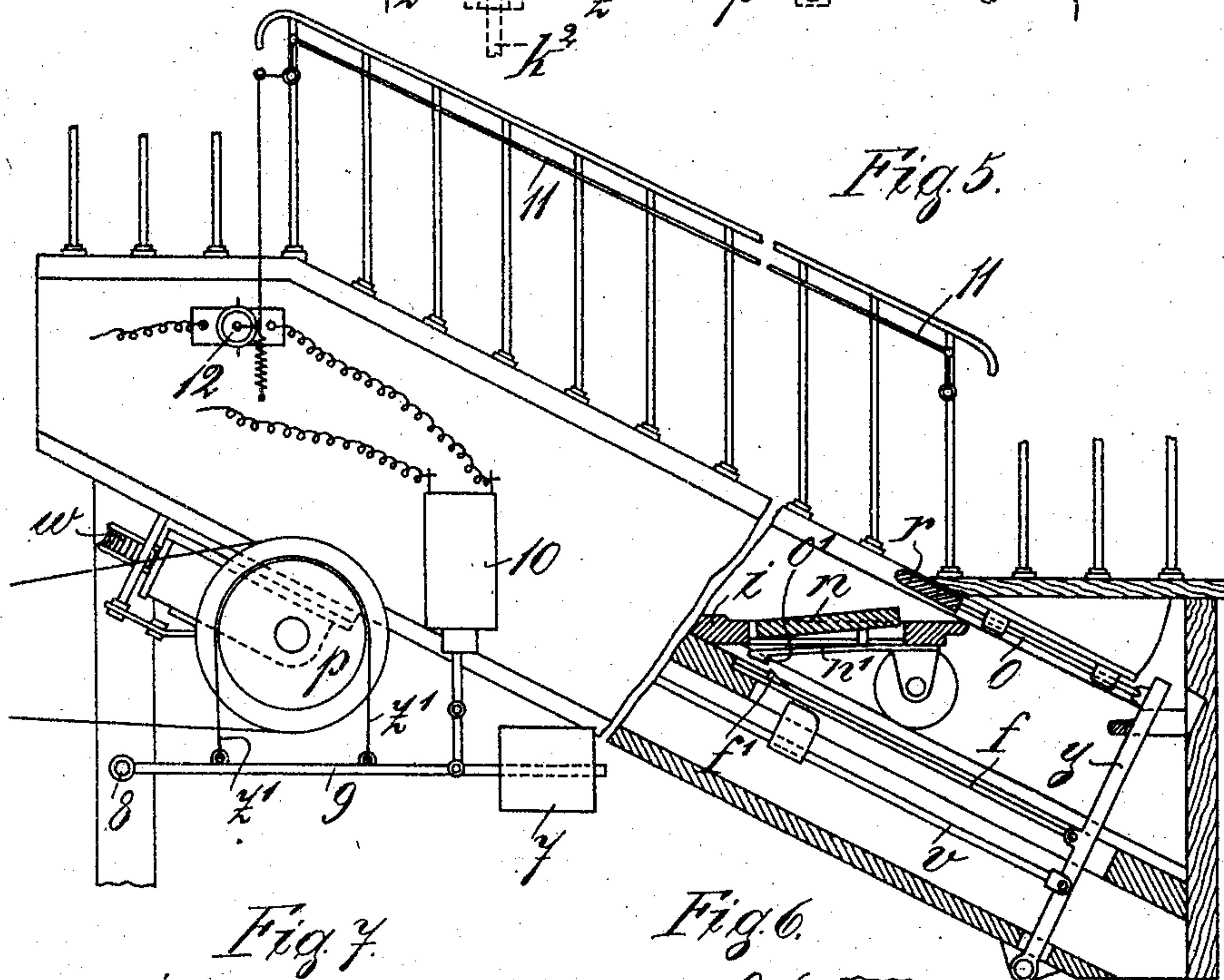
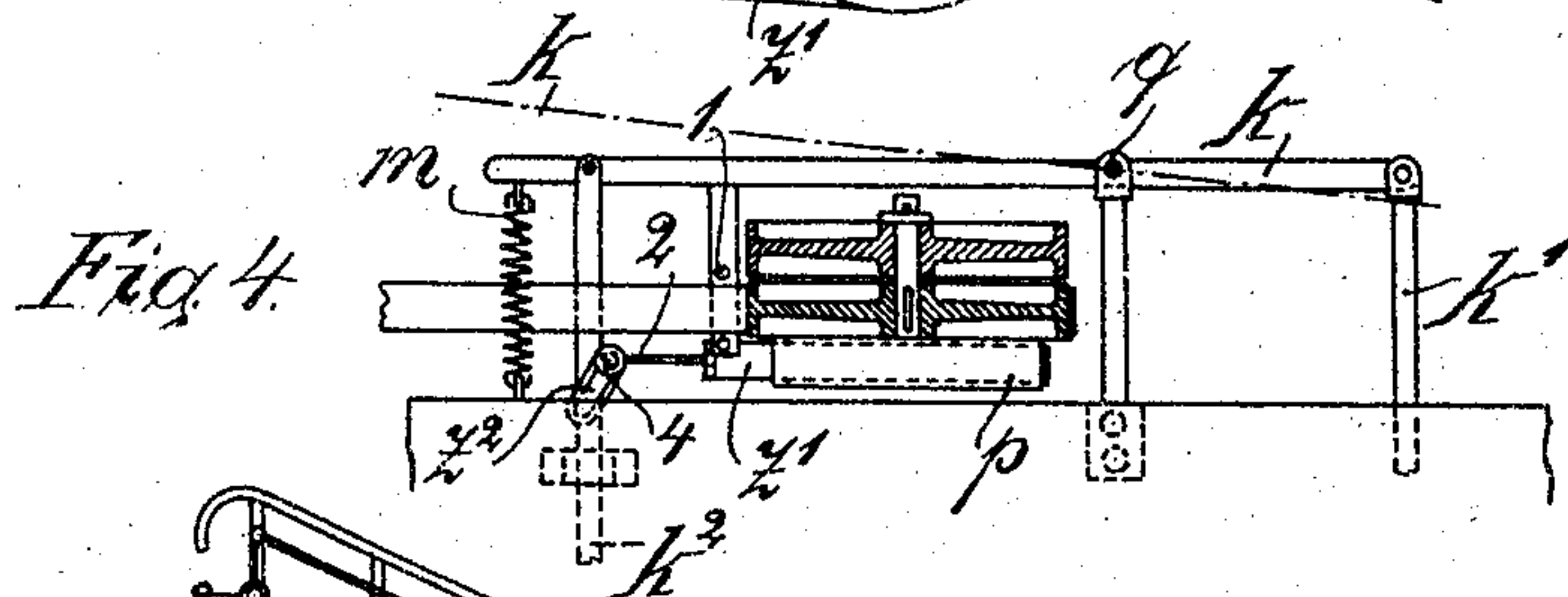
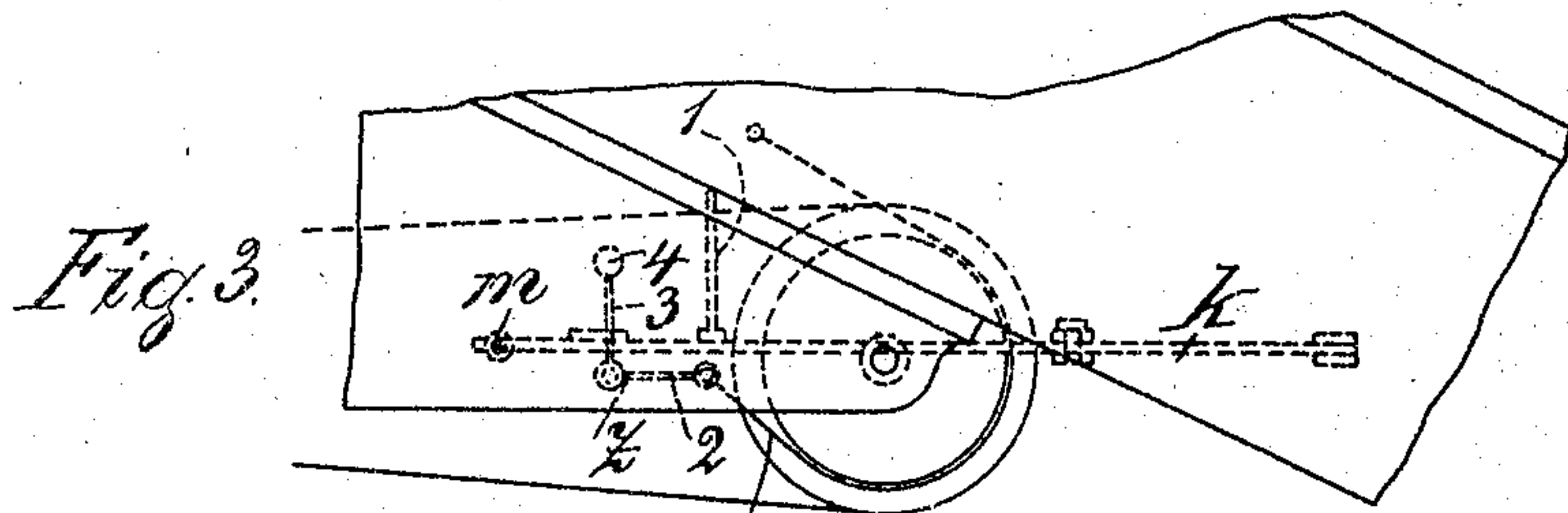
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UNITED STATES PATENT OFFICE.

CARL GEORG RODECK, OF HAMBURG, GERMANY.

TRAVELING STAIRWAY.

SPECIFICATION forming part of Letters Patent No. 781,023, dated January 31, 1905.

Application filed May 2, 1903. Serial No. 155,423.

To all whom it may concern:

Be it known that I, CARL GEORG RODECK, a subject of the German Emperor, and a resident of 22 Carolinenstrasse, Hamburg, in the German Empire, have invented certain new and useful Improvements in Traveling Stairways, of which the following is an exact specification.

My invention relates to improvements in traveling stairways, and more especially to safety devices for such stairways, by means of which safety devices the movement of the stairway is stopped as soon as the traveling person does not leave the stairway in due time at the upper or lower landing-place.

In order to attain a perfect safety, several devices for stopping the movement of the stairway are provided, which devices are arranged so that they are operated one after the other, thereby attaining that in case one device does not work the other one will begin to operate. Besides the automatic safety devices an arrangement must be provided by means of which the stairway can be stopped at will at any moment.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar characters refer to similar parts, and in which—

Figure 1 is a vertical section of the upper part of the stairway constructed according to my invention, said section being taken on line 5 5 of Fig. 2, and of the lower part of the stairway, said section being taken on line 6 6 of Fig. 2. Fig. 2 is partly a plan and partly a section of the upper and lower part of the stairway provided with automatic safety devices. Fig. 3 is a side view of a modified construction of the device for stopping the movement of the stairway. Fig. 4 is partly a plan and partly a section of the parts shown in Fig. 3. Fig. 5 shows, partly in side view and partly in a vertical section, a safety device actuated by means of an electric current. Fig. 6 is a lower view of the switch arrangement for the construction shown in Fig. 5, said switch arrangement being provided at the landing-place. Fig. 7 is partly a side view and partly a vertical section of a modified con-

struction of a safety device actuated by means of the treads of the stairway.

As to the construction of the traveling stairway proper, I beg to say that this stairway consists advantageously of one part traveling upward and another part traveling downward. Underneath both parts an endless chain *c* is situated, which by means of the pins *w* takes the single steps *i* along. At the end of each part the steps are guided horizontally to the other part, means being provided for avoiding a turning of the steps. The stairway is driven under mediation of a worm and wheel *s'w* or of suitable gears from any kind of motors. The traveling stairway is provided with safety devices which partly work automatically and partly can be operated by hand. The movement of the stairway can be stopped either by uncoupling a coupling device situated between the driving-motor and the shaft for moving the stairway or by stopping the motor itself. Advantageously braking devices are provided for quickly stopping the movement of the stairway.

If the stairway is very often used, it is advantageously constructed so that after stopping the movement of the same it begins again automatically, whereas the stairways which are not very often used are constructed so that the movement of the same must always be introduced by hand. The automatic stopping devices are provided at the upper end of the part traveling upward and at the lower end of the part traveling downward, so that in case the traveling person does not leave the stairway in due time the automatic safety devices always begin to operate. In order to obtain a perfect safety, two automatic safety devices must be provided, the second one beginning to operate only after the first one failing to operate.

In the constructions shown in Figs. 1 and 2 the movement of the stairway is stopped by uncoupling a friction-coupling. The driving-belt is situated around a pulley *g*, forming one-half of the friction-coupling and provided with a conical friction-surface. Upon the shaft *g'* a friction-wheel *b* is situated, which

friction-wheel is connected to the shaft by means of a key and a key-groove, so that it can be moved in the axial direction. The moving of the friction-wheel b can be effected by means of the double-armed lever k , pivoted at q . To both ends of this lever k drawing-rods are fixed. These drawing-rods k^1 and k^2 are connected to the devices for stopping the movement of the stairway—that is to say, they are connected to two different devices—one of which is operated by means of the steps, while the other one is fixed to the landing-place. On the right-hand side of Fig. 1, which shows a section on line 6 6 of Fig. 2, the lower end of the stairway is shown. The step i consists of a tread provided with a board n , hinged to the same. Underneath the board n a spring n' is situated, which tends to press the board n upward. The spring n' is provided at one end with a nose or stop o' . At the lower end of the stairway a slide f , provided with a nose f' , is situated. If the board n is pressed upward by means of the spring n' , the nose o' of the spring will pass over the nose f' . In case, however, the board n is pressed downward by a person standing upon the same, the nose o' pushes against the nose f' , and consequently takes the slide f along. The slide f is connected by means of a connecting-rod v and an angle-lever s to the rod k^1 , fixed to the lever k , so that by moving the slide f by the nose o' pushing against the nose f' the friction-coupling $g b$ is uncoupled and the movement of the stairway stopped. The nose f' of the slide f is situated a short distance underneath the place at which the passenger has to leave the stairway, so that in case the passenger does not leave the same in due time the stairway stops automatically. After the person now leaving the tread the board n is pressed upward by means of the spring n' , and the nose o' is freed, so that the same can pass over the nose f' . The friction-coupling $g b$ is then coupled again by means of the spiral spring m , which tends to press the friction-wheel b into the pulley g , so that the stairway moves on again. The double-armed lever k is connected to the friction-wheel b by means of a conical ring u . If the movement of the stairway is stopped, this ring u acts as a brake, whereby it is attained that the stairway stops nearly instantly. That part of the stairway which moves upward is provided with a similar arrangement, as may be seen from the left-hand part of Fig. 5. If the board n is pressed downward against the action of the spring n' , the spring n' will push against a nose f' of the slide f , so that the slide is taken along and the friction-coupling $g b$ is uncoupled by the movement of the slide f being transferred by means of the angle-lever s and the connecting-rod k^2 to the lever k . If the person leaves the step in due time, the spring n' or the nose o' of the same will not push against the noses f' of the slides f , so that the

stairway always moves on. If this device should not operate by an accident or the like, the feet of the person standing upon the tread i push against a plate r , arranged at the landing-place, as may be seen from the right-hand part of Fig. 1. In consequence hereof the plate r is pushed downward, hereby moving a lever y , pivoted in the notch-board and connected to the plate r by means of the bar o . The bar o , connected to the slide f , mentioned above, is also connected to this lever y , so that by the movement of this lever the movement of the stairway is stopped. A similar arrangement must naturally be provided at the upper landing-place of the stairway.

It will be understood that the connection of the several parts can be modified according to the different circumstances to be taken into consideration, the construction shown being only an example.

In Figs. 3 and 4 a modified construction of the device above described is shown. In this modification the movement of the stairway is stopped by shifting the driving-belt from a fixed pulley to a loose pulley and simultaneously braking the movement of the stairway. The devices for actuating the stopping mechanism are the same as in the construction shown in Figs. 1 and 2. Instead of the lever k being connected to a friction-coupling it is in this modified construction connected to a belt-shifter l . A spiral spring m tends to hold the belt-shifter l in the position in which it keeps the belt upon the fixed pulley—that is to say, in which the stairway moves. If one of the stopping devices is actuated, the belt-shifter l shifts the belt upon the loose pulley. To the fixed pulley a brake consisting of a brake-disk and a brake-band is connected. In the notch-board an angle-lever z is pivoted, one arm, 2, of which is connected to the brake-band z' , while the other arm, 3, is provided with a weight 4. The arm 3 of this angle-lever z can be moved by the lever k by means of the slot z^2 , provided in a plate fixed to the bar k^2 . If the belt is shifted upon the loose pulley of the arm 3 of the angle-lever z , it will be moved to the left-hand side. The arm 2 will consequently be moved upward, and the brake-band z' is drawn tightly around the brake-disk p . The weight 4 has the purpose of increasing the pressure of the brake-band. In consequence hereof the movement of the stairway will be stopped nearly instantly after the belt being shifted upon the loose pulley.

In the constructions shown in Figs. 1 and 2, as well as in the constructions shown in Figs. 3 and 4, a device must be provided for stopping the movement of the stairway at will and at any desired place. For this purpose ropes or rods are provided along the guard of the stairway, by means of which ropes or rods the mechanism for stopping the movement can be actuated. This can easily be effected by connecting the rope or rod by means

of a lever mechanism to the double-armed lever *z*. If the stairway shall not move continuously—that is to say, shall not automatically begin to move after the movement of the same being stopped—the connection between the three safety devices may be such as to effect the movement of the stairway by moving the rope or rod mentioned above.

If the stairway is to be moved by means of an electromotor, it is advantageous to provide devices for effecting the stopping of the movement of the stairway by interrupting the electric circuit. This can be effected by the constructions shown in Figs. 5 to 7. It will be seen from the right-hand side of Fig. 5 that the construction is broadly the same as in the modifications described above. It will be understood that the plate *r*, situated at the landing-place, is always moved backward if one of the safety devices is actuated. To this plate *r* a contact-piece 6 is fixed, as may be seen from Fig. 6, which shows a lower view of the landing-place. At the landing-place two contact-pieces 5 are provided, which contact-pieces are usually in contact with the contact-piece 6, connected to the plate *r*. The electric current for actuating the electromotor flows through the contact-pieces 5 6 5 to the motor. If now the plate *r* is moved either by the foot of the passenger pushing against the same or by actuating one of the other mechanisms for stopping the movement of the stairway, the circuit is interrupted by the contact-piece 6 leaving the contact-pieces 5 5. In order to hold the plate *r* in the position in which the circuit is closed, a spiral spring *m* is provided. Advantageously an electromagnet is inserted in the circuit, by means of which electromagnet a brake-band is actuated in that way that in case the circuit is closed the brake-band is kept loose, while as soon as the circuit is interrupted the brake-band is by means of a weight tightly drawn around the brake-disk, hereby stopping the movement of the stairway. This arrangement is shown on the left-hand side of Fig. 5. The belt transferring the movement of the motor is situated around a pulley upon the shaft of which a brake-disk *p* is situated. The brake-band *z'*, situated around the brake-disk *p*, is connected to a lever 9, pivoted at 8 and provided with a weight 7. 10 is an electromagnet which is energized by the current for driving the electromotor. If the circuit is closed—that is to say, if the stairway moves—the lever 9 is attracted by the electromagnet 10, hereby loosening the brake-band *z'*. If by actuating one of the stopping devices the circuit is interrupted, the lever 9 falls down on account of the weight 7 and draws the brake-band tightly around the brake-disk. Also in this construction a device is provided for stopping the movement of the stairway at will and at any desired place. As will be

seen in Fig. 5, a bar 11 is provided at the side of the guard, which bar 11 is connected by a suitable mechanism to an interrupter 12, so that by moving the bar 11 the circuit can be closed and interrupted. For attaining a still greater safety it is advantageous to arrange different stopping mechanisms—that is to say, a special stopping mechanism actuated by the tread *i* and another one actuated by the plate *r*—which stopping mechanisms are not connected one to the other. If, for instance, the mechanisms actuated by means of the plate *r* remains the same as described above, another mechanism actuated by means of the tread *i* may be provided, as shown, for instance, in Fig. 7. The tread is provided in the same manner as described above, with the board *n* influenced by a spring *n'*, provided with the nose *o'*. This nose *o'* is naturally pressed down if the passengers stand upon the tread *i*. If the nose *o'* is pressed down, it catches with the arm 14 of an angle-lever situated underneath the stairway, the other arm, 13, of which angle-lever is provided with a contact-piece 16, which by means of the spring *m* is held in contact with the contact-piece 15. As soon as the nose *o'* begins to move the angle-lever 13 14 the contact 15 16 is interrupted, and consequently the motor will stand still, and the brake will effect the standstill of the stairway.

It will be understood that the constructions described can be modified in different ways without changing the idea of the invention.

Having thus fully described the nature of my said invention, what I desire to secure by Letters Patent of the United States is—

1. In a traveling stairway, the combination of the stairway proper with safety devices actuated by the traveling person not leaving the tread at the landing-place in due time and a stopping device for stopping the movement of the stairway at will, substantially as described and for the purpose set forth.

2. A safety device for traveling stairways, consisting of a coupling between the driving motor and the traveling stairway, said coupling being actuated by means of two different devices, substantially as described and for the purpose set forth.

3. In a safety device for traveling stairways, the combination with a tread with the middle part hinged to the same, a spring for pressing this middle part upward, a nose fixed to this spring, a slide provided with a nose situated underneath the traveling stairway in the path of the nose of the spring, means for actuating the coupling device by the movement of said slide, a second means for actuating the coupling device, said means consisting of a movable plate situated at the landing-place and connected to the slide mentioned above, and a device for braking the movement of the stairway after uncoupling the coupling, sub-

stantially as described and for the purpose set forth.

4. In a safety device for traveling stair-
ways, driven by means of an electromotor
5 the combination of two automatically-oper-
ated interrupters situated in the circuit of the
motor, with an interrupter situated in the cir-
cuit, said interrupter being actuated by means
of a rope or bar situated at the side of the

guard, substantially as described and for the purpose set forth.

In testimony whereof I have signed my name
to this specification in the presence of two sub-
scribing witnesses.

CARL GEORG RODECK.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.