

(No Model.)

J. F. R. KNOBLOCH.
POWER CONVERTER.

No. 561,998.

Patented June 16, 1896.

Fig. 1.

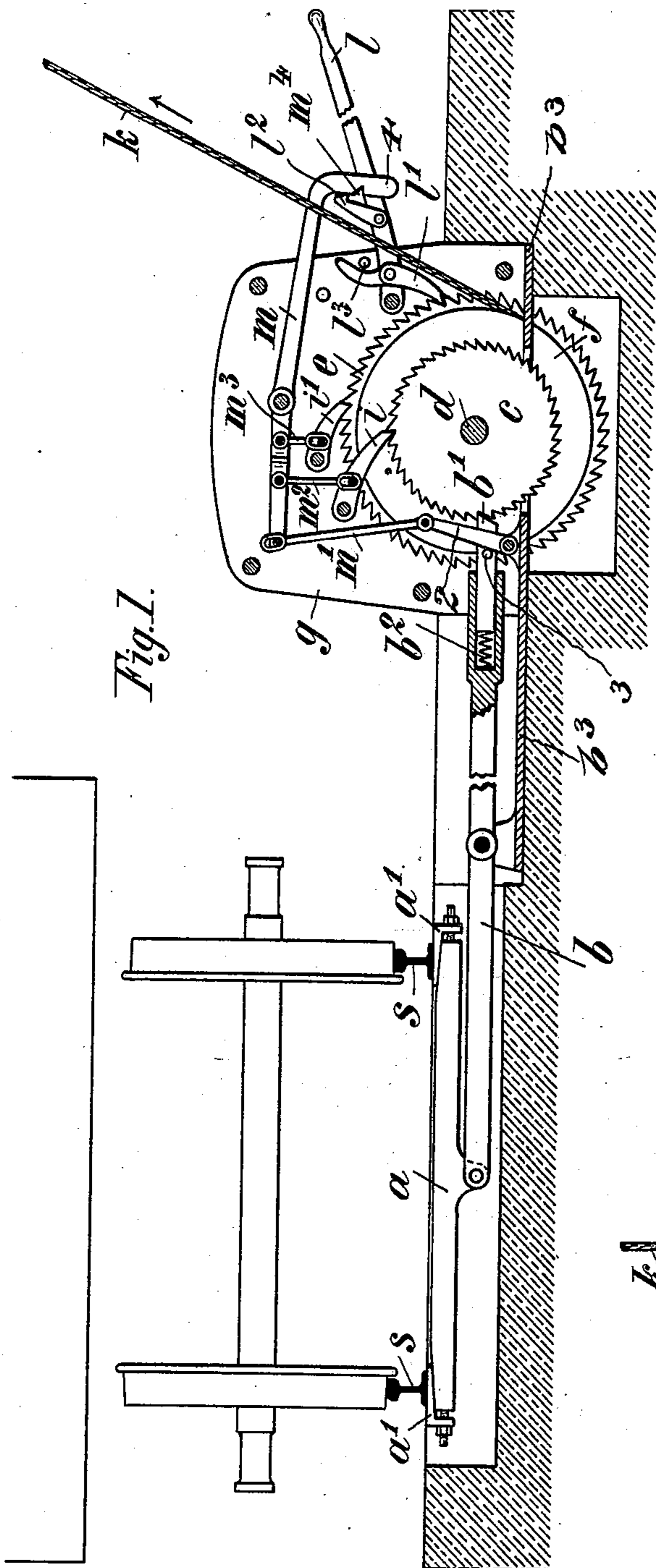


Fig. 2.

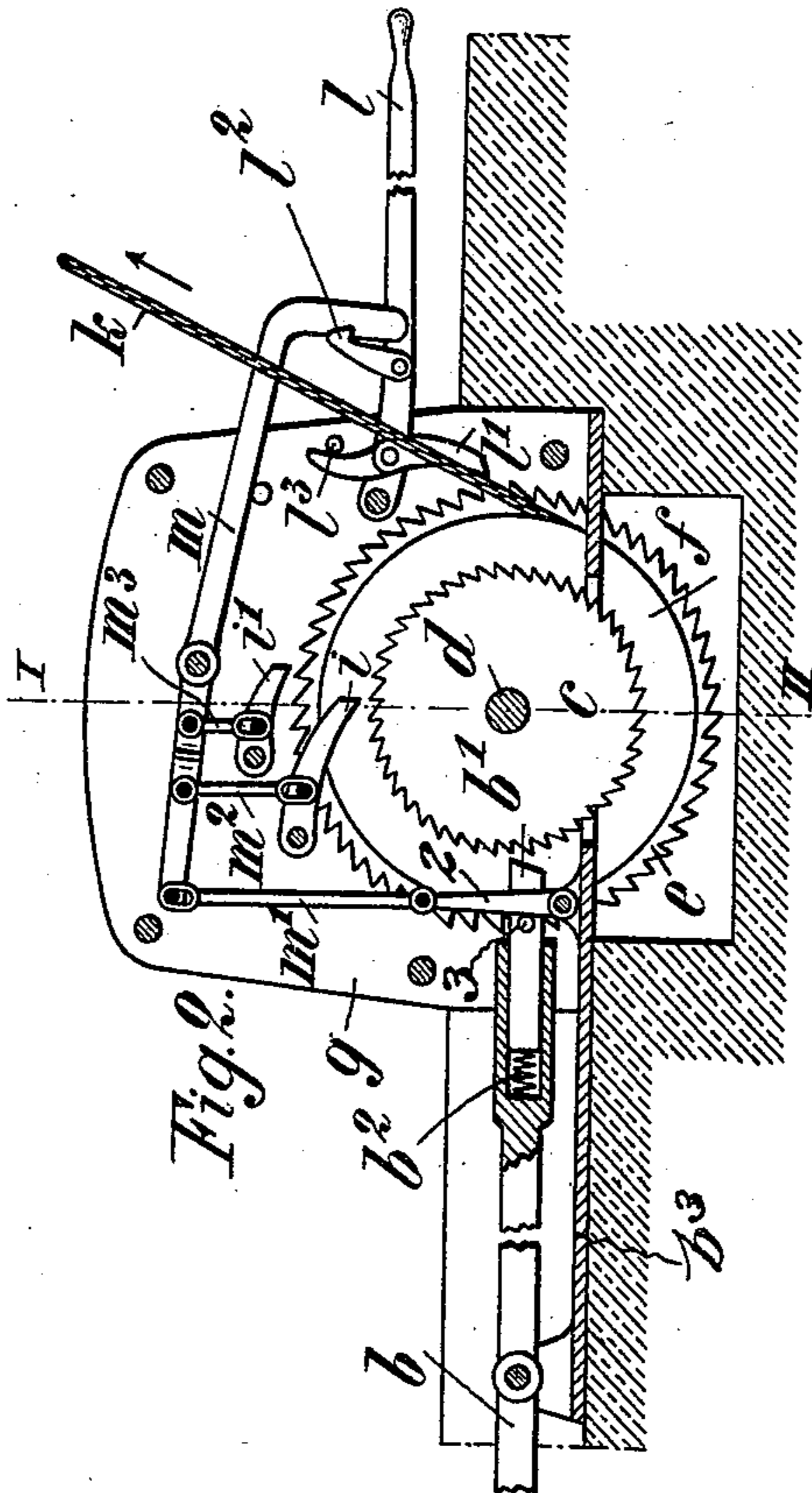
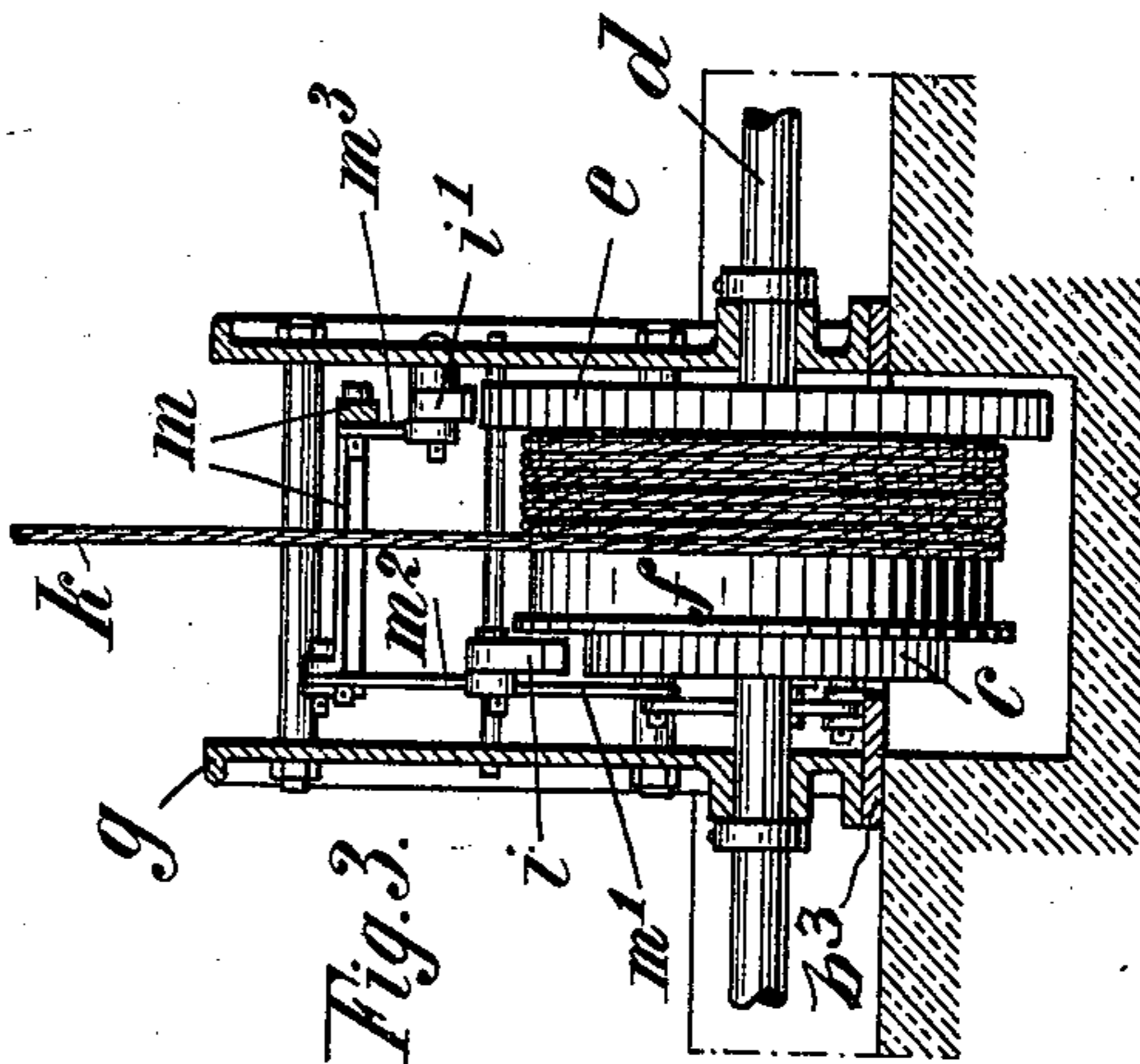


Fig. 3.



Witnesses:

B. S. Ober.

[Signature]

Inventor:

Johann Ferdinand Robert Knobloch

By *[Signature]*
Att'y

UNITED STATES PATENT OFFICE.

JOHANN FERDINAND ROBERT KNOBLOCH, OF HAMBURG, GERMANY, ASSIGNOR OF ONE-THIRD TO MAX BACHUR AND JAMES HEYN, OF SAME PLACE.

POWER-CONVERTER.

SPECIFICATION forming part of Letters Patent No. 561,998, dated June 16, 1896.

Application filed May 18, 1895. Serial No. 549,833. (No model.)

To all whom it may concern:

Be it known that I, JOHANN FERDINAND ROBERT KNOBLOCH, a subject of the German Emperor, and a resident of Hamburg, Germany, have invented certain new and useful Improvements in Power-Converters, of which the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to appliances for accumulating or storing power resulting from the vibratory movements or alternate depressions and elevations imparted to a prime mover, and it is particularly designed to convert into power the flexure of railway-rails under the weight of a train traveling over the same and to accumulate or store such power for useful purposes.

It is well known that the rails of railways are subjected to flexure or alternate depression and elevation by the weight of a train traveling over the same and that however slight these flexures may be their sum total on a line with average traffic is very considerable, and by means of my invention I am enabled to convert these pressures into power and accumulate and utilize the same.

Referring to the accompanying drawings, Figure 1 is a fragmentary side elevation, partly in section, of a power-converter embodying my invention. Fig. 2 is a like view illustrating the various parts of the converting mechanism in their relative positions when yielding up the accumulated or stored-up power, and Fig. 3 is a cross-section taken on the line I II of Fig. 2.

In the described drawings, *a* indicates a transmitting-lever pivoted centrally to the end of one of the arms of a two-armed rock-lever *b*, having its fulcrum in a bracket on the base or bed plate *b*³ of a framing in which the converting mechanism is mounted. Inasmuch as the levers *a* and *b* require but a comparatively small space, they can be located between two cross-ties, and in order to

afford a firm bearing for the rails *S* on the opposite ends of the transmitting-lever *a* I provide wedge-shaped plates *a'*, adjustable by means of nuts on extensions or journals projecting from the opposite ends of said lever, as shown in Fig. 1. In the end of the other arm of the rock-lever *b* is formed a socket in which slides freely an actuating-pawl *b'*, held normally in engagement with the teeth of a ratchet-wheel *c* by a coil-spring *b*², interposed between the inner face of such socket and between the inner end of pawl *b'*.

The converting mechanism, as heretofore stated, is mounted in a suitable framing comprising slide-plates *g* and the aforementioned base-plate *b*³. This mechanism consists of the aforesaid ratchet-wheel *c*, adapted to be rotated step by step by the pawl *b'*, said ratchet-wheel being mounted on a spindle *d*, that has its bearing in the side plates *g* of the framing. The said spindle *d* also carries a second ratchet-wheel *e* and a barrel or drum *f*, suitable check-pawls *i* and *i'* being provided that prevent the backward rotation of said ratchet-wheels *c* and *e*.

In order that the power exerted upon the rails *S* by the load moving over the same may be accumulated or stored, the rotation of the barrel or drum *f* under the action of the pawl *b'* on its ratchet-wheel *c* must be antagonized by a resistance so arranged as to be capable of yielding up the accumulated or stored power. This resistance may consist of a spring arranged within the barrel *f* to antagonize its rotation under the action of the pawl *b'*, said spring to be wound up by the power exerted upon the rails *S* to flex the same, or said resistance may consist, as shown, of a rope *k*, adapted to wind on the drum or barrel *f*, and the winding of which is antagonized by a weight at its free end. In either case the resistance to the rotation of the ratchet-wheels *c* and *e* in one direction must be proportioned relatively to the power exerted upon the rails *S* to flex the same as to be overcome by such power, as will be readily understood. Furthermore, in order to make the accumulated or stored power available, means must be provided to throw the actuat-

ing-pawl p , as well as the check-pawls i and i' , out of engagement with their respective ratchets. To these ends I provide a hand-lever l , fulcrumed to one of the side plates g of the framing, said hand-lever provided with a two-armed pawl l' , adapted to engage the ratchet-wheel e , so that when said lever is depressed the wheel e will be turned forward or in the direction in which it is moved by the pawl b' , thereby relieving the pawls i and i' of the pressure exerted thereon through their respective ratchet-wheels c and e by the resistance, the tendency of which is to revolve said wheels in a direction opposite to their directions of rotation under the action of pawl b' .

The lever l has pivoted thereon a catch or detent l^2 , adapted to engage a notch m^4 in the downwardly-bent end 4 of a two-armed lever m , fulcrumed to one of the side plates g of the framing, said lever having a laterally-projecting arm near its left-hand end, Fig. 3, to which is pivoted one end of a link m^2 , the other end of said link being slotted for the reception of a pin projecting from the side of the check-pawl i , the check-pawl i' being similarly linked to the left-hand arm of said lever by a link m^3 . At the end of its left-hand arm the lever m has a pin projecting into a longitudinal slot at the upper end of a connecting-rod m' , whose lower end is pivoted to the free end of a rock-lever 2, having its fulcrum on the base-plate b^3 of the framing, said lever being normally in contact with a pin 3, projecting from the side of the actuating-pawl b' , Figs. 1 and 2. From one of the side plates g of the framing projects a pin l^3 , that lies in the path of the upper arm of the two-armed pawl l' on lever l .

During the accumulation or storage of power the catch or detent l^2 is out of engagement with the notch m^4 on the arm 4 of lever m , while the lower arm of pawl l' is in engagement with the teeth of ratchet e , Fig. 1, and as said ratchet revolves toward the pawl the latter rides freely over the ratchet-teeth, the actuating-pawl b' and the check-pawls i and i' being also in engagement with their respective ratchet-wheels. When, however, the lever l is depressed, the lower arm of pawl l' turns the ratchet-wheels e c and drum f forward or toward the right, thereby relieving the check-pawls i and i' of strain or pressure and causing the catch or detent l^2 to hook into the notch m^4 of lever l . Upon a further depression of said lever l the upper arm of pawl l' strikes the pin l^3 , which throws said upper arm toward the left and disengages the lower arm of the pawl from the ratchet-wheel e , and at the same time the lever m lifts the check-pawls out of the teeth of the ratchet-wheels c and e and throws the lever 2 also toward the left, thereby moving the actuating-pawl b' out of engagement with its ratchet-wheel c , leaving the converting mechanism free to revolve backward or toward the left under the action of the spring

or weight, thereby revolving spindle d , whose rotary motion may be transmitted to any suitable apparatus.

It is obvious that when a train passes over the rails S and the latter are deflected or bent downwardly the pressure will be transmitted to both ends of the lever a . Hence said pressure will be uniformly distributed over the length of said lever and transmitted thereby to the rock-lever b and through the pawl b' thereof to the ratchet-wheel c , rotating the latter a distance commensurate with or proportionate to the amplitude of the track deflection, and as the track again assumes its normal position thereby lifting the left-hand end of the lever b , its pawl riding over the teeth of ratchet-wheel c , owing to the fact that said pawl is held in engagement with the ratchet-teeth by a yielding pressure. Inasmuch as the lever a is pivoted centrally to the rock-lever b , said lever a is adapted to swing on its pivot under unequally-distributed loads, and as the said lever b is a rocking lever a yielding or flexible support is provided for the lever a and rails S .

By means of the wedge-shaped plates I not only provide a bearing for the rails of the desired superficial area, but am enabled to take up wear between the parts.

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

1. The combination with the track-rails, a horizontal two-armed rock-lever, a transmitting-lever provided with bearings for the aforesaid rails, said lever pivoted centrally to one of the arms of the rock-lever, and a spring-actuated pawl on the other arm of said rock-lever, of a shaft, a drum and ratchet-wheel secured rigidly to said shaft, said ratchet-wheel normally engaged by the aforementioned pawl, a yielding resistance antagonizing the rotation of the drum, and a check-pawl for checking the ratchet against backward rotation, for the purpose set forth.

2. The combination with a horizontal, two-armed rock-lever, a vertically-reciprocating prime mover transmitting mechanism for transmitting the reciprocations of the prime mover to one of the arms of said lever, an actuating-pawl at the other end of such lever and a yielding connection between said pawl and lever, a shaft, a drum and two ratchet-wheels rigidly secured to the shaft, one of said ratchet-wheels normally engaged by the aforementioned pawl, a yielding resistance antagonizing the rotation of the drum, and check-pawls for locking the ratchets against rotation under the stress of the resistance and a releasing mechanism, operating to disengage the actuating and check pawls from their respective ratchets, for the purpose set forth.

3. The combination with the rock-lever b and its spring-actuated pawl b' , the ratchet-wheels c and e and the check-pawls i and i' , of a hand-operated lever connected with the

check-pawls, an auxiliary lever in normal engagement with the actuating-pawl, said auxiliary lever actuated by the hand-operated lever to move the actuating-pawl out of engagement with its ratchet-wheel and simultaneously lift the check-pawls out of engagement with their ratchet-wheels, for the purpose set forth.

4. The combination with the rock-lever *b*, the spring-actuated pawl *b'* provided with a laterally-projecting pin 3, the ratchet-wheels *c* and *e*, the check-pawls *i* and *i'*, the lever 2, normally in contact with the aforesaid pin 3, the lever *m* and link connections between said lever, the check-pawls *i* and *i'* and the lever 2, of a hand-lever *l* provided with a detent *l'* adapted to engage a notch in one arm of the lever *m* and with a pawl *l'* adapted to engage the ratchet-wheel *e* and means for automatically disengaging the last-named pawl from its ratchet when the hand-lever is depressed, substantially as and for the purpose set forth.

5. The combination with a two-armed rock-lever, a reciprocating prime mover adapted

to rock said lever, a revoluble shaft, a drum and two ratchet-wheels of different diameters secured to said shaft, one of said ratchets normally engaged by the aforementioned pawl, check-pawls for locking the ratchets against backward rotation and a yielding resistance antagonizing the rotation of the drum, of releasing mechanism comprising a lever, intermediate connections between said lever and the actuating and check pawls, operating to disengage the same from their respective ratchets, when said lever is moved in the proper direction and means for relieving the pawls of the strain thereon due to the yielding resistance, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 4th day of May, 1895.

JOHANN FERDINAND ROBERT KNOBLOCH.

Witnesses:

ALEXANDER SPECHT,
HEINRICH BETHGE.