No. 717,182. Patented Dec. 30, 1902.

J. FISCHER & H. SCHNEIDER.

SELF ACTING BRAKE.

(Application filed Jan. 15, 1902.)

(No Model.) 3 Sheets—Sheet 1.

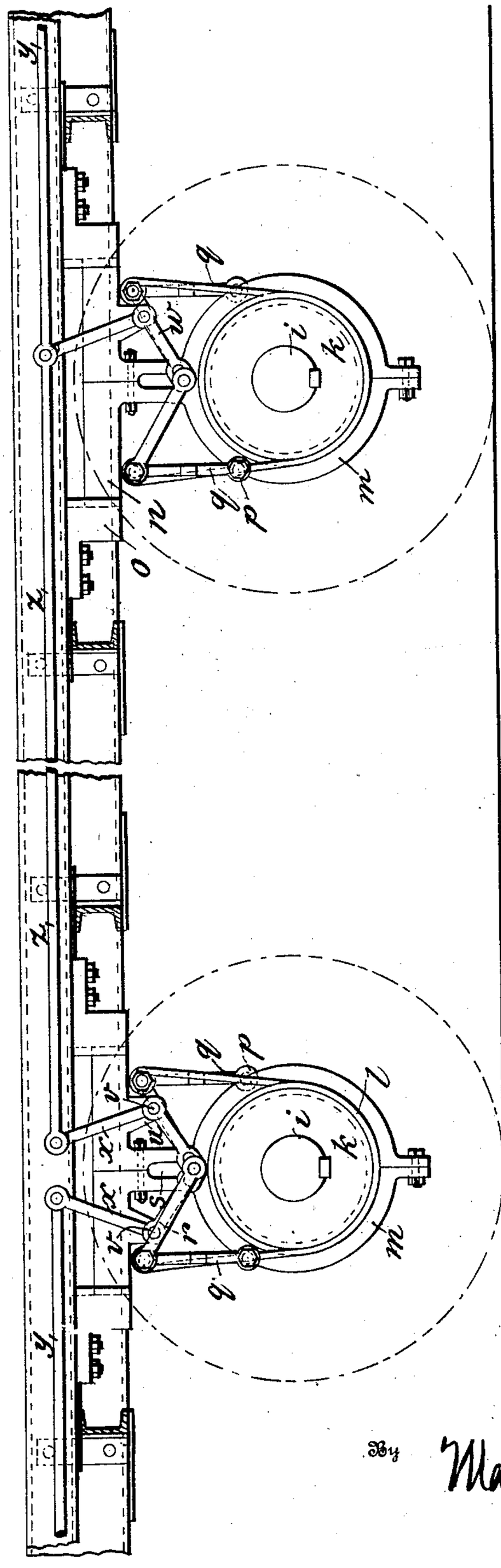

Fig. 2.

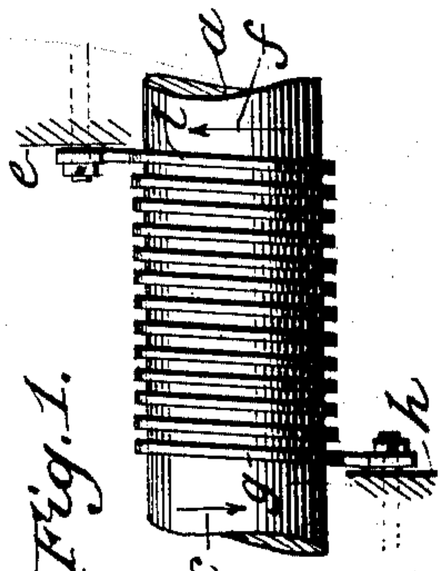

Fig. 1.

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Fig. 3.

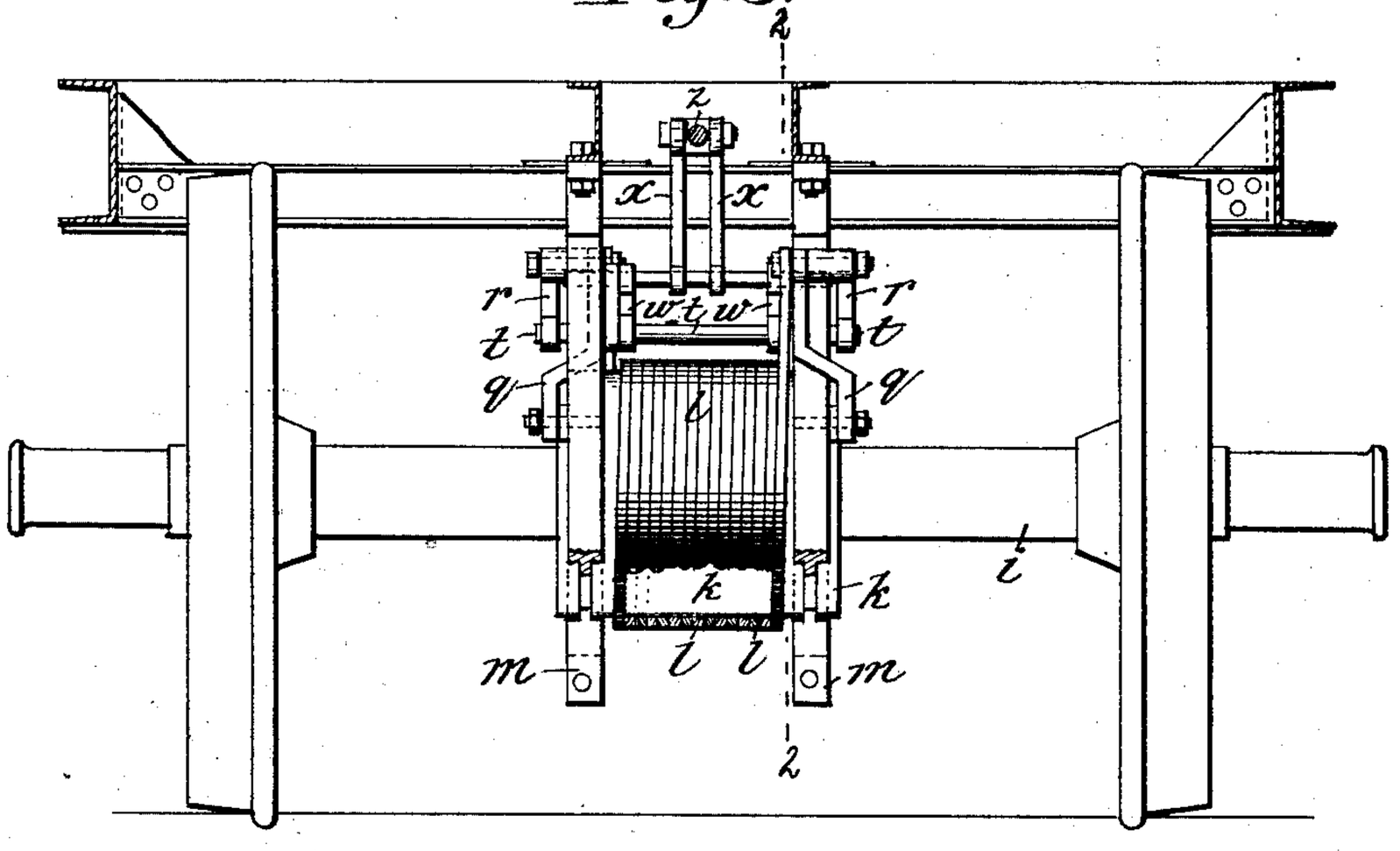
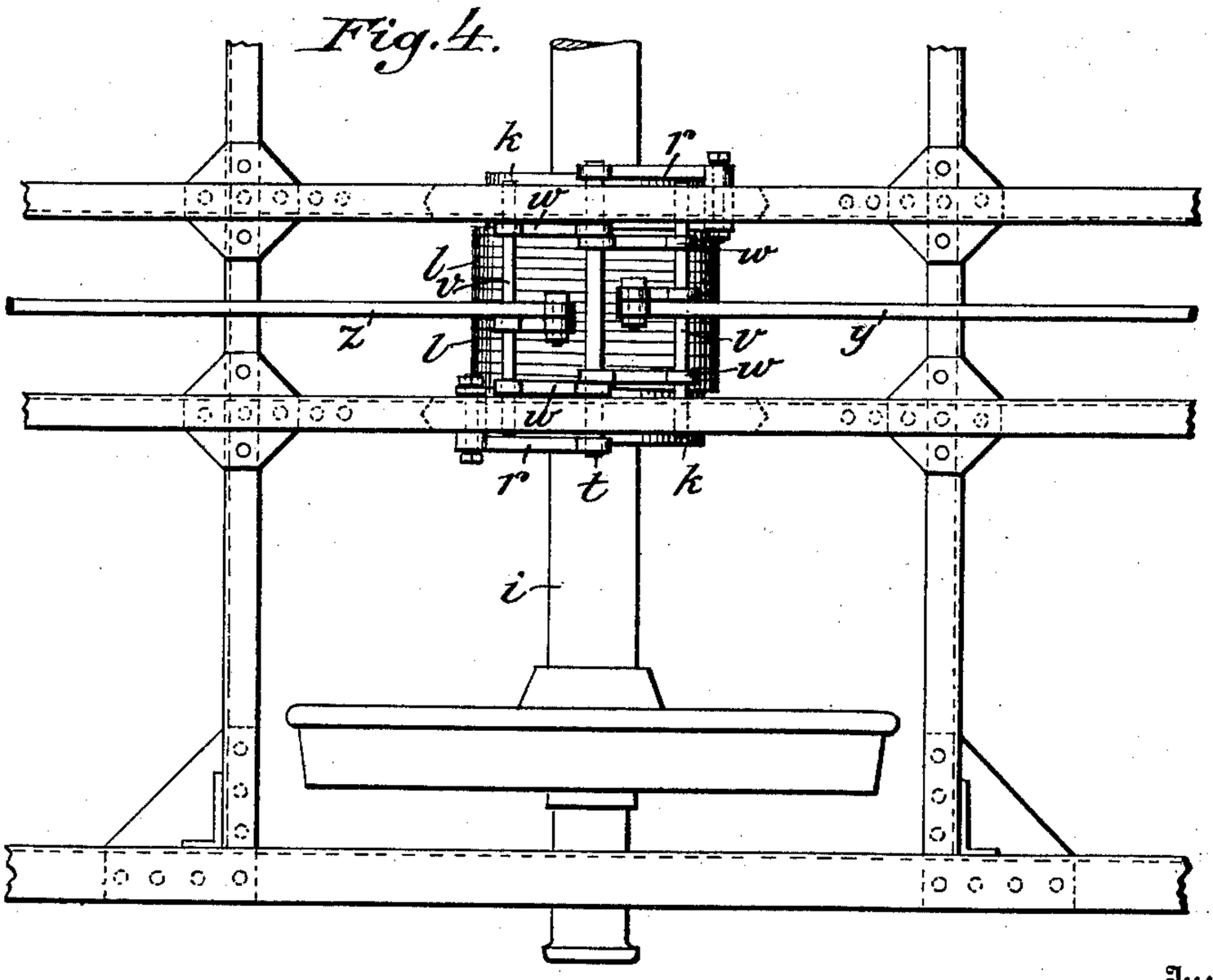


Fig. 4.



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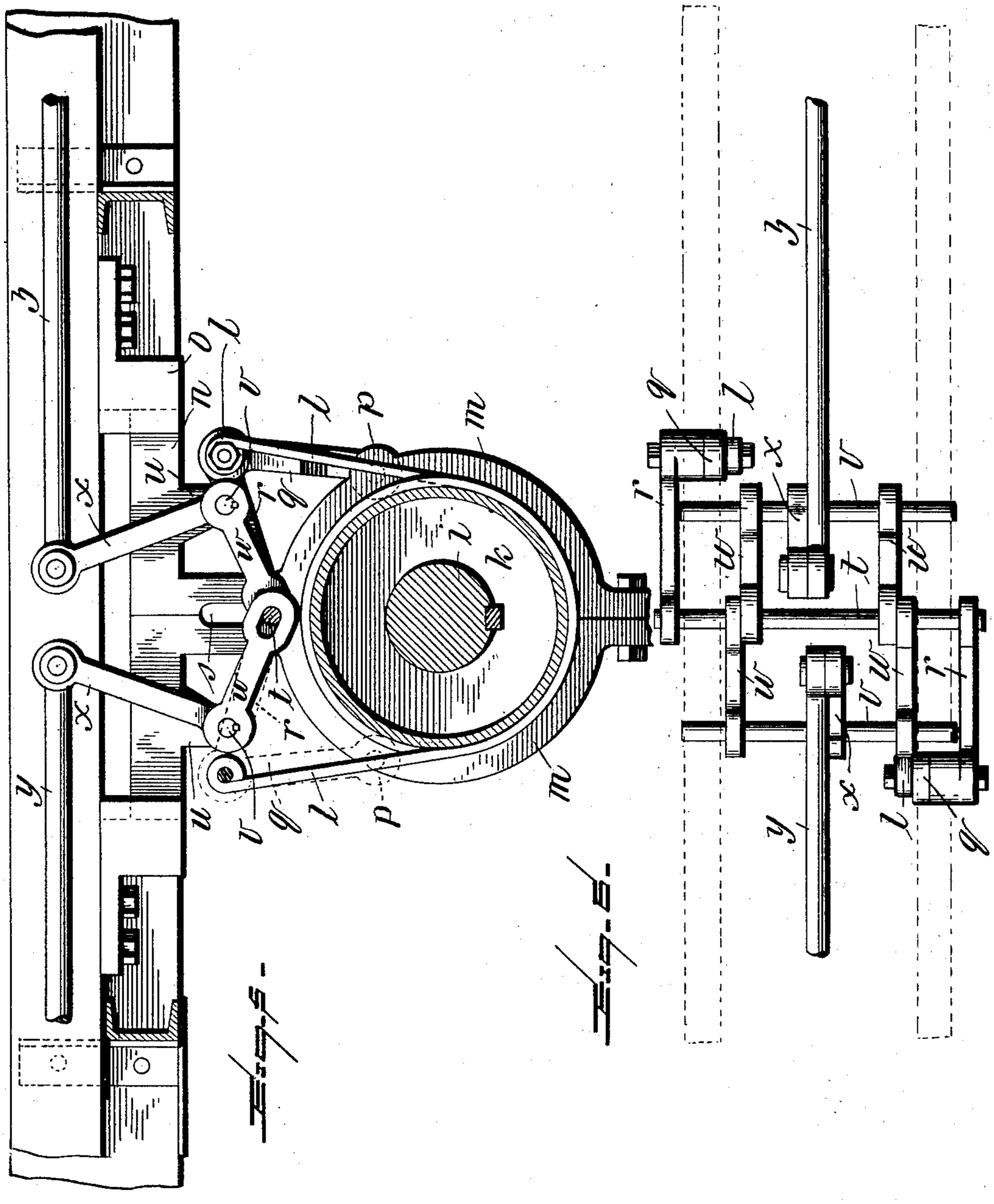

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

JACOB FISCHER AND HERMANN SCHNEIDER, OF SOLOTHURN, SWITZERLAND.

SELF-ACTING BRAKE.

SPECIFICATION forming part of Letters Patent No. 717,182, dated December 30, 1902.

Application filed January 15, 1902. Serial No. 89,920. (No model.)

To all whom it may concern:

Be it known that we, JACOB FISCHER, a citizen of Switzerland, and HERMANN SCHNEIDER, a citizen of Germany, both residing at Solothurn, Republic of Switzerland, have invented certain new and useful Improvements in Self-Acting Brakes; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable other skilled in the art to which it appertains to make and use the same.

This invention relates to a self-acting brake for drums, shafts, axles, and the like; and it consists principally of a spiral spring wound around the machine element which is to be braked, the inner diameter of which spiral when in a relaxed state being somewhat smaller than the diameter of the element to be braked and whose one end is so secured that the spiral cannot revolve with the element it envelops.

In the accompanying drawings, Figure 1 is a side elevation of a simple form of construction of this invention. Figs. 2, 3, and 4 are an end elevation, longitudinal section, and plan, respectively, of a second form of construction of this invention as applied to a railway-vehicle. Fig. 5 is a transverse section on line 2 2 of Fig. 3. Fig. 6 is a top plan view of the operating-levers, the framework and drum being removed.

Referring to Fig. 1, *a* indicates the rotary element, (a shaft,) and *l* the spring spiral, wound around the same. For the direction of rotation of the shaft *a* indicated by the arrow *c* one end is assumed to be held by securing it to the rigidly-fixed point *e*. It is clear that the spiral, whose inside diameter is less than the diameter of the shaft *a* in its relaxed state, exercises pressure on the periphery of this shaft and creates frictional resistance, so that the spiral has a tendency to rotate with the shaft *a*. As, however, the end *d* of the spiral is held fast, the friction created causes the spiral *l* to coil itself more closely around the shaft *a* and to effect a constantly-increasing braking action on this said shaft until it is brought to a standstill. To release the shaft *a*, the spiral must be turned back until its coils are no longer in contact with the shaft. For the direction of rotation of the shaft *a* indicated by arrow *f* the other end of the spiral must be rigidly secured to effect that it should brake automatically, for example, by securing this end to a fixed point *h*.

Referring to Figs. 2 to 4, a drum *k*, which is the equivalent of the shaft *a*, is mounted rigidly on each of the axles *i* of the vehicle, and the spiral *l* is placed on the drum with its coils encircling the same. Divided rings *m*, forming part of depending brackets, are pushed on loosely over the ends of these drums, the rings being provided with internal ribs which project into grooves in the drum *k* to prevent them moving laterally. The rings *m* have feet *n* above which fit between guides *o* fixed to the underframe of the vehicle so that the rings *m* cannot rotate with the drum *k*. Links *q* are pivoted at their lower ends to bosses *p*, provided on the rings *m*. To each of the upper ends of these links is attached one end of the spiral *l* and one end of a link *r*. The other end of the link *r* is pivoted to a transverse rod *t*, sliding in a slot *s*, provided between the two rings *m*. When the transverse rod *t* is raised parallel to itself in the slot *s*, both ends of the spiral *l* are forced away from one another through the medium of the links *r*, or, in other words, these ends are turned back and the drum *k*, with the axle of the vehicle, is released. On the other hand, if the transverse rod *t* be left to itself its dead-weight, in conjunction with the tension of the spiral acting at the upper ends of the links *r*, causes it to sink in the slots *s* and through the tension of the spiral *l*, which is now increased, an automatic contraction of the spiral, or, in other words, an automatic braking of the vehicle is effected, through which the spiral is continually coiled tighter around the drum irrespective of the direction in which the vehicle is going, each end of the spiral *l*, which is pulled by this rotation, being held by one of the links *q* and the fixed ring *m*.

The arrangement for raising the transverse rod *t* to release the brake is as follows: In depending lugs *u* of the two rings *m* a shaft *v* is mounted to rotate, and two levers *w x* are fixed on this shaft, or these two levers may be combined in one bell-crank lever. These

levers *w* each engage, by means of slotted ends, with one of the two transverse rods *t*, while a draw-rod *y* is coupled to the lever *x*. This latter is assumed to be connected in the usual manner with a screw-spindle and brake hand-wheel situated at one end of the vehicle or other suitable mechanism.

In Fig. 2 is further shown how from one end of the vehicle both ends of the spiral *l* may be actuated simultaneously to engage and disengage. To this end a second lug *u* and a second shaft *v*, with levers *w x*, are supplied to the rings *m* of one of the drums *k*. A rod *z* is then provided to connect the brake-disengaging gear of both the vehicle-axles. The rods *z* may also be considered as coupling-rods, by means of any one of which the vehicle is coupled to a locomotive. As long as the car is being pulled along by the engine the spiral remains disengaged. If, however, the engine relaxes its pull on the coupling-rod, an automatic braking of the vehicle is effected by permitting the rod *t* to drop, as already described.

This brake-gear can be most advantageously applied to cranes, lifts, and the like to automatically prevent the load falling when the motive power is thrown out of gear. To prevent the spiral wearing, the element it is coiled around may be made of some material which is softer than the spiral. Furthermore, the spiral and the element it encircles may be placed in a casing containing some suitable fluid.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. A self-acting brake, consisting of a helical spring wound around the rotating element which is to be braked, and whose coils in a relaxed state are of less diameter than the diameter of the rotating element, so that they exert a pressure in consequence of their innate tension, that end of the spring which points in a direction opposite to the direction of rotation being rigidly fastened in such a manner that the said spring cannot participate in the rotary motion.

2. A self-acting brake, consisting of a helical spring wound around the rotating element which is to be braked, and whose coils in a relaxed state are of less internal diameter than the diameter of the rotating element, so that they exert a pressure in consequence of their innate tension, that end of the spring which points in a direction opposite to the direction of rotation being rigidly fastened in such a manner that the said spring cannot participate in the rotary motion, and means for positively holding said spring free from the rotating element against the tension of the spring.

3. A self-acting brake comprising a helical spring wound around the rotating element which is to be braked, and whose coils in a relaxed state are of less internal diameter than the diameter of the rotating element, links pivoted at one end to the spring and at the other end to a fixed support, links connected at one end to the first-named links and having the other end engaged by a rod mounted for vertical movement in a plane parallel to its own axis, and means for normally holding the rod in its upper position against the tension of the spring, whereby when the rod is allowed to drop the tension of the spring will cause the same to automatically grip the rotating element and effect a braking thereof.

4. A self-acting brake, consisting of a helical spring wound around the rotating element which is to be braked, fixed rings loosely encircling the rotating element, links pivoted at one end to the rings and at the other end connected to the spring, links having one end attached to the first-named links, and a transverse rod engaging the other end of the links and moving parallel to itself in slots in the rings.

5. A self-acting brake comprising a helical spring wound around the rotating element which is to be braked and whose coils in a relaxed state are of less internal diameter than the diameter of the rotating element, links pivoted at one end to the spring and at the other end to a fixed support, links pivoted at one end to the first-named links and at the other end engaged by means mounted for movement in a direction at an angle to the last-named links whereby when the slotted ends of said links are raised the rotating element will be free from engagement with the spring, and when said ends are allowed to drop the inherent tension of the spring will cause the same to automatically grip said rotating element and effect a braking thereof.

6. A self-acting brake consisting of a helical spring wound around the rotating element which is to be braked, the coils of which spring in a relaxed state are of less internal diameter than the diameter of the rotating element, a pair of links each pivoted at one end to an end of the helical spring and at the other end to a fixed support, a second pair of links pivoted at one end to the first-named links and at the other end engaged by a rod common to both links and mounted for vertical movement, whereby when the same is raised the ends of the spring will be forced apart against their tension thus releasing the rotating element from its grip, and when the same is permitted to drop the tension of the spring will automatically grip the rotating element with increasing force thus effecting a braking of the same.

In testimony whereof we affix our signatures in presence of two witnesses.

JACOB FISCHER.
HERMANN SCHNEIDER.

Witnesses:
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