

No. 798,635.

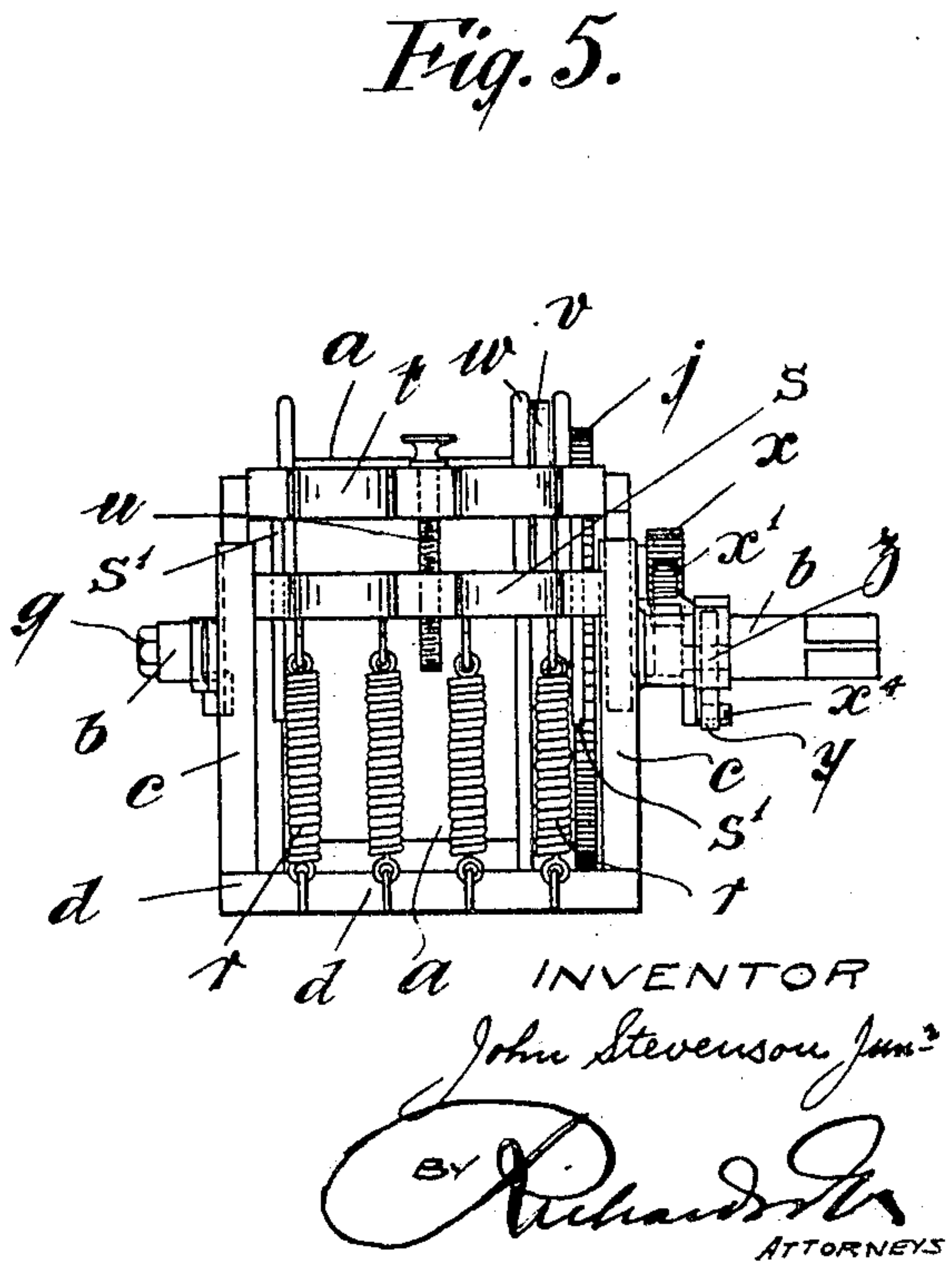
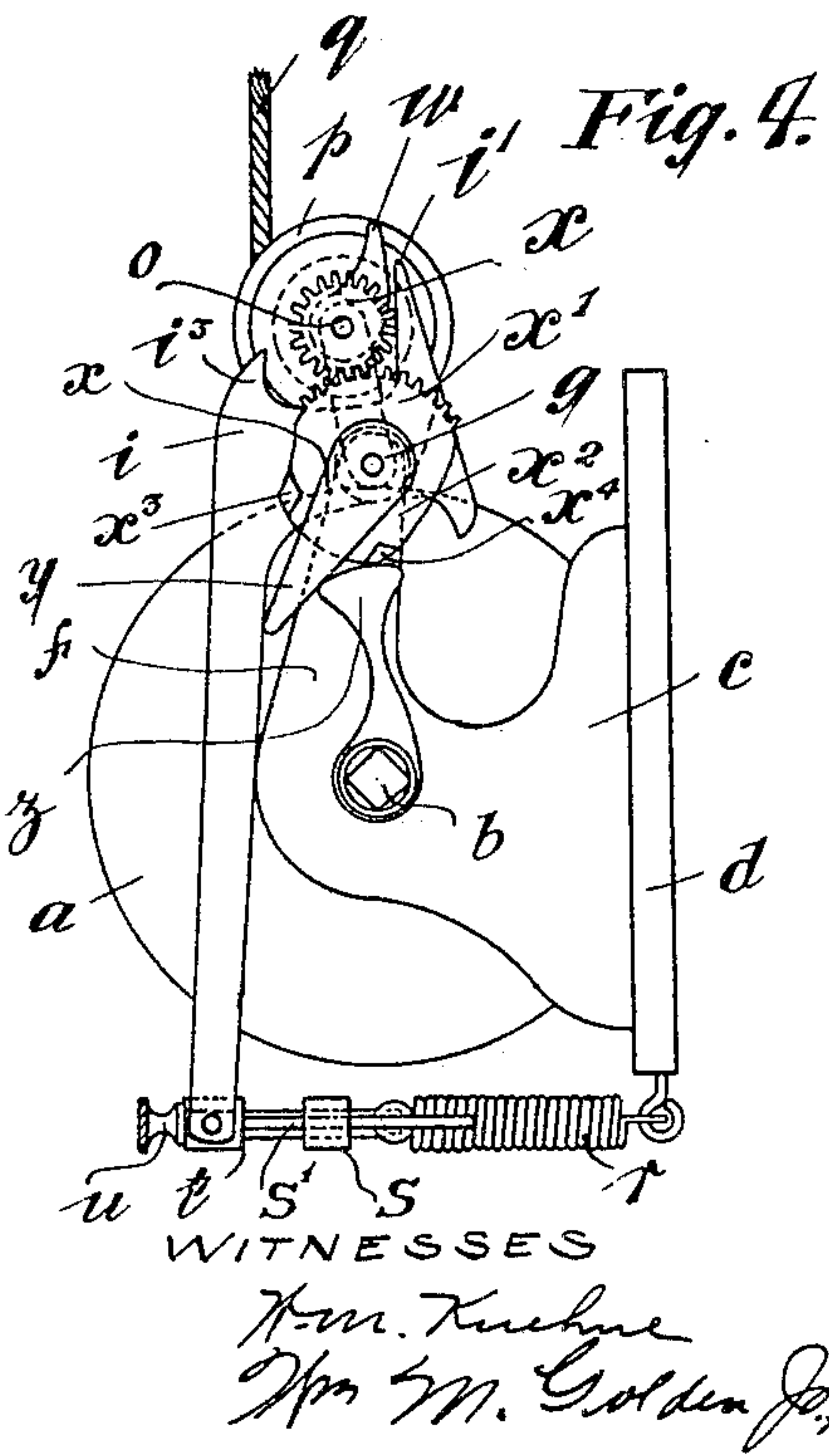
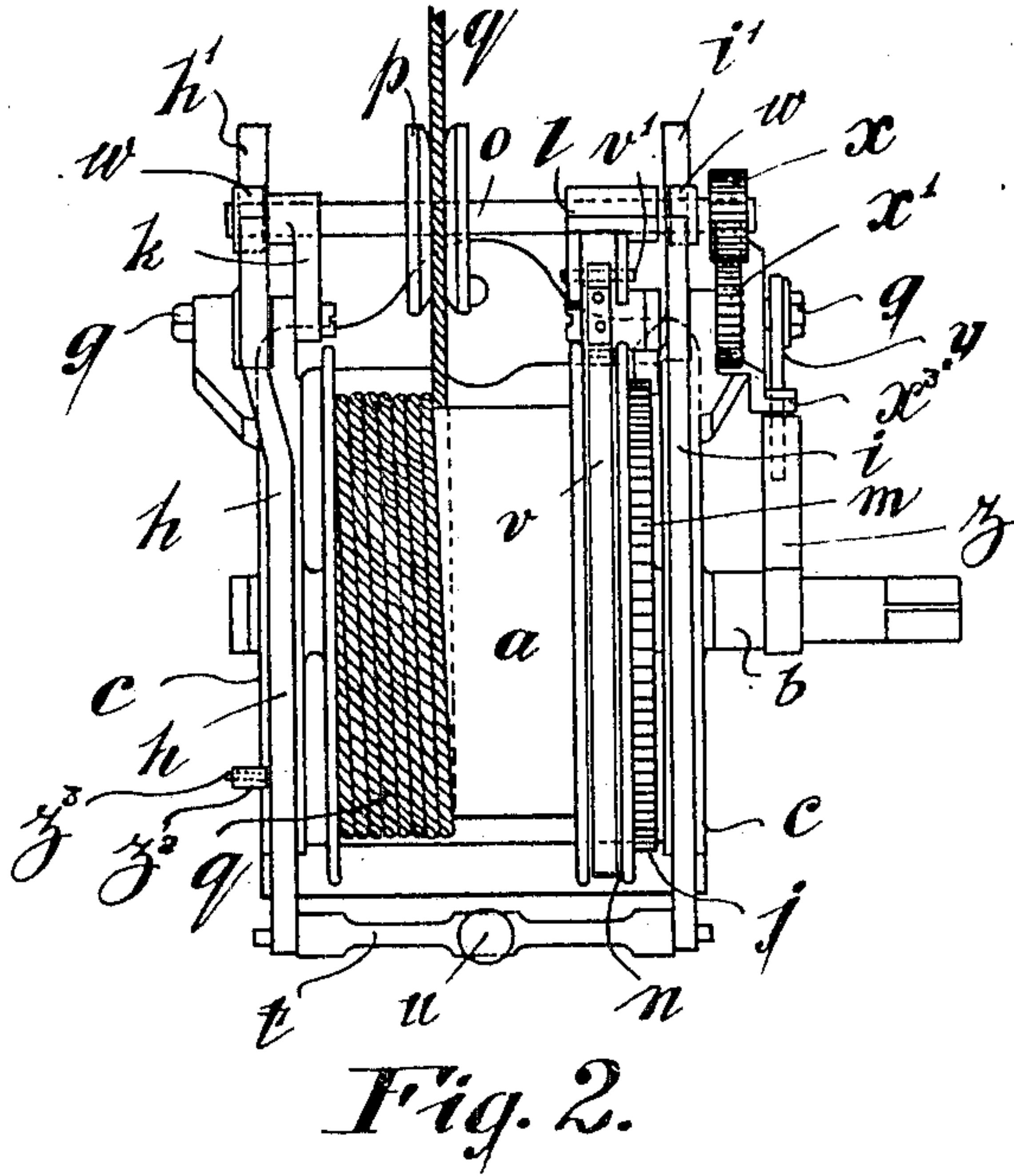
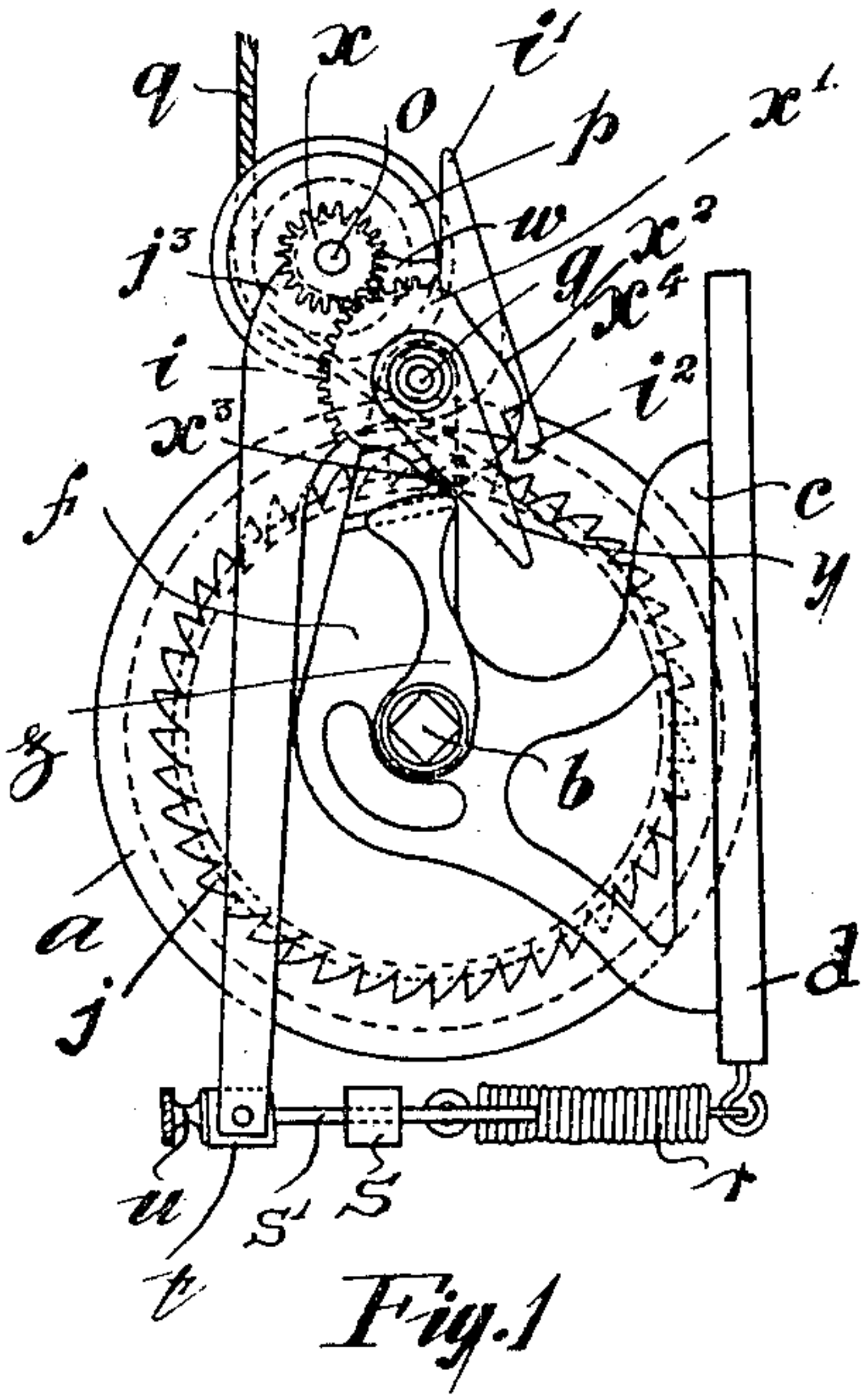
PATENTED SEPT. 5, 1905.

J. STEVENSON, JR.

APPARATUS FOR RAISING, LOWERING, OR HAULING WEIGHTS.

APPLICATION FILED DEC. 22, 1903

2 SHEETS—SHEET 1.



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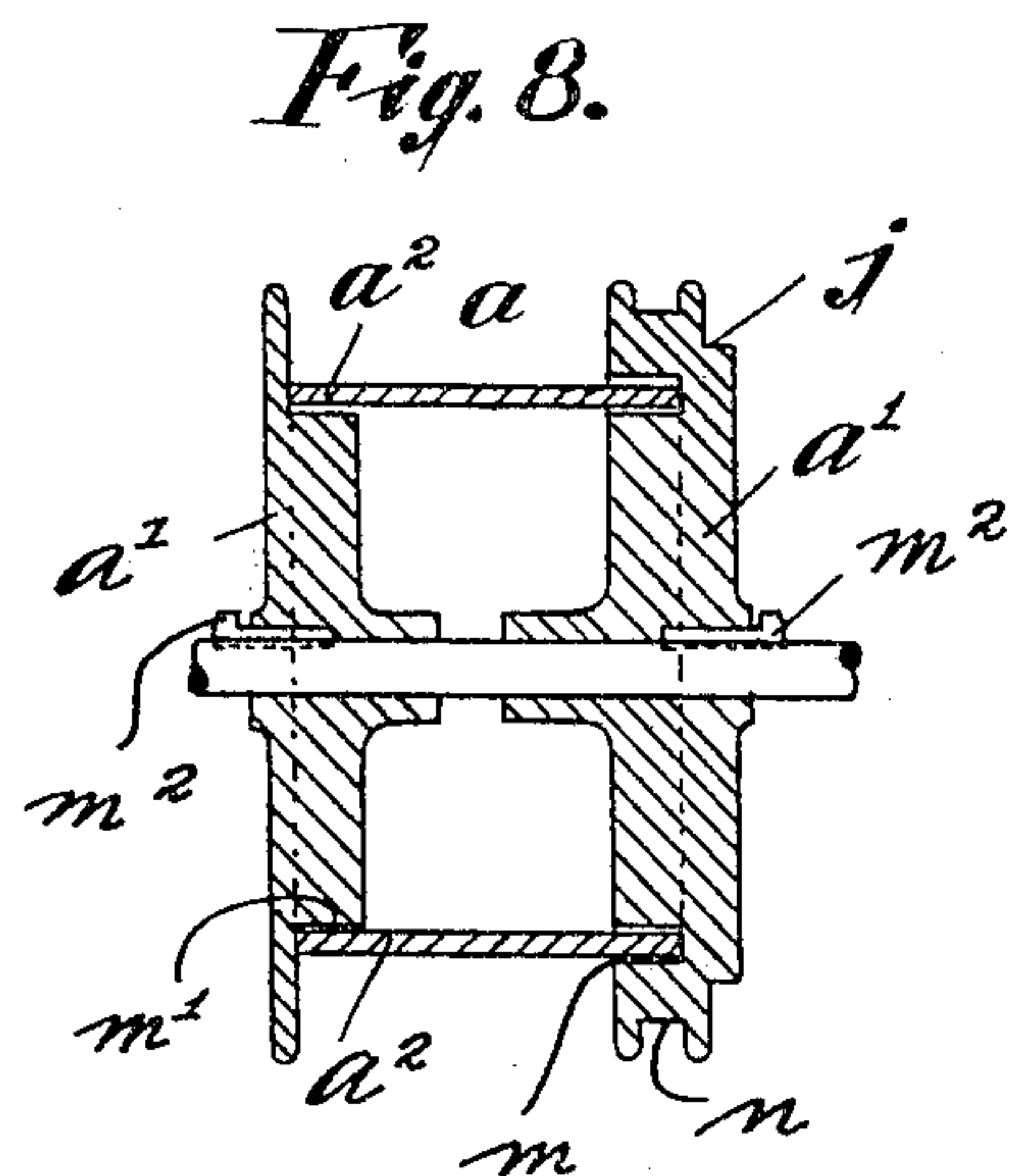
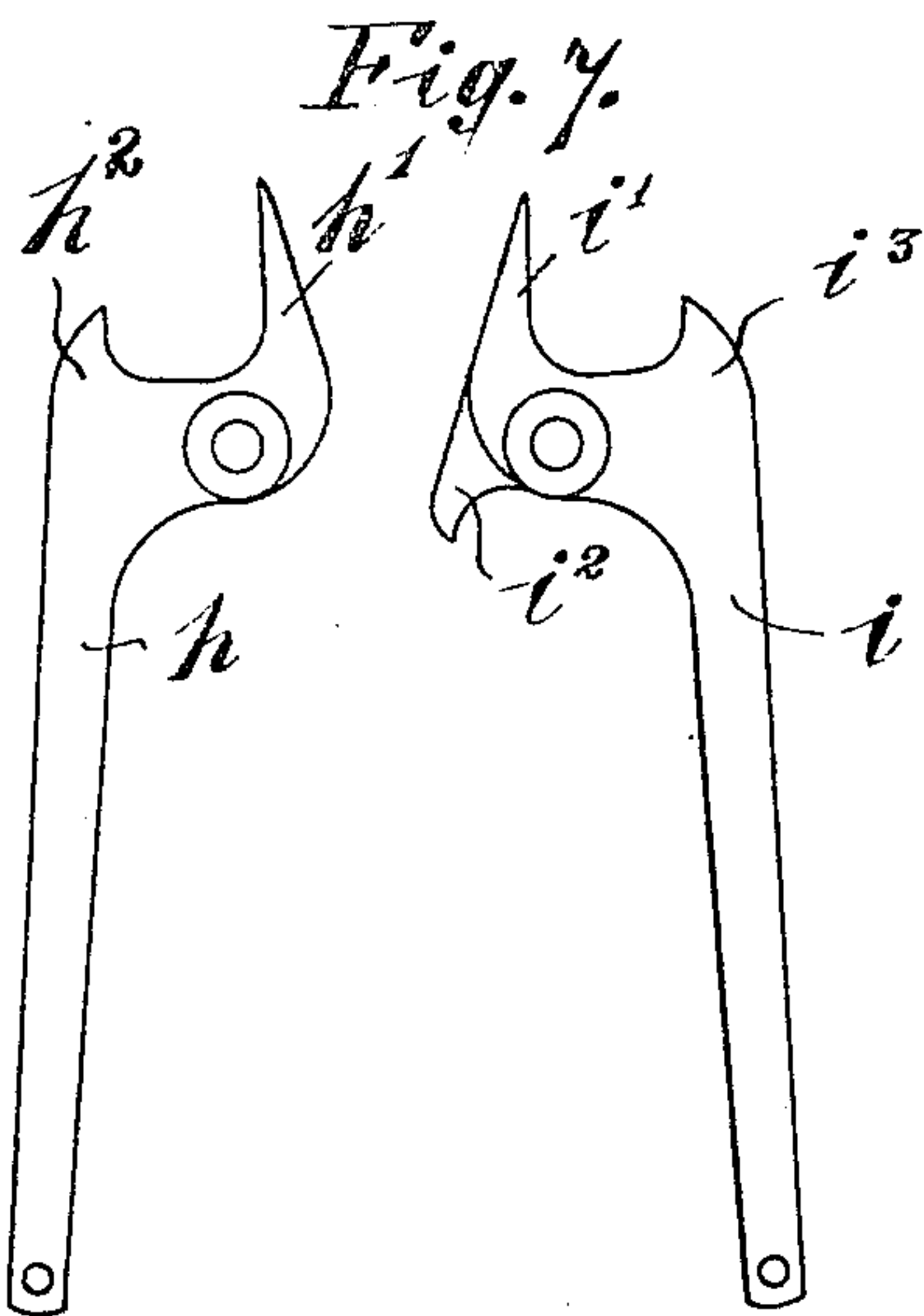
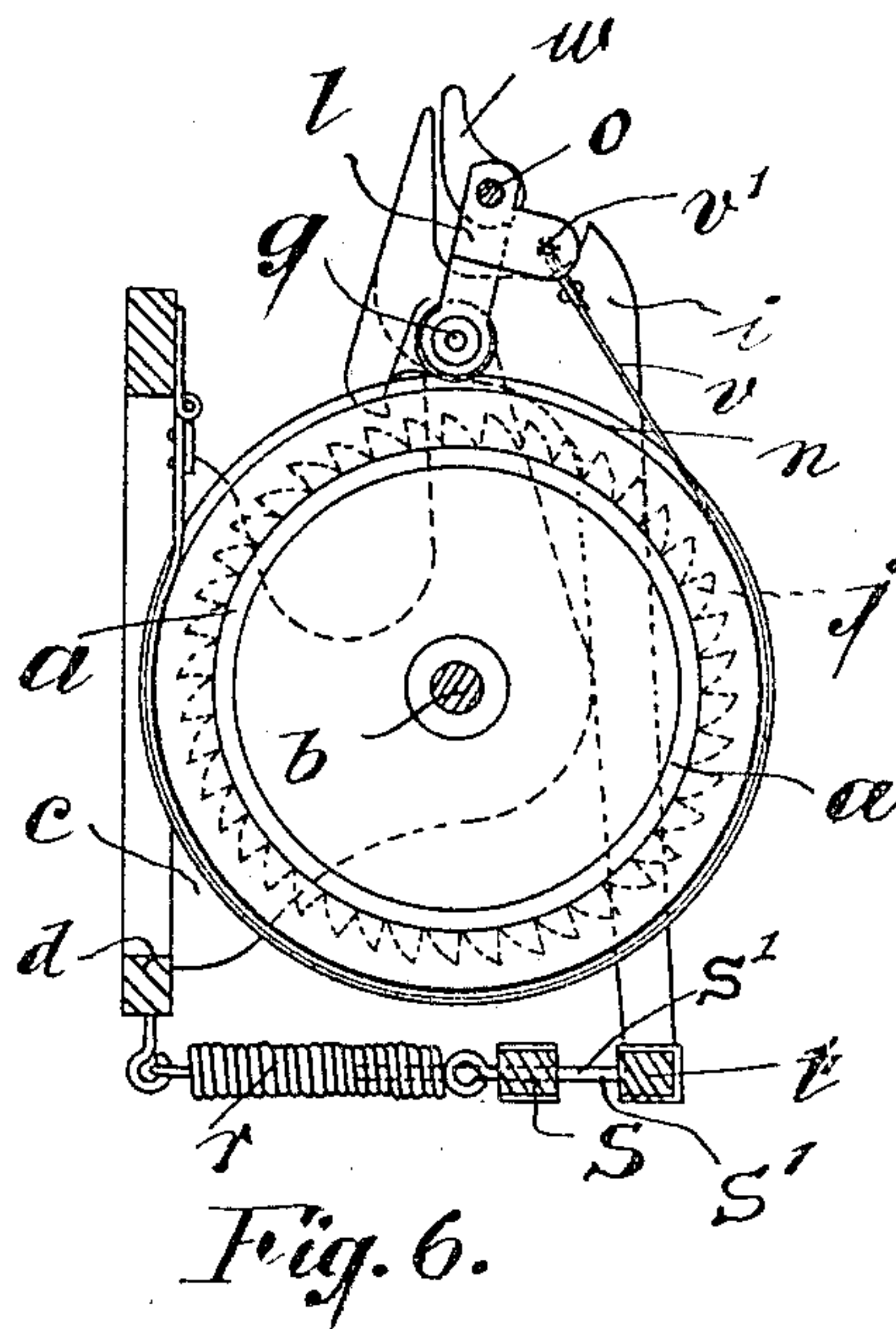
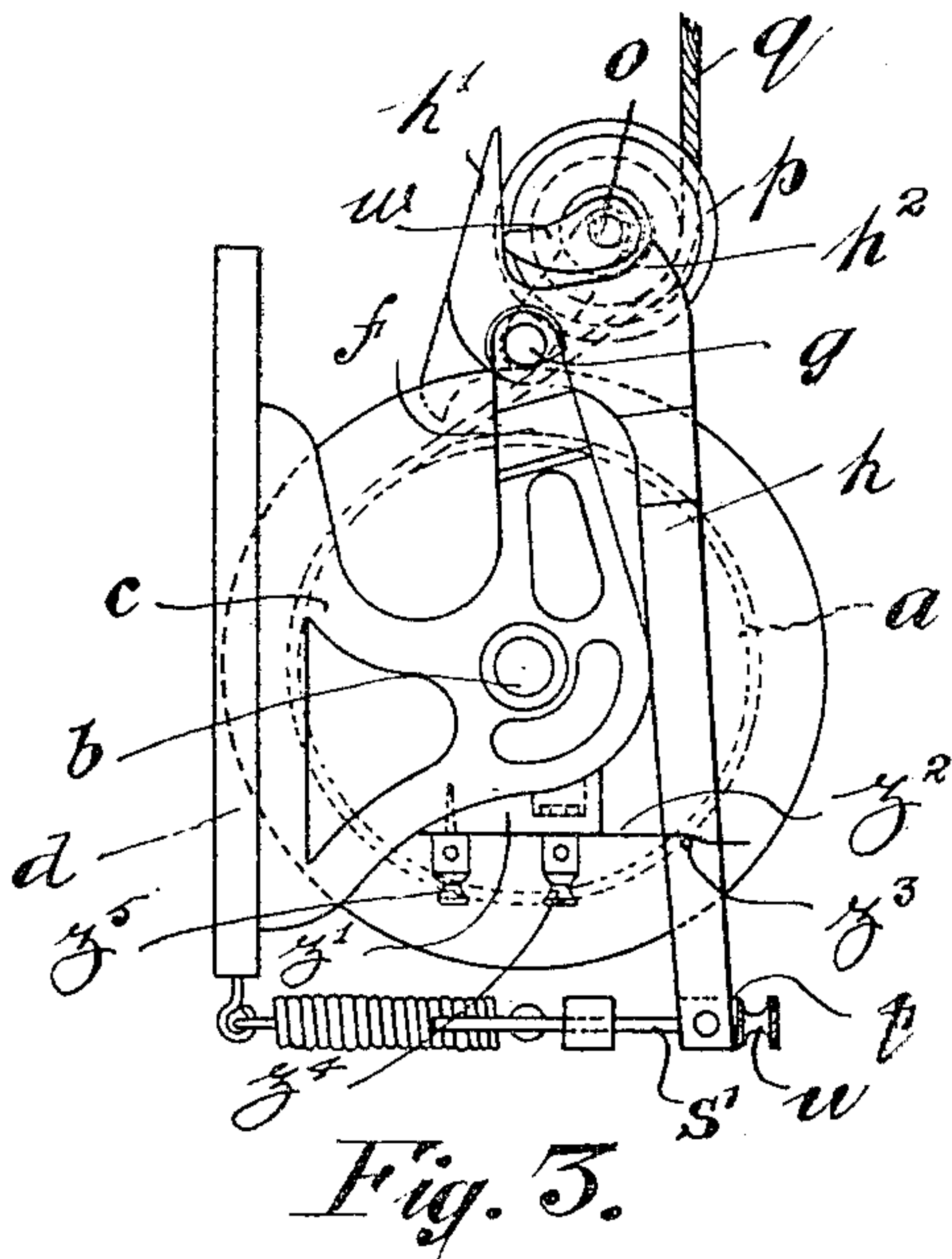
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2 SHEETS--SHEET 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN STEVENSON, JR., OF PORTOBELLO, SCOTLAND.

APPARATUS FOR RAISING, LOWERING, OR HAULING WEIGHTS.

No. 798,635.

Specification of Letters Patent.

Patented Sept. 5, 1905.

Application filed December 22, 1903. Serial No. 186,223.

To all whom it may concern:

Be it known that I, JOHN STEVENSON, JR., electrical engineer, a subject of the King of Great Britain, and a resident of Rowan Bank, Durham Road, Portobello, Scotland, have invented an Improved Apparatus for Raising, Lowering, or Hauling Weights, of which the following is a specification.

The object of the apparatus is to provide means whereby when weights are to be raised or lowered or hauled by means of a flexible medium—such as a rope, cord, or chain—the following ends can be obtained, namely:

A. The cord, rope, or chain cannot be strained beyond a certain predetermined limit.

B. Brake-power can be readily thrown on the winding-drum in proportion to the weight being lifted or hauled to relieve or lessen the strain on the handle when unwinding.

C. The wear and tear on the rope can be lessened by having a large drum-barrel and also by preventing overriding of windings.

D. The approximate strain on the suspender can be indicated when approaching its maximum strain.

I will now proceed to describe my invention with reference to the accompanying sheets of drawings, whereon—

Figure 1 is a side elevation of the improved apparatus or winch. Fig. 2 is a front elevation of the same. Fig. 3 is an elevation of the opposite side to that shown in Fig. 1. Figs. 4, 5, and 6 are respectively side, bottom, and sectional views, showing the winch with the band-brake applied. Fig. 7 is a view of the levers h i . Fig. 8 is a section of the winch-drum.

Referring to the drawings, whereon the same reference-letters wherever repeated indicate the same parts, I mount a metal drum a , free to rotate with its axle b between two side frames or pillars c , cast on a suitably-designed base d and having the usual handle (not shown) for turning the drum. The side frames c , which support the drum-axle, are extended at f out beyond the drum-axle journals to a point slightly exceeding the radius of the drum-cheeks. At the extremity of these arms pivots g are arranged, on which two lever-arms h i are loosely mounted. The outer end of one of these arms i is shaped (see Fig. 7) in such a way that it resembles a hammer-head, forming a step i' at the upper side and a catch i'' , shaped to engage into ratchet-teeth j on the drum a , at the lower side. It has or may have also a projection i''' . The other lever h

has a similar step h' and projection h'' . The pivots g carry loosely short arms k and l , which are held together at their outer ends by means of a spindle or rod o , onto which a loosely-fitted grooved pulley p is slipped, so that it is free to travel along the spindle. The levers h i are extended downward beyond the axle to form levers so proportioned that the power at their extremities will be such that a spring or springs can be applied to overcome the force exerted on the suspending-rope q , which passes round the pulley p to the drum a . I prefer to arrange the tension-regulating springs in the manner shown at Figs. 4 and 5—that is, four springs r are fastened to the base d at one end and to a slidable cross-bar s , working on guide-pins s' , at the other end. The ends of the levers are connected with a cross-bar t , provided with a screw u , which works through a free hole in the bar t and into a tapped hole in the bar s . By manipulating this screw u the tension put upon the levers can be increased or diminished, as required. A band-brake v is attached at one end to the base and passes round a flat groove n on the drum and terminates on a swivel-joint v' on the arm l of the spindle o . Cams w are fixed on the ends of the spindle o and are so designed that they can be made to engage with and bear against the steps h' i' of the levers h i . Fixed also on the end of the spindle o is a wheel x , whose teeth engage with those of a segmental wheel x' , mounted loosely on the pivot g . The segmental wheel is projected beyond its pivot and forms a cam x'' , which is provided with stops x^3 x^4 . Between the stops x^3 x^4 a movable finger y , loosely mounted on the pivot g , can work. The finger y is caused to move against one or other of the stops by means of an arm z , rigidly fitted to the axle b .

On the lower face of one of the cheeks c is an electric indicating device for lighting an electric lamp or ringing a bell whenever the strain on the rope q reaches a certain amount. This device may consist of a vulcanite or other insulator z' , having a thin metal strip z'' projecting outward and which is capable of being brought into contact with a pin z^3 on the lever h . z^4 and z^5 are binding-screws for the conductors. The plate z^2 forms one contact with the terminal z^4 , and the terminal z^5 , which forms the other contact, is connected direct to the frame c , and thus is in circuit with the pin z^3 .

The indicator is connected in bridge with

the terminals and the circuit is closed by the raising of the lever h , bringing the pin into contact with the strip z^2 , thereby lighting the lamp or sounding the bell. It will be seen
5 that the strip is slightly bent or stepped near its end.

To enable the barrel a to be made of large diameter, so as to lessen the wear and tear on the rope q without unduly adding to its weight, the drum can be built up, as shown
10 at Fig. 8—that is to say, the cheeks a' can be separately cast, one cheek having the ratchet-wheel j cast or clamped on its outer side and a circular groove m on its inner side, while
15 the other cheek has a step m' cast on it to support the barrel a^2 of the drum. The barrel rests at one side on the step m' and at the other side in the groove m . The barrel may be a cast or wrought iron tube, and the axle
20 passing through the center clamps and locks the cheeks to the cylinder by means of keys m^2 , pins, nuts, or some such devices.

The action of the device is as follows: The rope q (or chain) passes over the drum and
25 round the under side of the guide-pulley p and rests in the groove thereof, continuing over a pulley to the object to be raised and lowered. When a strain is being applied to the rope by turning the drum, the tension
30 tends to force the arms k and l , on which the spindle o of the loose pulley is mounted, toward the base d , thereby turning the spindle o by the wheel x turning on the segment x' and causing the cams w to engage
35 with and press against the steps $h' i'$ of the levers $h i$, as shown at Figs. 1 and 3. This movement forces or tends to force the ends of the lever-arms outward against the action of the springs r at their extremities and does
40 force them out immediately the strain on the rope exceeds the pressure of the springs, thereby causing the catch i^2 on the lever i to engage with the ratchet-teeth j on the drum and lock the latter, thus preventing any fur-
45 ther strain being put on the rope.

When the strain on the rope reaches a certain predetermined point, the electrical device is arranged to come into action and by
50 the contact of the strip z^2 with the pin z^3 to close the local circuit and light the lamp or sound the bell, thereby indicating to the attendant that further strain should not be put on the rope.

When the object is being lowered, the
55 band-brake can be automatically applied by the arm z of the axle (as the latter turns with the drum) striking against the finger y and ultimately throwing it over to the position shown at Figs. 4 and 6. The finger y strikes
60 against the stop x^3 and moves the segment x' so as to turn the wheel x and move the cams w out of engagement with the steps $h' i'$ of the levers $h i$, thereby permitting the rope to act on the pulley p and spindle o and bring
65 the arms $k l$ into a line nearly parallel with

the base d , thereby moving the swivel-joint v' so as to tighten the band v on the drum. The brake is taken off by turning the axle as if for winding up the rope, so as to cause the arm z to strike the finger y and throw it over
70 against the stop x^4 and turn the segment x' and wheel x so as to bring the cams w into the position shown at Figs. 1 and 3. The cams as they move along the steps $h' i'$ force back the spindle o and arms $k l$, and thereby
75 take off the brake.

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

1. In apparatus for raising, lowering and
80 hauling weights, the combination with a winding-drum with rope or chain, a frame carrying the drum, means for operating the drum, a band-brake for the drum connected with a spindle carried on arms pivoted on said frame,
85 and a pulley on said spindle acted on by the rope or chain.

2. In apparatus for raising, lowering and hauling weights, the combination with a wind-
90 ing-drum with rope or chain, a frame carrying the drum, means for operating the drum, a band-brake for the drum connected with a spindle carried on arms pivoted on said frame, cams on said spindle, means for partially ro-
95 tating the cams when the drum is turned in one direction and also when it is turned in the opposite direction, levers acting in conjunction with the cams to take off the brake and a pulley on said spindle acted on by the
100 rope or chain.

3. In combination, a winding-drum, a frame therefor, a band-brake for the drum, wind-
105 ing means, means whereby the drum is automatically locked whenever the tension on the winding means reaches a certain predetermined limit and means for regulating or de-termining the limit.

4. In an apparatus for raising, lowering and hauling weights, the combination with wind-
110 ing means, a brake therefor, and means for applying the brake, when the strain on the winding means has reached a predetermined point, said means being controlled by the weight.

5. In an apparatus for raising, lowering and
115 hauling weights, the combination with a winding-drum, of a band-brake therefor, a spindle to which said brake is connected, a pulley on said spindle, a winding-rope running over said pulley, levers, springs holding the same,
120 cams for acting on said levers and means connected to said spindle for taking off the brake when the weight is being raised or hauled, said means acting through the cams and levers.
125

6. In combination, a winding-drum, a frame therefor, a band-brake for the drum a spindle,
130 means connecting the band-brake with the spindle, cams on the spindle, gear for turning the spindle, levers and springs connected

with the levers and means for regulating the tension of the springs.

7. The combination with the mechanism for preventing the strain on the winding means exceeding a certain predetermined limit of means for automatically indicating when the limit has been reached or nearly reached.

8. The combination with the winding-drum of teeth thereon, a frame for the drum, a lever pivoted in the frame, a spring connected with said lever, swinging arms on the frame, a spindle carried by the arms, a cam on said spindle, adapted to engage with the lever, a

wheel on the spindle round which the winding rope or chain passes and a locking tooth or pawl on the lever adapted to engage with and lock in the teeth of the drum so as to prevent the drum being turned when the tension on the winding rope or chain exceeds a certain predetermined limit.

Signed at Glasgow this 10th day of December, 1903.

JOHN STEVENSON, JUNR.

Witnesses:

JNO. W. FADZAN,
WILLIAM FLEMING.