

(No Model.)

3 Sheets—Sheet 1.

J. BELL, W. C. MELVILLE & J. W. FOSTER.

WINCH.

No. 559,158.

Patented Apr. 28, 1896.

Fig. 2.

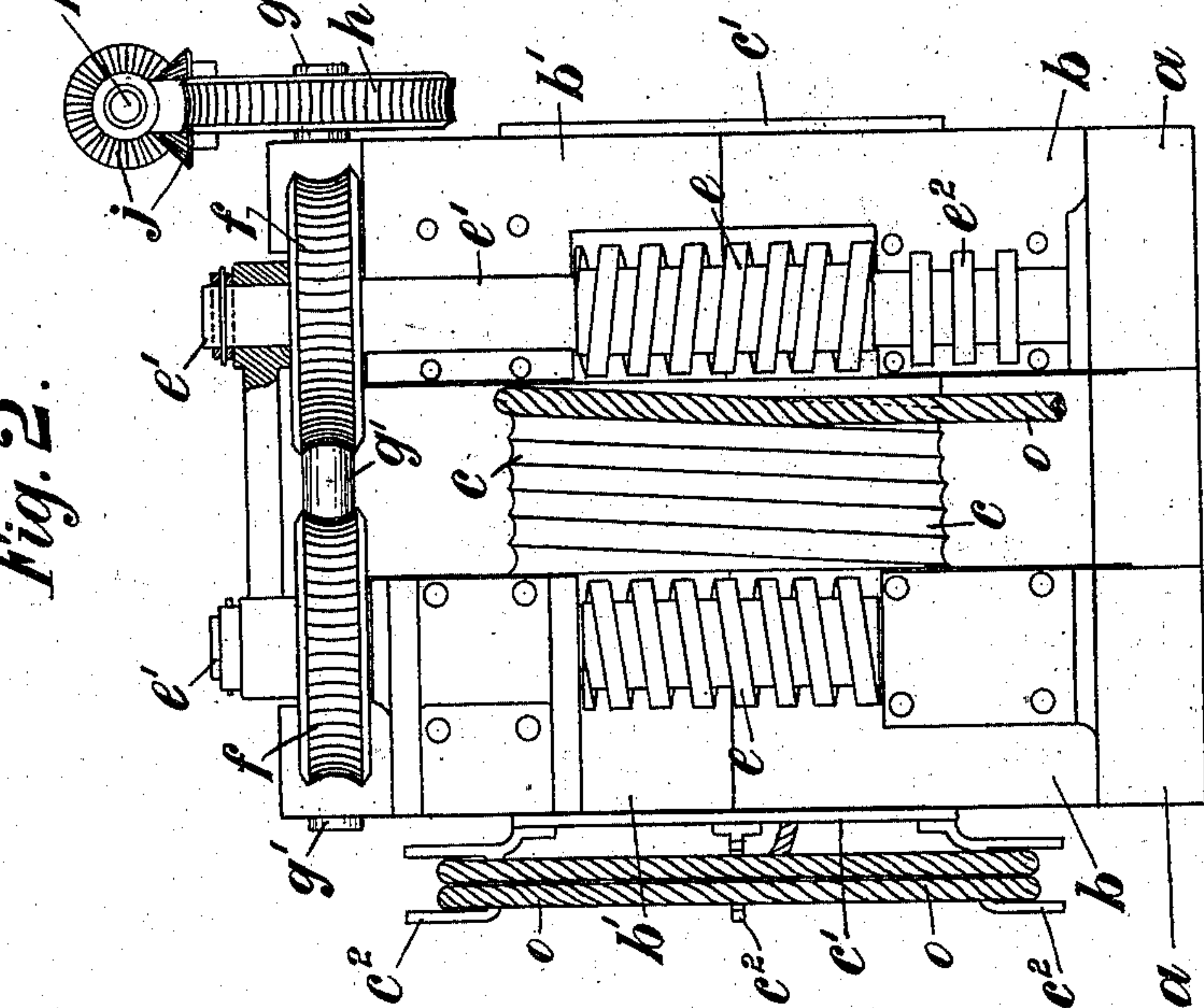
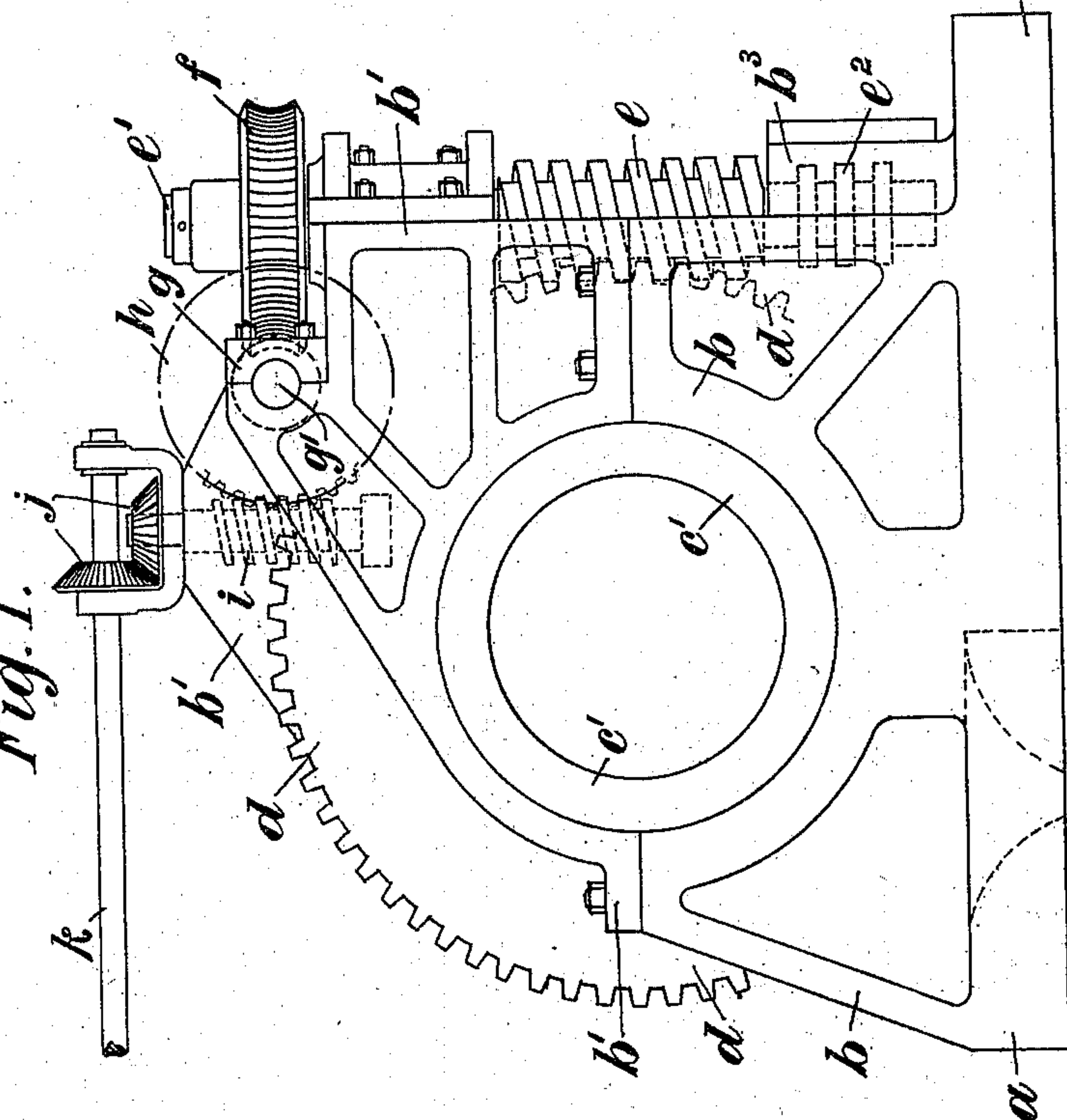


Fig. 1.



Witnesses.

H. van Oldenmeel
C. A. Scott

Inventors.

James Bell
William Charles Melville
James William Foster

by *Richardson*
Attorneys

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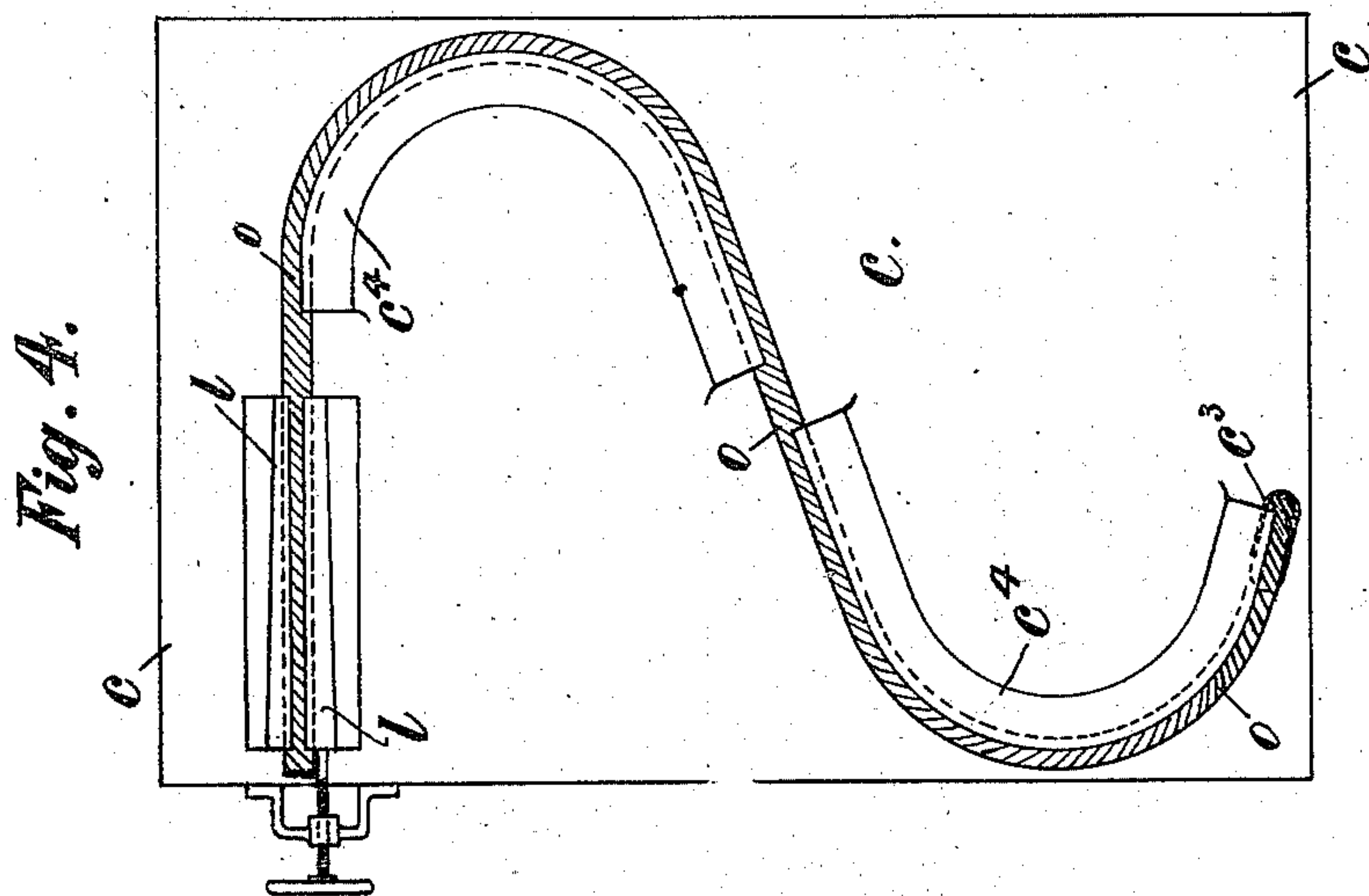
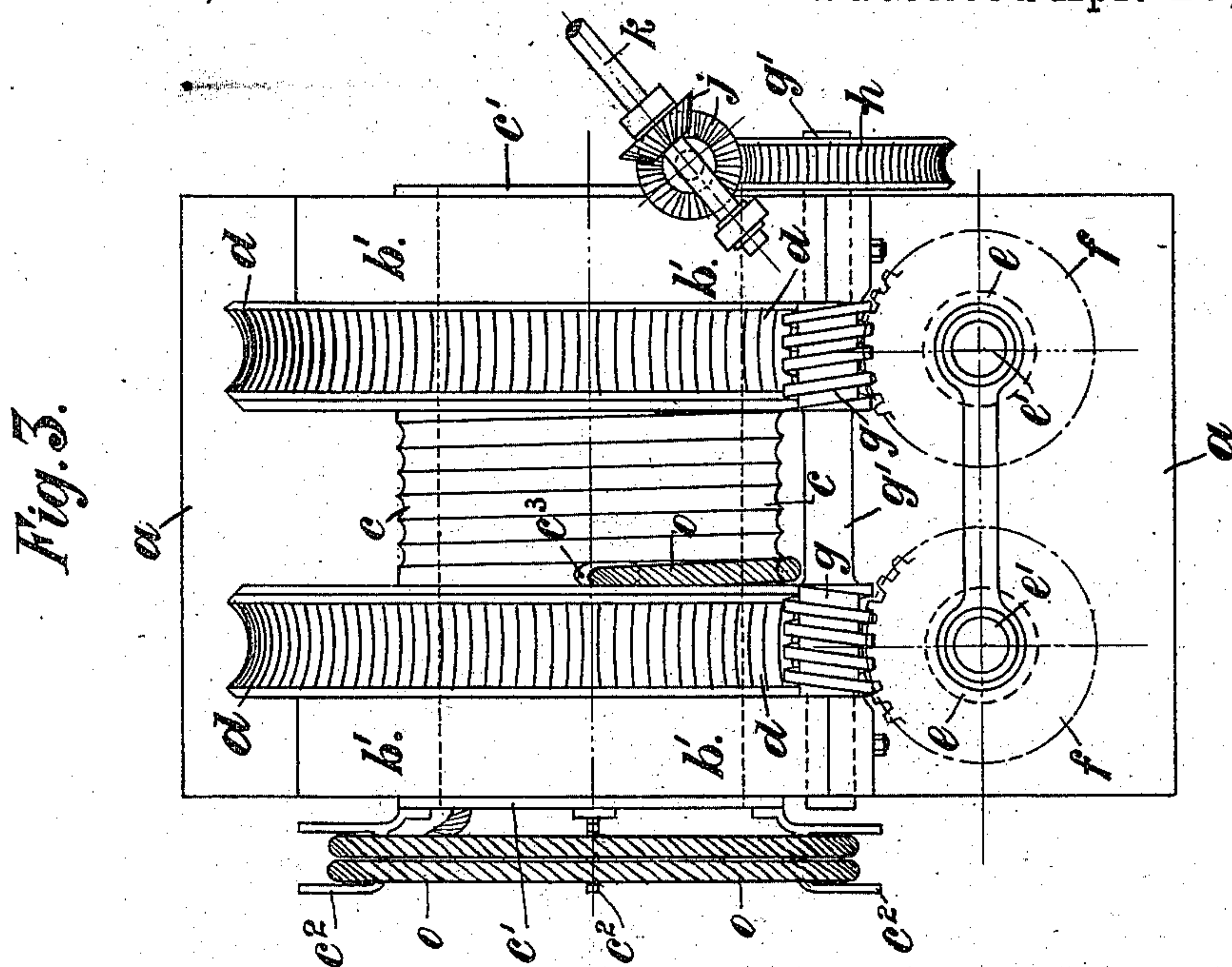
3. Sheets—Sheet 2.

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Witnesses.

H. van Oudenweert
E. A. Scott.

Inventors.

James Bell
William Charles Melville
James William Foster

James William Foster
by Richard R
Attorneys

(No Model.)

3 Sheets—Sheet 3.

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Fig. 6.

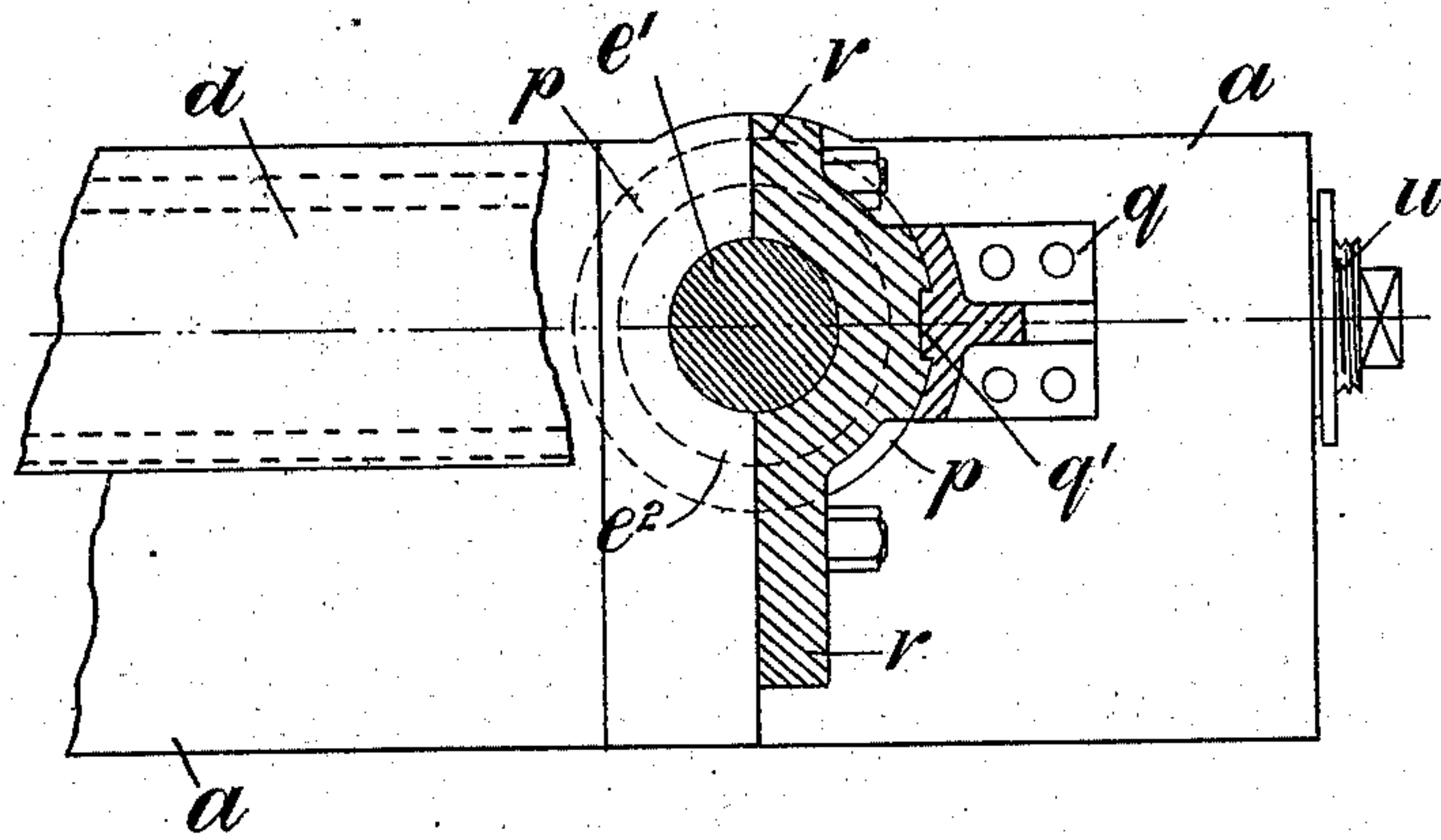
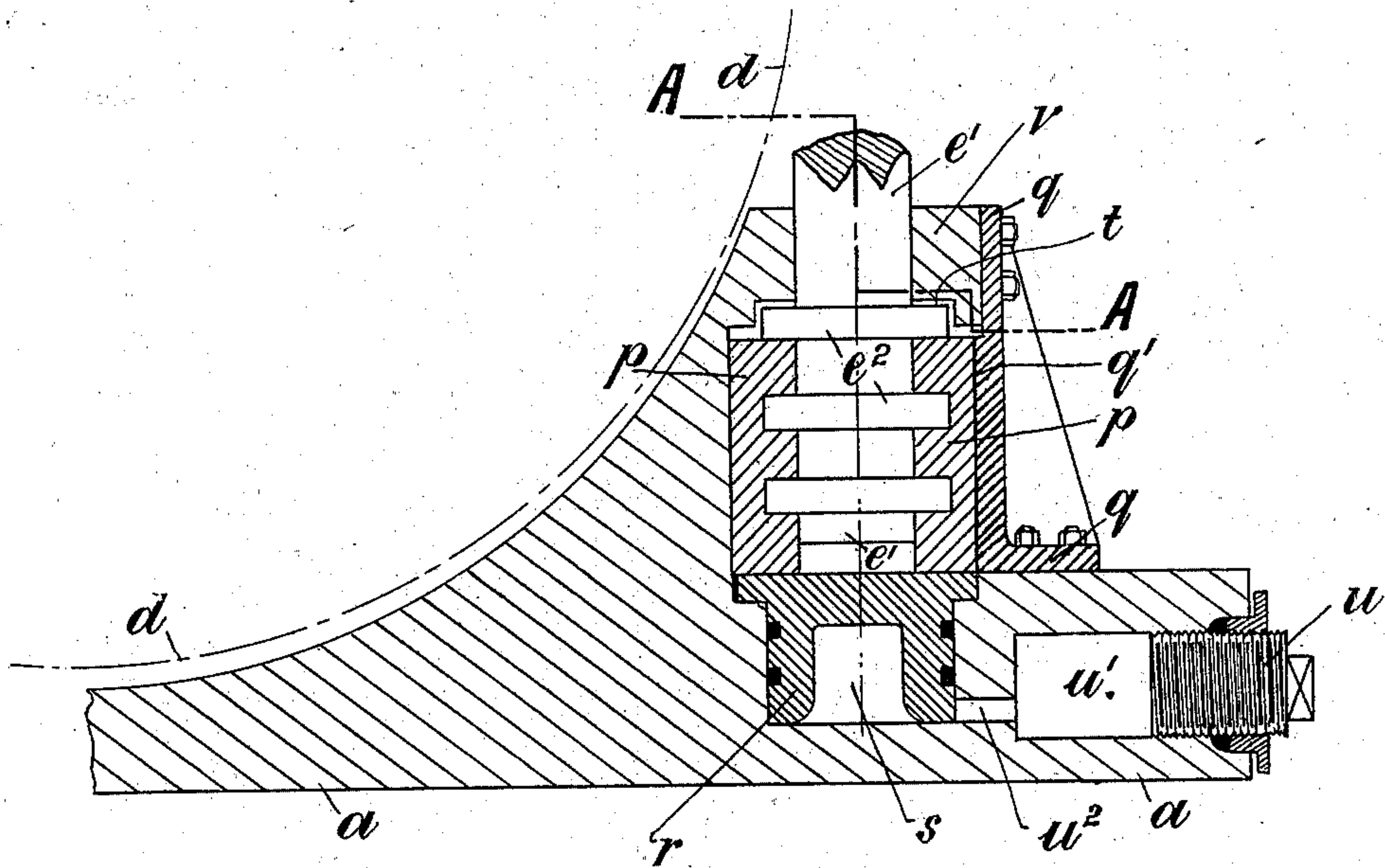


Fig. 5.



Witnesses.
J. van Oldenmeel
E. A. Scott

Inventors.
James Bell
William Charles Melville
James William Foster

by *Richard R.*
Attorneys

UNITED STATES PATENT OFFICE.

JAMES BELL, WILLIAM CHARLES MELVILLE, AND JAMES WILLIAM FOSTER,
OF LIVERPOOL, ENGLAND.

WINCH.

SPECIFICATION forming part of Letters Patent No. 559,158, dated April 28, 1896.

Application filed September 13, 1895. Serial No. 562,391. (No model.)

To all whom it may concern:

Be it known that we, JAMES BELL, WILLIAM CHARLES MELVILLE, and JAMES WILLIAM FOSTER, subjects of the Queen of Great Britain and Ireland, residing at Liverpool, in the county of Lancaster, England, have invented certain new and useful Improvements in Machinery Connected with Winches, of which the following is a specification.

This invention has reference to winches for raising very heavy loads where wire ropes of large size are employed and where, when lifting the loads, it is not permissible to have on the winding-barrel more than a single coil of rope—that is, where the convolutions of rope cannot be superposed one upon the other—this prohibition being rendered necessary by the fact that in raising heavy weights if the coils were superposed the pressure of the one upon the other would so damage the rope as to make it useless after using once.

The invention will be described with reference to the accompanying drawings, in which—

Figure 1 is a side elevation, Fig. 2 an end view, and Fig. 3 a plan, of the winch. Fig. 4 is an internal view showing the interior barrel laid out flat. Fig. 5 is a sectional elevation, and Fig. 6 a plan in section at the line A A, Fig. 5, showing a modification of a part of the winch.

By this invention where only a certain length or quantity of the rope used is carried on the hauling or winding drum the remaining portion of the rope is carried on a reel, drum, or like device, which revolves at the same rate as the winding-drum, the unused portion being passed direct from the winding drum or barrel to the reel or barrel carrying it.

Referring to the drawings, the winch consists as follows: On the base-plate *a* there are two lower frames *b*, one at either side, above which are two upper half side frames *b'*, fitting on and bolted to *b*. Supported by these is a hollow winding-barrel *c*, the ends *c'* of which work in the side frames, which form bearings to the barrel, and on the end of this barrel is a reel *c²*, by which the unused portion of the rope is carried. The

barrel *c* is worked by worm-wheels *d*, fixed on the barrel *c* inside the frames *b b'*, worms *e* engaging with and driving them, these worms being worked by worm-wheels *f* on the shafts *e'*, driven by worms *g*, mounted on the shaft *g'*, said shaft being rotated by a worm-wheel *h* thereon, driven by a worm *i*, supported in one of the flanges *b'* and driven by the bevel-wheels *j* from the shaft *k*, this shaft being worked or revolved by suitable power.

As regards the construction of the barrel *c* and the arrangement of parts connected with it for storing and manipulating the rope *o* at the starting of a hauling or lifting action of the winch, the rope will be in the condition shown in Figs. 2 and 3—that is, little or none of it will be on the barrel, while the part of it between the barrel *c* and the body to be moved would be fairly tight, the remainder of the rope being coiled on the winch or reel *c²*. The mode of passing this part of the rope to the reel *c²* is shown more particularly in Figs. 3 and 4. In the barrel, at one side, there is a hole *c³* of gradual curvature, so as not to bend the rope at too great an angle in passing into the interior of the barrel, and in the interior of the barrel it is passed over grooved guides *c⁴* of suitable curvatures, on the interior of the barrel, to and fro, by which when tension is put upon the rope friction would be created and assistance to the holding of the rope afforded. Then between the second guide *c⁴* and the reel *c²* there is introduced a wire-rope-gripping device *l* of any known suitable kind, such as are commonly used for gripping and holding wire ropes, by which the actual holding and making fast of the rope is effected. From this device the rope is passed over the reel *c²*, on which it is not in tension, it being wound thereon merely to carry the unused portion of the rope.

By the construction described not only is the unused portion carried, but also the lead of the rope from the exterior of the barrel *c* to the reel is nowhere bent or turned at such an angle as to injure the rope—that is, the curves which it takes are easy and gentle. It will be seen that in action as the barrel revolves so the unused portion revolves with it.

As regards the main gearing of the ma-

chine, each of the main worms e which drive the barrel has its shaft e' vertically mounted and the lower end of it provided with rings e^2 , which fit and work in corresponding grooves 5 in the part b^3 of the frames b . By this construction a suitable thrust-block bearing is provided which takes all the strain which comes upon the shafts e' and worms e .

A modification of this method of supporting the shaft e' is illustrated in Figs. 5 and 6, 10 and the improvement consists in the employment, in connection with the machine, of hydraulic means for supporting the shaft e' and an indicating means by which the pressure 15 on the winch and the rope will be ascertained. This consists, essentially, in carrying the lower ends of the shafts e on pistons supported on oil or other suitable liquid. In the example given in the drawings the collars e^2 of the 20 shaft e' work in and are carried on a block p , made in halves and prevented from rotating by a key q' on the retaining-bracket q , and the lower end of the shaft e' and block p rest upon a piston r , working in a cylinder s in 25 the bed-plate a of the winch. In some cases the cylinders s are connected together. The shaft e' is mainly kept in position vertically by the cap v . Only a small amount of movement is allowed to the shaft e' , and the amount 30 of this is indicated by the space t between the upper ring e^2 and the metal of the machine above it. The adjustment, vertically, of the shaft e' is effected by a screwed plug u , which 35 screws in and out of the cylinder u' , which is connected to the cylinder s by a passage u^2 and is filled with oil, and accordingly as it is screwed in or out so the piston s and the shaft e' are raised and lowered, respectively. To 40 indicate the pressure on the shaft and piston, and so the lifting-rope, a suitable pressure-gage will be used in connection with the cylinders s or u' . By this mode of adjusting, and also indicating, the pressure on the two shafts 45 of a winch and the pressure on both sides of the winch can be regulated, and the strain ascertained; and besides this, when several winches are used together for raising a single body of great weight, as when raising a ship, the strain on the different machines acting 50 upon it can be seen at once and controlled or regulated as required.

The gear introduced between the worms e and the motive power, whatever it may be, may be varied according to circumstances or

as desired, and in no way is it restricted to the 55 particular gearing shown and described.

It is to be stated in conclusion that although the invention has been mainly described with reference to the accompanying drawings, in 60 which a particular construction and arrangement of parts of a winch are given, and which is a convenient one and may be used with advantage, yet it is not restricted to the particular form or construction given in the drawings, since it can be modified or varied in 65 these respects without departing from the chief characteristics of the invention; and

What is claimed as the several characteristics of the invention is set out or referred to 70 in the following claiming-clauses:

1. In combination the frame, a hollow winding-drum journaled therein at its ends, a reel on the end of the drum beyond the frame and adapted to receive the loose end of the rope projecting from the hollow end of the drum, 75 said drum having a passage-way extending from inside to outside for the passage of the rope and means for operating the drum, substantially as described.

2. In combination, the frame, the hollow 80 winding-drum having bearings in said frame, a supplemental drum arranged at the end of the hollow drum, guiding means for directing the unused end of the rope through the hollow drum and rope-gripping means in the interior 85 of the hollow drum.

3. In machinery for hauling wire ropes of large size, the combination of a hollow winding-barrel c adapted to have wound upon it in a single coil the part of the rope being 90 used; a secondary barrel or reel rotated at the same rate of revolution as the winding-barrel, and adapted to carry the part of the rope not being used, the rope being passed thereto through the interior of said winding-barrel; 95 and frictional curved guides c^4 on the interior of the barrel, over which the rope is passed, and by which the friction is put upon it; substantially as described.

In testimony whereof we hereunto affix our 100 signatures in presence of two witnesses.

JAMES BELL.
WILLIAM CHARLES MELVILLE.
JAMES WILLIAM FOSTER.

Witnesses:

ERNEST R. ROYSTON,
FREDERICK JOHN CHEESBROUGH.