

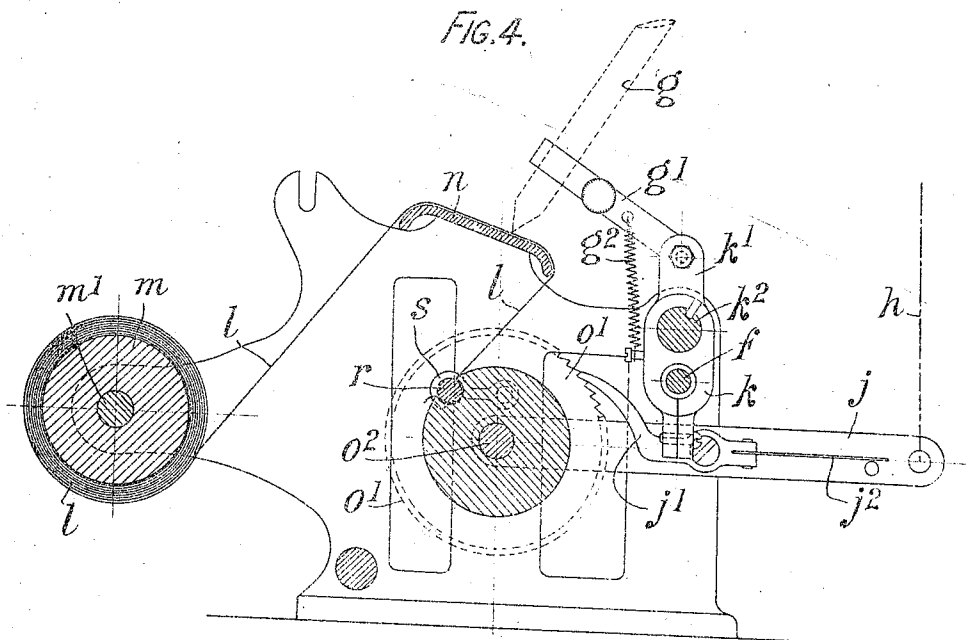
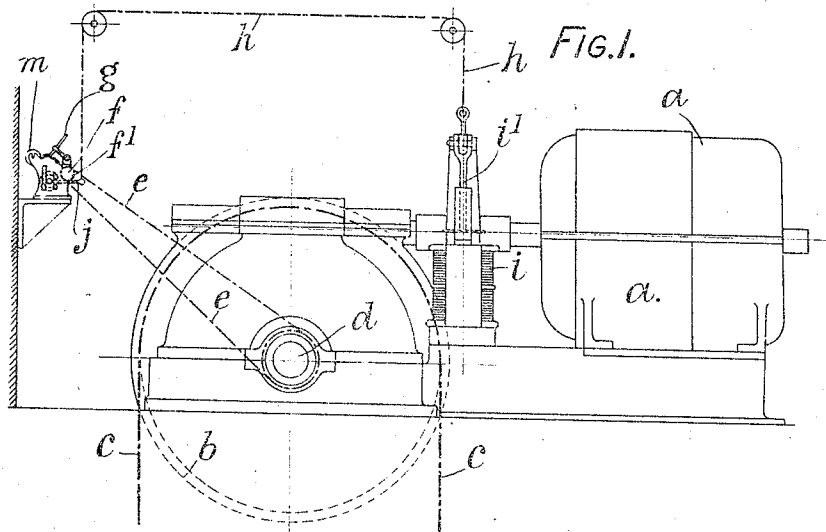
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H. A. MATEAR, T. F. KENNEY & H. WOODHOUSE.
RECORDING AND INDICATING THE WORKING OF HYDRAULIC AND ELECTRIC LIFTS OR HOISTS.
APPLICATION FILED AUG. 13, 1910.

1,038,922.

Patented Sept. 17, 1912.

3 SHEETS--SHEET 1.



WITNESSES

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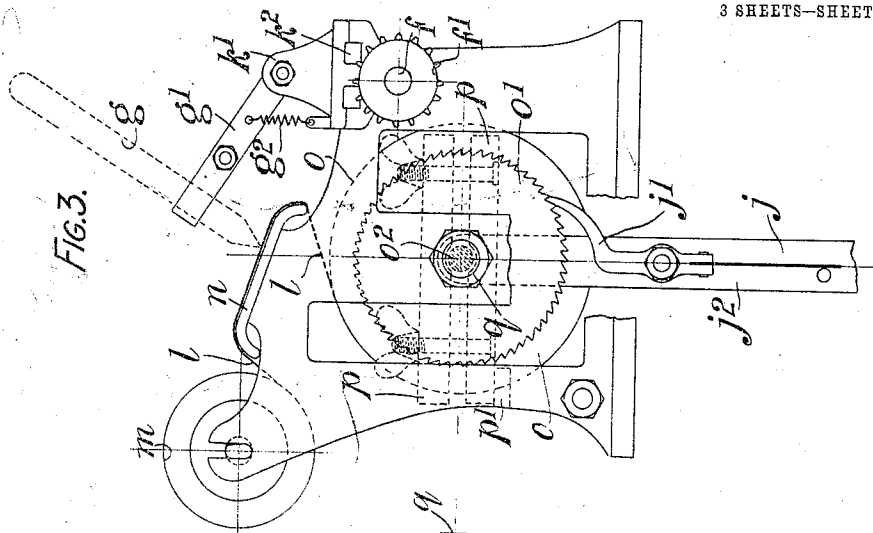
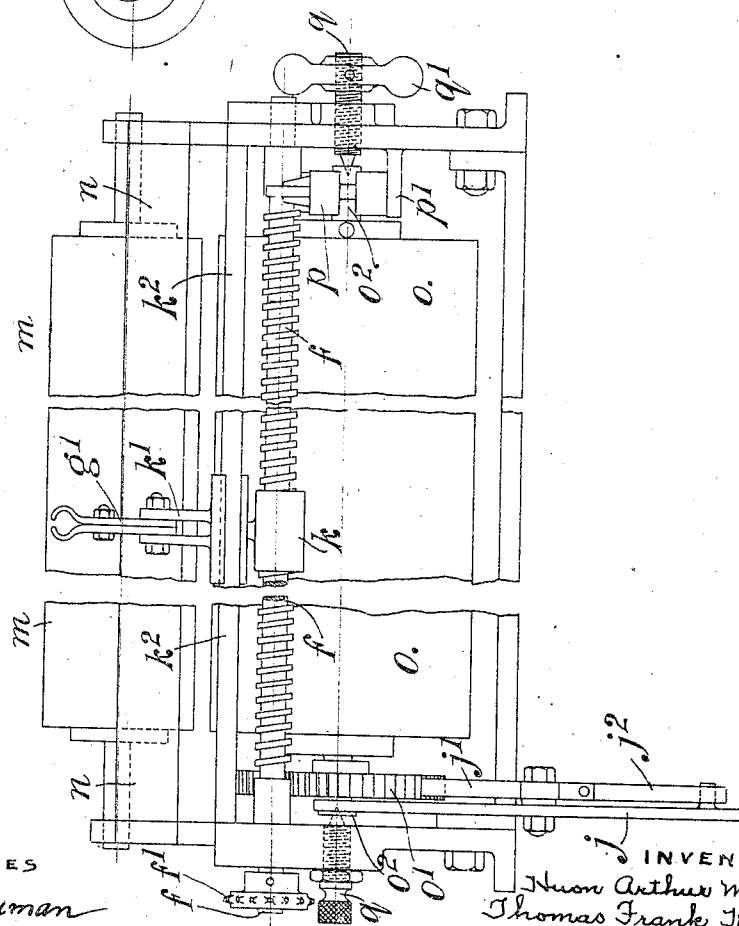


FIG. 2.



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3 SHEETS—SHEET 3.

Fig. 5.

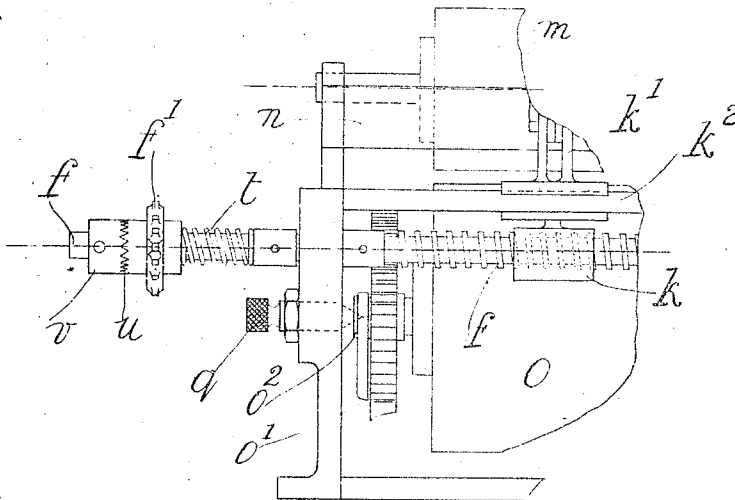
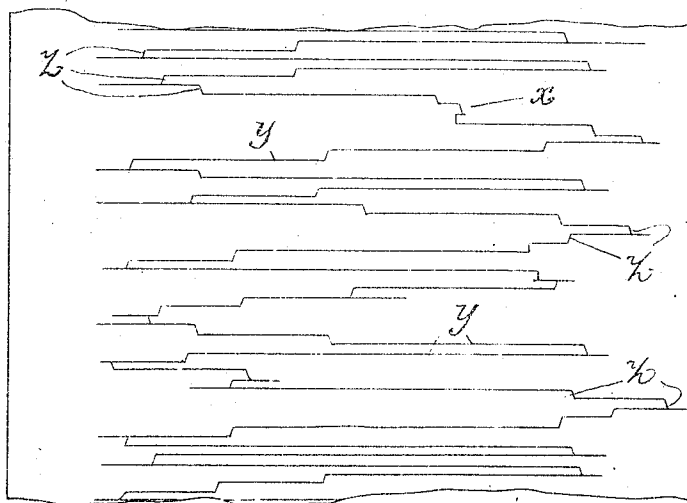


Fig. 6.



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UNITED STATES PATENT OFFICE.

HUON ARTHUR MATEAR, THOMAS FRANK KENNEY, AND HENRY WOODHOUSE, OF
LIVERPOOL, ENGLAND.

RECORDING AND INDICATING THE WORKING OF HYDRAULIC AND ELECTRIC LIFTS OR
HOISTS.

1,038,922.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed August 13, 1910. Serial No. 577,114.

To all whom it may concern:

Be it known that we, HUON ARTHUR MATEAR, THOMAS FRANK KENNEY, and HENRY WOODHOUSE, subjects of the King of England, residing at Orleans House, Edmund street, Liverpool, in the county of Lancaster, England, have invented new and useful improvements in or connected with the Recording and Indicating of the Working of Hydraulic and Electric Lifts or Hoists, of which the following is a specification.

This invention has reference to lifts or hoists, primarily electrically operated lifts or hoists, and has reference more particularly to means for recording the movements of the lift or hoist; and it has for one of its objects to provide mechanism or apparatus for recording how the lift is operated, that is to say, whether it is carefully or carelessly operated by the attendant, or whether the lift is brought to a standstill by the attendant at its proper position by one actuation of the lift stopping and starting mechanism, or whether the attendant has to make several attempts before the lift is brought to its proper position, that is, with the floor of the lift level with the floor of the building to which the lift may be raised or lowered.

For recording the movements of the lift, there is connected with the operating or switch handle a recording sheet or the like, such for instance, as a paper strip working over a drum, or a pair of drums with a length of paper passing from one to the other; and in connection with it a marker or stylus is used; and these are so operated by the lift in its motion, and by the switch in its action—directly or indirectly—that a record of the working is effected. For instance, one of such drums may be adapted to be partially rotated so as to cause the length of paper to move forward by means of the switch mechanism when operated. This movement may be imparted to the drum or drums by means of ratchet or other mechanism, and adapted to gear with a part of the switch, or a part connected therewith. In this arrangement, over the face of the paper or drum is arranged a recording pencil or stylus, which is adapted to move transversely of the length of paper as the lift travels up or down, the movement of the recording device being in one direction when

the lift is traveling up, and in the opposite direction when the lift is traveling down.

The invention is further described with the aid of the accompanying drawings, which illustrate an electrically operated lift with a recording apparatus having the characteristics as above described, but while this particular form of apparatus is convenient and advantageous, the invention is not restricted to it, but under varying conditions of use, may be modified and arranged differently to suit such varying conditions; and while it is shown as applied to an electrically operated lift or hoist, it is to be understood that with suitable modifications, it may be applied to lifts operated hydraulically, or otherwise.

In the drawings, Figure 1 is a diagrammatic view showing the apparatus and the upper part of the electric lift machinery. Fig. 2 is a front elevation, and Fig. 3 an elevation of the recording apparatus proper; and Fig. 4 is a cross section showing a slight modification of the apparatus. Fig. 5 is a view of part of Fig. 2 illustrating an automatic clutch mechanism between a driving sprocket wheel and a screw which serves to move the recording marker; and Fig. 6 illustrates a part of a record obtained from such apparatus.

Referring now to the drawings, *a* represents the electric motor, and *b* the pulley over which the lift cage ropes—which are indicated by the dotted lines *c*—pass; and *d* is the pulley shaft. In the case shown, the motion of the lift cage is transmitted to the recording instrument—the construction of which is shown in Figs. 1 to 4—from the shaft *d* through a sprocket chain *e*, or other driving gear, which passes over and revolves a wheel *f* on the threaded shaft *f*; and this operates the marker *g* to and fro in the manner hereinafter explained. The paper which is to be marked upon by the marker *g*, is moved forward the required amount at each actuation of the switches of the motor, through a cord or chain connection *h*, which may be directly connected to the plunger or core *i* of the solenoid *j*, connected with and operating the brakes of the machinery, the solenoid being energized and deenergized with the switch is operated in stopping and starting the lift. Or, the means for operating the paper feeding device may be di-

rectly connected to a part of a switch mechanism, if it is more convenient or desired. This motion is transmitted to the paper through the cord or connection *h* by a vibrating lever *j*, connected with the paper moving mechanism and apparatus, which it operates in the manner hereinafter described. Thus, in the arrangement shown, the marker *g* is operated by the lift cage or chamber raising and lowering part of the lift machinery, while the paper moving mechanism is operated, indirectly, through the movement of the switch mechanism of the lift machinery; but the invention is not restricted to this particular manner of operation, as for instance, the marker might be moved by the switch mechanism directly or indirectly, and the paper moved by the raising and lowering part of the machinery.

Referring now more particularly to the drawings—Figs. 2 and 3, showing the apparatus in detail, on the threaded spindle *f* there is provided a nut *k* having connected with it a fitting *k*¹ which slides on the bars *k*², and supports on a hinge the carrier *g*¹, in which the marker *g* is fixed; and as the shaft *f* is revolved in one direction or the other from the raising and lowering part of the machinery of the lift, the marker *g* will be moved backward and forward in the apparatus transversely. The paper strip—which is designated *l*—is stored on the roller *m*, and passes over a table *n*, and leads onto a winding on the roller *o*, which is adapted to be moved a certain amount each time the switch is operated through the lever *j*; this movement being effected by a pawl *j*¹ upon the lever, and a ratchet wheel *o*¹ on the spindle *o*² of the shaft of the roller *o*, which causes the roller to be given a partial revolution each action, and so moves the paper *l* under the pencil or marker *g* a short distance each time the switch is operated. The pawl *j*¹ is normally pressed toward the ratchet wheel *o*¹ by a spring *j*²; and the marker carrying arm *g*¹ is normally pressed toward the table *n* by a spring *g*². The shaft *o*² of the roller *o* has a clamped brake *p* connected with it, operating in connection with a stop *p*¹, so that the rotation of the roller *o* is braked and steadied when being actuated. In the apparatus shown in Figs. 2 and 3, the roller *o* is supported by conical pivot pins *q* at each end, the ends of which fit into conical sockets in the shaft *o*²; and one of these pivots has an operating handle *q*¹ for easily screwing it up and unscrewing it, so that the roller *o* can be readily taken out when full, and a fresh sheet fastened to it when required. In the operation of this arrangement of the apparatus, the actuation of the switch causes the drum *o* to be partially rotated, and a length of paper *l* to be moved a predetermined distance; and this opera-

tion will cause the recording marker *g* or device to make a mark *z* (Fig. 6) on the recording sheet or paper *l* lengthwise; and when the switch is moved so as to start the lift in one direction or the other, the recording device *g* will be caused, through the threaded shaft *f* and nut *k*, to travel transversely of the apparatus and shaft, and mark a transverse line *y* on the paper. In bringing the lift or hoist to a standstill at any certain floor or level, if the attendant is careless in effecting this, or the lift or hoist is caused to travel either too far, or not far enough, and this requires a further operation of the stopping and starting switch, or if the attendant is not proficient in the operation of the lift or hoist, these two or three attempts at bringing the lift to its proper position, and any other sudden or improper working of the lift or hoist, will be recorded and exhibited by means of short lengths of vertical and horizontal lines as indicated at *x* in Fig. 6; whereas, if the lift or hoist has been operated and brought to its proper position at a single operation, there is simply one short length of line *y* in the longitudinal direction of travel of the paper at each point of stoppage; and the absence of other markings will show the lift or hoist to have been properly and carefully worked.

By the above means, the proficiency of the attendant is exhibited and recorded; and this will cause him to take greater care in the work of operating the lift or hoist, as not only is such careless operation inconvenient to persons carried by an electric lift, but it also means waste of power in operating electric lifts or hoists, and is very liable to cause damage and serious expense. The above means also provide a record of how many times the lift has been in use, and the floors of the building to which the lift is operated, and is a general index and record of its action.

In the modification shown in Fig. 4, the end of the strip of paper *l* is fastened and secured onto the winding on roller *o*, by a rod *r* which fits into a recess in the roller, and is held in position by hooks *s* secured onto the ends of the roller. To fasten the paper in position on the roller, the end of it is placed over the groove in it, and then the rod *s* is placed in position over the paper, and pressed into the groove, and is fastened in this position by the hooks *s*. In such a case, the storing roller *m* may be adapted to hold a large quantity or store of paper; and when a certain amount is wound on the roller *o*, say for a given time, the sheet can be torn and cut, and the record removed from it, and then the fresh edge of the paper fastened and secured to the roller *o* as described, and the machine can then go on recording. This can be repeated

until all the paper on the roller end has been so used.

A governing grip brake, similar to *p*, may be used in connection with and applied to both the spindle *o*², and the spindle *m*¹ of the storing roller *m*, and this will prevent the paper becoming slack, and will hold it taut in the required manner.

In some cases, lift ropes slip somewhat on the upper supporting pulleys, and this has the effect of disarranging the concurrent action or movement of the driving wheels and the marker, and to counteract this, there may be provided on the spindle *f* a clutch or equivalent slip device *u* which serves to engage the wheel *f*¹, with a collar *v* mounted on the spindle, and adapted to revolve therewith. The wheel *f* is free to slide longitudinally on the spindle *f* being held in engagement with the collar *v* by a spring *t*—and to be revolved therewith under normal conditions, but should any resistance to the revolution of the shaft take place, due say to the marker carrier reaching the end of its predetermined stroke, the sprocket wheel *f*¹ will be disengaged from the collar *v* and will then revolve freely on the shaft, and so danger of the marker coming off the paper, or the apparatus becoming deranged, is avoided.

What is claimed is:—

1. Means for recording and indicating the working of lifting and hoisting apparatus comprising means for moving a length of recording paper, a recording marker, a mechanism for obtaining relative motion between the marker and the paper in one direction, a part which is connected with and moves with the apparatus when it is in use, means for transmitting motion from the said part to the mechanism for obtaining the relative motion, means for controlling the operation of the lifting and hoisting apparatus, and means for obtaining relative motion between the marker and the paper connected with the controlling means.

2. Means for recording and indicating the working of lifting and hoisting apparatus comprising means for moving a length of recording paper, a recording marker, mechanism for moving the marker transversely of the paper, a part which is connected with and moves with the apparatus when it is in use, means for transmitting motion from the said part to the transverse moving mechanism, means for controlling the operation of the lifting and hoisting apparatus, and means connected with the controlling means for moving the recording paper longitudinally.

3. Means for recording and indicating the working of lifting and hoisting apparatus comprising means for moving a length of recording paper, a recording marker, a carrier for the marker having a screw nut,

a screw engaging the said nut, means for rotating the screw and moving the nut and carrier with its marker transversely of the paper, means for controlling the operation of the lifting and hoisting apparatus, a winding on the roller having a ratchet wheel connected therewith, an arm having a pawl, the latter of which engages with said wheel, and means connecting the said arm to the controlling means for actuating it.

4. Means for recording and indicating the working of lifting and hoisting apparatus comprising means for moving a length of recording paper, means for controlling the operation of the apparatus, a length of recording paper, means for intermittently moving the paper lengthwise for predetermined distances connected with the said controlling means, a recording marker, a spring held marker carrier connected with a screw nut, a screw disposed transversely of the paper and engaging the said nut, a sprocket wheel on the said screw, a hoisting and lifting pulley shaft, a toothed wheel connected with said shaft, and means connecting the said wheels together and imparting motion to the screw and nut when the apparatus is in use.

5. Means for recording and indicating the working of lifting and hoisting apparatus comprising means for moving a length of recording paper, means for controlling the operation of the apparatus, means connected with the control means for intermittently moving the paper, a recording marker, a carrier for the marker having a nut, a screw engaging the nut, means for imparting motion to the screw, clutch mechanism for engaging and disengaging the screw and the motion imparting means, and a part connected and movable with the apparatus and connected with the said motion imparting means.

6. Means for recording and indicating the working of lifting and hoisting apparatus comprising means for moving a length of recording paper, a recording marker, a spring controlled and adjustable carrier for the marker having a nut portion, a screw engaging the said nut disposed transversely of the paper, a sprocket wheel on the said screw, a clutch mechanism for engaging and disengaging the said screw and sprocket wheel, a spring for holding the clutch in the engaging position, a hoisting and lifting apparatus pulley shaft, a toothed wheel on the said shaft, a chain gearing the two wheels together, means for controlling the operation of the apparatus, a winding on roller having a recess; means for holding one end of the length of recording paper in the winding on roller recess, comprising a rod and hooks engaging the ends of the rod; a recording table disposed beneath the roller.

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cording marker; a ratchet wheel connected with the winding on roller, a pivoted arm carrying a spring controlled pawl which engages the ratchet wheel; a flexible connection between the said arm and the means for controlling the apparatus and which serves to partially rotate the winding on roller intermittently; and braking mechanism controlling the movement of the recording paper.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HUON ARTHUR MATEAR.
THOMAS FRANK KENNEY.
HENRY WOODHOUSE.

Witnesses:

SOMERVILLE GOODALL,
DONALDSON PETER COULTER.