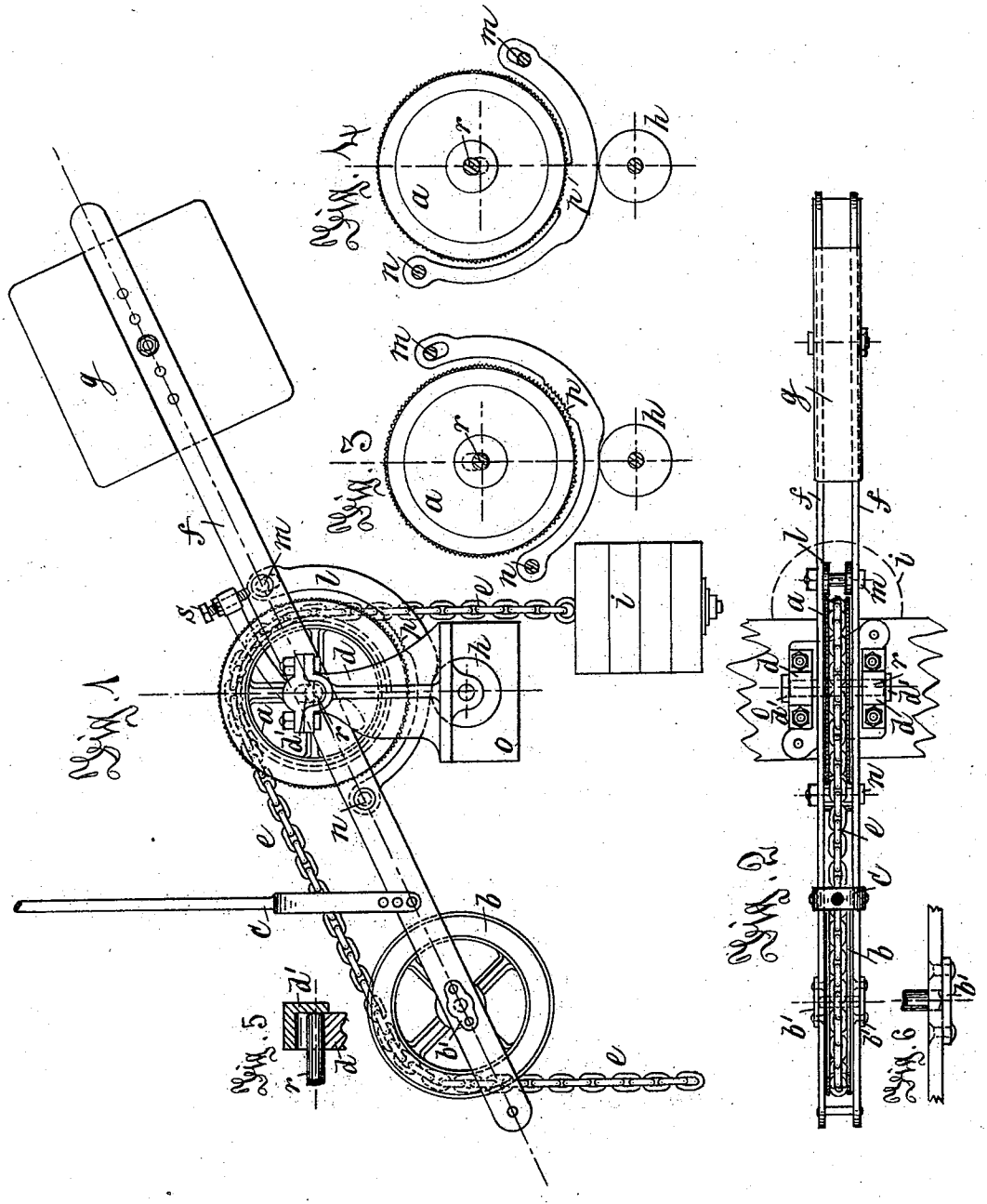
(No Model.)

J. FISHER.

SIGNAL WIRE COMPENSATOR.

No. 506,106. Patented Oct. 3, 1893.



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UNITED STATES PATENT OFFICE.

JOHN FISHER, OF MATLOCK, ENGLAND.

SIGNAL-WIRE COMPENSATOR.

SPECIFICATION forming part of Letters Patent No. 506,106, dated October 3, 1893.

Application filed February 4, 1893. Serial No. 461,024. (No model.)

To all whom it may concern:

Be it known that I, JOHN FISHER, gentleman, a subject of the Queen of Great Britain, residing at Matlock, in the county of Derby, England, have invented an Improved Apparatus for Keeping Constantly Stretched the Wires Used for Actuating Signals upon Railways and for other Purposes of the Like Kind, of which the following is a specification.

My invention relates to the wires used for actuating semaphore or other mechanical signals situated at considerable distances from the point where the signalman is situated. Such wires are liable to vary in length by fluctuations in temperature, by the strain upon them and from other causes, and attempts have been made to provide means for automatically compensating such variations in length and for keeping the wires uniformly stretched, but such attempts have not hitherto been successful, and the object of my improvement is to insure the signal wires being kept properly stretched, and being automatically connected to the signalman's lever when the latter is being used and automatically disconnected from the lever when it is out of use, without the possibility of failure. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the entire apparatus; Fig. 2 a top view of the same; and Figs. 3 and 4 detailed views of the chain wheel and friction bar in different positions, and Figs. 5 and 6 show further details on an enlarged scale.

Similar letters refer to similar parts in the different views.

In such apparatus it is necessary that the wire which extends from the lever actuated by the signalman to the distant semaphore or other signal which remains normally in the position indicating "danger" should be kept permanently and uniformly stretched while in such position, and for this purpose the wire after passing over a pulley at the signalman's station has suspended to it a weight sufficiently heavy to keep it properly stretched under all circumstances but not sufficient to prevent the greater weight at the distant signal from raising it when the latter is brought to the position indicating "danger." In this position the lever worked by the signalman is practically disconnected from the wire, but when he moves the lever over for the purpose of lowering the signal from the danger position, it becomes automatically connected with the wire which is therefore pulled with sufficient force to raise the signal weight and lower the signal. When on the other hand the lever is brought back the wire is also brought back and the signal returns to the danger position, the wire being then freed so that the weight suspended to it keeps it properly stretched in spite of variations of temperature or other causes tending to alter its effective length.

It is necessary that the apparatus should be absolutely reliable and incapable of getting out of order and this I effect by my present invention.

f is a horizontal lever turning upon a pivot *r* at or near the center of its length supported in fixed bearings *d*. This lever *f* is made double (as shown in Fig. 2) the two sides being parallel but at a short distance apart, and at the outer end is arranged a pulley *b* turning in bearings in the lever, over which pulley a chain *e* is passed, the lower end of the chain passing down and under a fixed pulley (not shown in the drawings) and being connected to the end of the signal wire in the usual way. Upon the center *r* on which the lever is pivoted as described, and between the two parallel sides of the latter is fitted a pulley *a* which can revolve freely independently of the lever. This pulley is grooved at its circumference with a groove of such shape as to receive the chain *e* which passes over it from the pulley *b*, without the possibility of the chain slipping in the groove. The end of the chain *e* passing down from the grooved pulley *a* has attached to it a weight *i* sufficiently heavy to keep the wire properly stretched and the inner end of the lever *f* is provided with an adjustable weight *g*. The lever is also connected to a vertical or other rod *c* (shown broken off) communicating with the ordinary signal-man's lever or handle. It is evident that if the last named lever or handle be now pulled over, the outer end of the pivoted lever *f* will be raised without altering the position of the signal wire, but if the grooved chain pulley *a* be first rigidly

attached to the pivoted lever *f*, then when the handle is pulled the pulley *a* will be turned with the lever and will draw the chain *e* with it, the signal wire being also pulled and the distant signal being thereby lowered, the stretching weight *i* suspended from the end of the chain also descending for a corresponding distance.

For the purpose of connecting and disconnecting the grooved pulley *a* from the pivoted lever *f* at the right times and with absolute certainty and freedom from risk of failure, I make the bearings *d* in which the pivot *r* of the lever *f* and grooved pulley *a* turns sufficiently elongated vertically (as shown in Fig. 1) so that it together with the lever *f* and pulley *a* can rise for a short distance, and to the lever I attach a semi-circular or curved bar *l* which passes round under the lower side of the pulley *a*, its ends being pivoted to the lever *f* at *m* and *n* between the two sides of the latter, and the hole through which the pivot at one of its ends passes being also somewhat elongated vertically as shown at *m*, so that it can rise and fall for a short distance, the curve of the lower side of the bar *l* being such that when raised it is concentric with the pulley *a*. This lower side of the bar rests upon a friction roller *h* turning in bearings below the pulley, which bearings may be made adjustable.

Upon the upper side of the curved bar *l* below the pulley *a* is a friction block or brake at *p* having teeth which fit into similar teeth made round the flange of the wheel *a*. The lower curved bar *l* which carries the friction block is made of less depth at and near its outer end so that when the pivoted lever is in its normal position (as shown in Figs. 1 and 3) such reduced part rests upon the friction roller *h* below, the friction block or brake *p* being clear of the pulley, and the central pivot *r* of the lever *f* and pulley *a* rests upon its bearings. When however the signal handle is pulled over the outer end of the lever *f* is raised and the enlarged part of the curved bar *l* comes upon the friction roller *h* below (as shown in Fig. 4) the friction block *p* being forced against the pulley *a* and the latter together with the pivoted lever *f* being raised somewhat from their bearings so that their whole weight forces the pulley *a* against the brake block.

As the movement of the handle is continued the wheel *a* locked as described to the lever *f* by the brake block *p* is turned with the latter and draws the chain *e* with it, the lower enlarged concentric part of the curved bar *l* moving over the friction roller *h* (as illustrated in Fig. 4) and slipping or failure being impossible. When the handle is brought back it brings the pulley *a* with it, until the reduced part of the curved bar *l* reaches the friction roller *h* when the brake block *p* is released, the pulley *a* and pivoted lever *f* return to their bearings, and the former is free to revolve and to allow the weight *i* to keep the wire stretched. The curved bar *l* has an opening through which the chain *e* passes to the weight *i*. An adjustable screw, as shown at *s* may be made to insure the release of the brake block *p*.

In order to prevent lateral play and to reduce friction, I preferably make the pivots of the pulleys of such length that they do not project beyond the bearings in which they turn, and I fit and attach plates outside the latter (as shown at *b'* in Figs. 1 and 2, and on an enlarged scale in Fig. 6) which effectually prevent any lateral play of the pivots and reduce friction.

The bearings of the pivot *r* may be provided with plates of a similar kind formed upon the covers of the bearings, as shown at *d'* in Figs. 1, 2, and 5.

Instead of teeth round the flange of the pulley *a*, they may be made round a separate wheel or disk attached to the pulley *a*. The teeth upon the pulley and upon the brake *p* may be made of any suitable shape to give sufficient adhesion between the pulley and the brake.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In apparatus for actuating signals, the combination of the lever *f*, loose chain wheel *a*, vertically elongated bearings *d*, curved bar *l* pivoted at *n*, and movable vertically on pivot *m*, friction roller *h*, chain *e*, and weight *i*, arranged and operating substantially as and for the purpose described and illustrated in Figs. 1, 2, 3, and 4.

2. In combination with the curved bar *l*, loose pulley *a*, and elongated bearings *d*, the friction block or brake, substantially as described and illustrated in Figs. 1, 3, and 4.

3. In combination with the lever *f*, and pulleys *a*, *b*, the plates *b'*, *d'*, against which the ends of the pivots bear, substantially as and for the purpose described and illustrated in Figs. 1, 2, 5, and 6.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN FISHER.

Witnesses:
EDMUND EDWARDS,
ARTHUR ERNEST EDWARDS.