

UNITED STATES PATENT OFFICE.

WILHELM MORELL, OF LEIPZIG, GERMANY.

SPEED-INDICATOR.

1,053,202.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILHELM MORELL, a subject of the King of Prussia, and resident of Leipzig, Germany, have invented a new and useful Improvement in Speed-Indicators, of which the following is a specification.

This invention relates to a speed indicator, in which a fly-mass operating after the principle of the circular or rotary pendulum is made use of.

My improvement consists in transmitting the movement from the fly-mass to the pointer of the indicator and not directly, but indirectly, *i. e.* by the mediation of elastic or yielding parts which are adapted to compensate or render harmless the shocks or pushes occurring particularly in such apparatus or machines as explosion motors and similar engines.

Referring to the accompanying drawing: Figure 1 is a vertical longitudinal section through one form of construction of my improved indicator. Fig. 2 is a vertical cross-section. Figs. 3, 4, 5 are some details, which will duly be referred to hereinafter.

Some known parts and combinations of parts, such as the counting wheel-work, the dial, and similar components of the apparatus are left away because they are not in any connection with the present invention.

The shaft *a*, Fig. 1, serves for transmitting the motion from the rotating part whose rotary speed shall be measured to the indicator. The latter has a shaft *d* connected by bevel-wheels *b* *c* with the shaft *a*. The shaft *d* is surrounded by, and carries, the fly-wheel like fly-mass *e* which may swing upon and around a horizontal axis crossing the shaft *d*, and which is under the action of a spring *d'* tending to hold the fly-mass in an oblique position. The shaft *d* has also a grooved roll *g* which is displaceable upon said shaft and is supported by a spring *e'* surrounding the same. A rod *f*, Fig. 2, hinged at one end to the roll *g* and at the other end to the fly-mass *e* connects these two parts with each other.

Into the groove of the roll *g* projects a pin *h* which is adjustably attached to the forked end of a bent arm *i* provided with a sleeve *j* which is located upon an axle *k* held by arms *g* *s* forming parts of the frame (Figs. 3, 4 and 5). To the sleeve *j* is secured a spring *n*, the two ends of which form a fork having between its prongs a pin

m (Fig. 4) projecting forth from a toothed sector *l* also held by said axle *k*. The sector *l* is in mesh with a pinion *o* fixed to the shaft *p* of the pointer *r*. The pinion *o* is connected with a cog-wheel of considerably larger diameter which forms part of a train of wheels serving for actuating a fly-or wind-brake *z* (Fig. 3) such as known in the art of clock-making. The fly *z* consists of a small metal-plate, which, when rotating, is subjected to the resistance of the air which in its turn acts like a brake and prevents a too quick rotation of the train of wheels in general and of the pinion *o* in particular. In other words; the pointer *r* is prevented from jerking. As soon as the shaft *a* and thus also the shaft *d* commence to rotate, the rotating fly-mass *e* changes, *i. e.* diminishes its inclination with respect to the horizontal plane containing the axle of that mass, and consequently the roll *g* is drawn downward by means of the bar *f*. The roll *g* moves the pin *h*, the arm *i*, the sleeve *j* and the spring *n*, and the ends of the latter, *i. e.* the fork, move the pin *m*, the sector *l*, the pinion *o*, the shaft *p* and the pointer *r*, which thus indicates upon the dial (not shown) the speed of the explosion motor or some other engine or apparatus.

Since the speed indicator in question is intended chiefly for apparatus in which a quick succession of shocks or pushes occurs, as in explosion motors, the object of the invention is to prevent the pointer from being affected, for instance oscillated, by said shocks or pushes, and I attain this object by transmitting the motion to the pointer not by rigid parts, but by elastic ones, such as the fork-forming ends of the spring *n*. There is, of course, a certain inertia in the parts *m*, *l*, *o*, *p*, *r*, and owing thereto these parts do not instantly give way to every impulse or pressure of the spring *n* in one or the other direction. There results always a medium pressure dependent, of course, upon the speed. As soon as the speed changes, the position of the pointer *r* changes also, but without any jerk, oscillation or the like, and also at a uniform rotation of the motor the pointer does not jerk or oscillate, but it stands quiet and allows of an easy, convenient and distinct reading.

To adjust the pointer upon zero when the apparatus is at rest, I have provided two means, the one for the coarse or initial adjustment, the other for the fine or ultimate

adjustment. The first is brought about by suitably displacing the pin *h* within the forked free end of the arm *i*, and the other is effected by means of a screw *v* (Figs. 2, 3) adapted to act upon a laterally projecting arm of the sector *l*.

Having now described my invention, what I desire to secure by a patent of the United States is:

10 1. In a speed-indicator having a fly-mass operating after the circular pendulum principle, the combination with said fly-mass, of a pointer, a plurality of transmitting-means between the said fly-mass and said pointer;
15 said transmitting means comprising an elastic fork, and a pin projecting into said fork, for the purpose as described.

2. In a speed-indicator having a fly-mass operating after the circular pendulum principle, the combination with said fly-mass of means for rotating the same, a pointer, a plurality of means for transmitting the movement of said fly-mass to the pointer, said transmitting means comprising a fork

having elastic prongs, and a pin projecting between said prongs, for the purpose as described.

3. In a speed-indicator having a fly-mass operating after the principle of the circular pendulum, the combination with said fly-mass of a grooved roll adapted to be displaced by the same, a pin projecting into the groove of said roll, an arm having said pin attached to it, a pointer, a shaft for the same, a pinion upon said shaft, a sector in mesh with said pinion, a pin fixed to said sector, and a spring establishing a connection between this pin and said arm and adapted to transmit the movements of the said pin elastically to the said arm, for the purpose as described.

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

WILHELM MORELL.

Witnesses:

RUDOLPH FRICKE,
ALBERT R. MORAWETZ.