No. 697,140. Patented Apr. 8, 1902.

A. GOLDSCHMIDT.

DEVICE FOR COMPENSATING FOR WEAR IN SHOES OF HYDRAULIC BRAKES.

(Application filed Dec. 11, 1901.)

(No Model.)

Fig. 1.

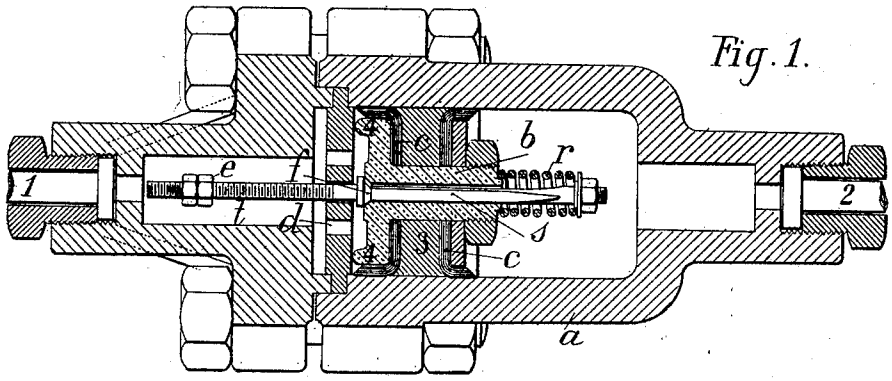
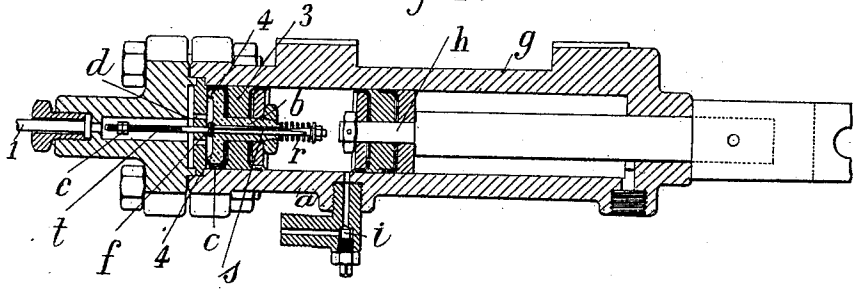


Fig. 2.



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ANDRÉ GOLDSCHMIDT, OF PARIS, FRANCE.

DEVICE FOR COMPENSATING FOR WEAR IN SHOES OF HYDRAULIC BRAKES.

SPECIFICATION forming part of Letters Patent No. 697,140, dated April 8, 1902.

Application filed December 11, 1901. Serial No. 85,509. (No model.)

To all whom it may concern:

Be it known that I, ANDRÉ GOLDSCHMIDT, residing at 73 Rue Caumartin, Paris, in the Republic of France, have invented certain new and useful Improvements in Devices for Compensating for Wear in the Shoes of Hydraulic Brakes, of which the following is a full, clear, and exact specification.

The invention which forms the object of the present application relates to an arrangement for automatically compensating for the wear in the shoes for hydraulic brakes. This arrangement is applicable to any existing hydraulic brake, all that is necessary being to introduce it into the pipe which communicates between the accumulator or reservoir for the liquid under pressure and the brake-cylinder.

In the accompanying drawings, Figure 1 is a longitudinal section along the axis of the arrangement placed between the pipes 1 and 2, of which the pipe 1 leads from the accumulator and the pipe 2 leads to the brake-cylinder.

A movable piston or diaphragm *b*, preferably consisting of a solid casting 3, on the two faces of which leather washers *c* are fitted, is placed in a cylinder *a*, communicating in front by the pipe 2 with the rear face of the piston or of the brake-cylinder. The rear of the cylinder *a* is provided with a fixed perforated diaphragm *d*, communicating with the passage of the pipe 1, which leads to the accumulator-reservoir. The center of the movable diaphragm *b* is bored out to form a pipe, through which the rod *s* of a valve *f* passes, a powerful spring *r* normally tending to maintain said valve pressed on its seat. The head *f* of the valve is prolonged to form a threaded rod *t*, on which a nut *e* may travel.

In normal working the free space between the face of the movable diaphragm *b* and the rear face of the brake-piston is full of liquid, and when the brake is released the movable diaphragm is pressed by a projecting cushion or projection 4 on its rear surface against the fixed perforated diaphragm *d*. The position of the nut *e* having been always determined for a given distance of separation between the brake-shoes and the tires, what takes place during the working of the apparatus will now be described.

When the brake is applied, the liquid under pressure entering by the pipe 1 passes through the apertures of the fixed diaphragm *d* and acts upon the movable diaphragm *b*. The latter pushes before it the liquid mass imprisoned between it and the rear face of the piston of the brake-cylinder, and consequently moves the latter and operates the lever mechanism of the brake. If the shoes are at their normal distance from the tires, the total displacement of the movable diaphragm *b* must be such that the nut *e* encounters the fixed diaphragm *d* when the brakes are in full engagement with the tires. If, on the contrary, the shoes are worn and the equivalent displacement of the brake-piston does not suffice to bring the shoes into contact with the tires, the liquid under pressure continuing to act on the diaphragm *b* will move the diaphragm against the pressure of spring *r* away from the valve *f*, which latter is rendered immovable by the nut *e* encountering the fixed diaphragm *d*. The liquid under pressure will then pass through the central passage of the diaphragm *b* and act directly on the piston of the brake-cylinder until the application of the shoes to the tires has been effected. At this moment the equilibrium of pressure is established, the spring *r* expands, the movable diaphragm presses again on the head of the valve *f*, and the quantity of liquid imprisoned between the movable diaphragm and the piston of the brake-cylinder has thus been increased. To take off the brake, the rear of the apparatus is placed in communication with the liquid-reservoir, the piston of the brake is returned by a recoil-spring or any other usual known means, and the movable diaphragm *b* forced forward by the interposed liquid recoils until its projection 4 strikes against the fixed diaphragm *d*. The spring *r* being sufficiently powerful to overcome the slight pressure of liquid interposed between the movable diaphragm and the brake-piston, the return of the brake-piston is stopped. If then the brake-shoes are at the desired distance away from the tires, the return movement of the brake-piston remains equal to the forward movement determined by the travel of the nut *e*. In any case the travel of the nut *e* remaining constant, the brake-shoes are always returned

to the desired distance away from the tires when the brakes are taken off. If the brake-shoes become worn, this is compensated for at the next application of the brakes.

Fig. 2 shows in longitudinal section a modification in which the apparatus hereinbefore described is directly arranged behind a brake-cylinder *g*. The cylinder *a* is in this case formed by a prolongation of the brake-cylinder, and the pipe 2 is dispensed with. The working remains exactly similar to that just described.

In order to allow the shoes when too much worn to be replaced by fresh shoes, the liquid is discharged from the space comprised between the movable diaphragm *b* and the brake-piston *h* by establishing communication by means of a valve *i* between this space and the liquid-reservoir.

I declare that what I claim is—

An arrangement for automatically compensating for the wear in the shoes of hydraulic brakes, consisting of a cylinder *a* open at both ends, which is placed in the pipe communicating between the accumulator-reservoir and the brake-cylinder, or which may be formed as an extension upon the rear end of this latter, a movable diaphragm *b* through a central opening in which passes the rod *s* of a spring-valve *f* which normally closes the said opening and which is prolonged to the rear as a screwed rod upon which may be adjusted a regulating-nut *e*, and a fixed perforated diaphragm *d*, which when the brake is applied serves as a stop for the nut *e* and when the brake is taken off forms a stop for the movable diaphragm, so that the travel of the nut determines the return movement of the brake-piston, while the forward movement of the latter varies according to the state of wear of the brake-shoes, as the device reëstablishes automatically the required clearance between the brake-shoes and the tires, substantially as described.

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

ANDRÉ GOLDSCHMIDT.

Witnesses:

ANDRÉ MOSTICHER,

EDWARD P. MACLEAN.