Dec. 27, 1960 L. N. LAUER ET AL 2,966,238

FORWARD AND REVERSE TRAILING SHOE BRAKE

Filed March 21, 1955 2 Sheets-Sheet 1

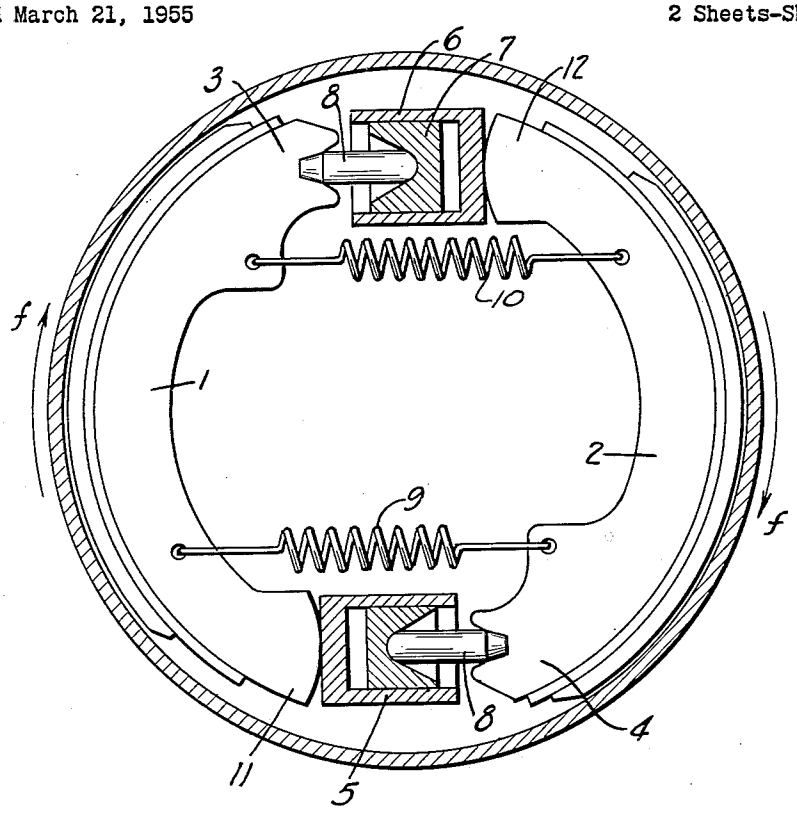


FIG. 1

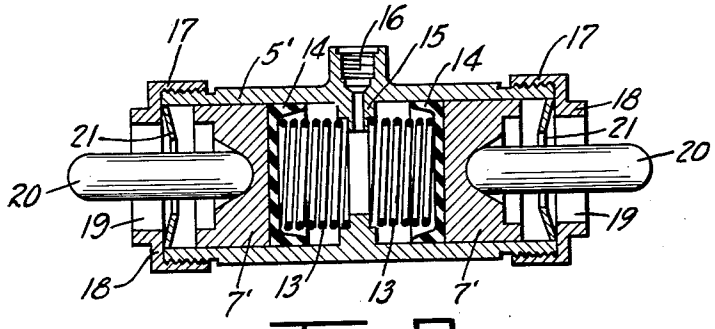


FIG. 2

INVENTOR
LEON N. LAUER
JEAN P. RUET
BY
John A. Young
ATTORNEY

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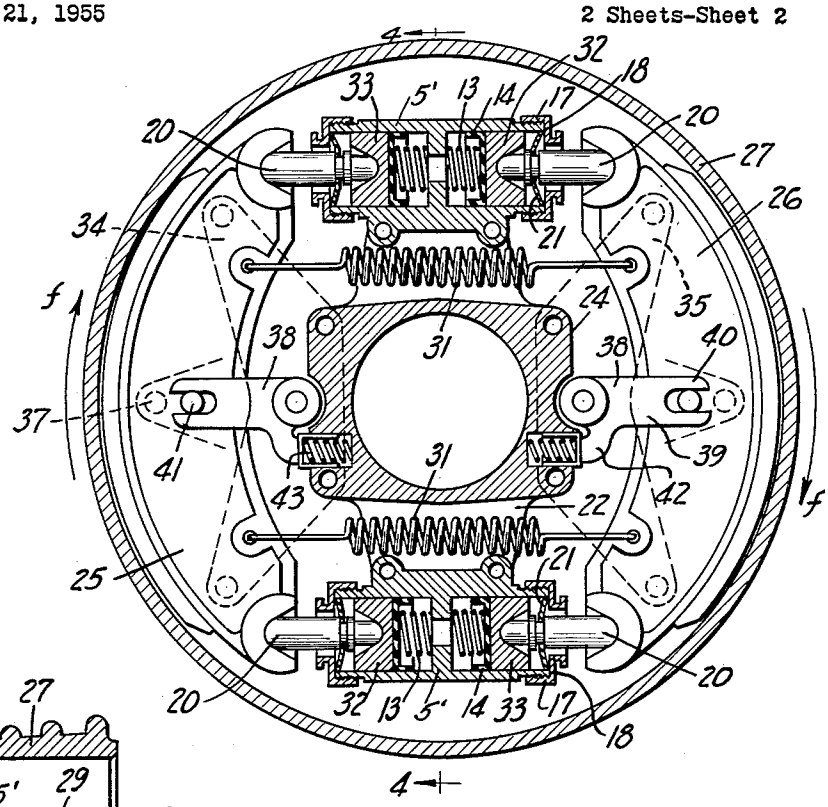


FIG. 3

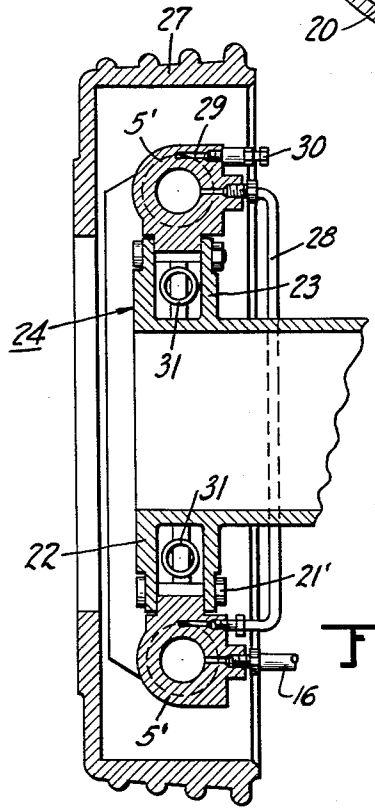


FIG. 4

INVENTOR
LEON N. LAUER
JEAN P. RUET
BY
John A. Young
ATTORNEY

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FORWARD AND REVERSE TRAILING SHOE BRAKE

Leon Nicolas Lauer, Clichy, and Jean Pierre Ruet, Limeil-Brevannes, France, assignors to The Bendix Corporation, a corporation of Delaware

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4 Claims. (Cl. 188—78)

The invention relates to brakes and one of the objects thereof is to obtain the advantages of "trailing shoe" brake operation. The term "trailing shoe" designates shoes which, under the wrapping action exerted by the drum, tend to disengage from the latter.

An object of the invention is to provide a brake equipped with shoes operating as trailing shoes for both directions of vehicle movement and thus drum rotation.

Another object of the invention is to provide a brake in which there is automatic inversion of shoe ends which are actuated by the applying pressure when the direction of drum rotation is reversed.

Still another object of the invention is to provide a brake comprising two floating shoes in combination with two motor cylinders (i.e. fluid pressure responsive cylinders), each of said motor cylinders being provided with a pair of pistons.

Another object of the invention is to adapt the piston as anchors, the piston anchors being operative in accordance with the direction of drum rotation.

Another object of the invention is to provide suitable dampening of the respecttive pistons with the abutment flange secured to end of the motor cylinder.

Another object of the invention is to provide a balancing means for the weight of the brake shoes, which are relatively heavy intended for rail vehicles.

Other particulars and advantages of the invention will appear from the following description which refers to the accompanying drawings, in which:

Figure 1 is the plan view of a brake comprising two shoes operating as trailing shoes for the direction of rotation indicated by the arrow *f*;

Figure 2 is a section of the fluid pressure responsive cylinder embodying the invention;

Figure 3 is a plan view, certain members being shown in section, of a brake embodying the invention; and

Figure 4 is a section along line 4—4 of Figure 3.

The brake shown in Figure 1 comprises two shoes **1** and **2** actuated at their ends **3** and **4** by means of fluid motors **5** and **6** having a single piston **7**, acting through the intermediary of plungers **8** on the ends **3** and **4** designated as outlet ends for the direction of rotation of the drum, indicated by the arrow "*f*." Shoes **1** and **2** are interconnected by return springs **9** and **10**. With direction of rotation indicated by arrow "*f*" corresponding to forward drive, the actuation of motor cylinders **5** and **6** transmits an applying pressure to the outlet ends **3**, **4** of the shoes, while the opposite ends **11**, **12** of said shoes take support on the closed end of the motor cylinders, so that the shoes operate as trailing shoes, solely in forward braking.

A brake having shoes operating as trailing shoes for both directions of rotation, is actuated by means of double acting motor cylinder **51** shown in Figure 2. These cylinders comprise two pistons **7'** urged outwardly by means of springs **13**. The springs **13** are compressed

between sealing cups **14** on the faces of the respective pistons, and a transverse internal flange **15** formed on the wall of the motor cylinder. The inlet port **16** of said cylinder is formed in this flange. Caps **17** which are secured to the ends of the motor cylinder, are provided with flanges **18** coaxial with the cylinder, and formed with apertures **19** through which extend plungers **20** connecting the pistons **7'** to the adjacent shoe ends. Yielding washers **21** may be provided to dampen the impact of engagement of the respective piston with the flange **18**.

The brake shown in Figures 3 and 4 comprises two motor cylinders, similar to that shown in Figure 2, and similar members thereof are indicated by the same reference numerals. Motor cylinders **5'** are secured by means of bolts **21'** to webs **22**, **23** which form a part of a fixed support member **24**, the medial plane of which registers with the medial plane of shoes **25**, **26** cooperating with a rotating drum **27**.

The shoes **25**, **26** are floating shoes and can thus move relatively to the fixed support **24**. The ends of said shoes may be connected to the respective pistons by means of plungers **20** the ends of which are spherically formed extending into corresponding recesses formed on the respective pistons on the one hand, and the ends of the shoes, on the other hand.

Motor cylinders **5'** are connected together by means of a conduit **28** and the upper cylinder is provided with a bleeding port **29** closed by bleeder screw **30**.

At the brake release position, the return springs **31** connected to the shoes locate the pistons **32** and **33** within each motor cylinder in a symmetrical position with respect to the axes of the brake. Upon actuation of the brake, fluid under pressure is transmitted through inlet port **16** to cause in each motor cylinder a spreading of pistons **32**, **33** in each motor cylinder thereby bringing the shoes **25**, **26** into contact with the drum **27**. The pistons **32** are shifted until they take support on abutment flanges **18** of caps **17** secured to the body of the cylinders where they act as anchors for the shoe ends, designated as "entry ends" for the direction of drum rotation indicated by the arrow "*f*." The braking then takes place to a degree determined by the displacement of pistons **33**, in accordance with the applying pressure transmitted to these pistons acting on the "outlet ends" of the shoes for the said direction of the drum rotation.

It can be easily noted that if the direction of the rotation shown by arrow "*f*" is reversed, pistons **33** will take support against abutment flanges **18** and the degree of braking will be determined by the pistons **32**.

Yielding members similar to washers **21** of Figure 2 may be used to dampen the engagement of the respective piston with abutment flange **18**.

On one of the webs **22**, forming part of the fixed support member of the brake, there are provided two arms **34**, and a third arm **35** is formed on web **23**. The webs of the shoes project between said arms **34** on the one hand and arm **35** on the other hand, to laterally position the shoes. Screws **37** serve to laterally guide the shoes.

When the brake is applied to rail vehicles, the shoes **25**, **26** which are relatively heavy, are provided with two balancing devices each comprising a cranked lever designated generally by reference numeral **38**. Each of the balancing devices has an arm **39** with a fork end portion **40** which engages a pin **41** carried by the respective shoes. A second arm **42** of the lever is loaded by a spring **43** located in a recess formed on the fixed support member **24**, to balance completely or partially the weight of the shoes **25**, **26**.

We claim:

1. A brake comprising two floating shoes, two fluid

pressure responsive cylinders, each having a pair of pistons and each located between a pair of adjacent shoe ends, abutments provided in each of the cylinders to limit the outward movement of said pistons, return springs loading the shoes, the pistons being normally disengaged from said abutments under the action of the return springs, one piston in each cylinder being adapted to take support in accordance with the direction of drum rotation on a corresponding abutment, said abutment thereby acting as an anchorage means for the entry end of one shoe while the second piston of the said cylinder transmits an applying pressure to the outlet end of the second shoe so that both shoes are operated as trailing shoes, the function of the pistons being invested for the opposite direction of the drum rotation.

2. A brake comprising a rotating drum, a pair of shoes and a balancing device for compensation of the weight of the shoes, said device comprising a cranked lever pivotally mounted on a fixed support and having two arms one of which is formed as a fork, and a member carried by each of the shoes and adapted to cooperate with said fork, the weight of said shoes being supportable by said balancing device acting through said member, the second arm being associated with a spring the reaction of which is transmitted to the fixed support.

3. A brake comprising a rotatable drum, two floating arcuate brake shoes arranged in end to end relation and engageable with said drum, actuating means for exerting applying force simultaneously at each end of each shoe and effecting their engagement with said drum, said

shoe ends being the leading or trailing ends depending on the direction of rotation of said drum, and abutment means so positioned relative to said actuating means that upon movement of the brake shoes toward the actuating means at the trailing ends the actuating means at the leading ends of the shoes in either direction of drum rotation engage their respective abutment means when the actuating means at the leading ends of the shoes are fully actuated and the actuating means at the trailing ends of said shoes have sufficient remaining movement that the applying action on said shoes is determined primarily at the trailing ends thereof in either direction of drum rotation.

4. A brake as set forth in claim 3 in which the actuating means include a pair of cylinders and a pair of fluid pressure responsive pistons in each cylinder.

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