

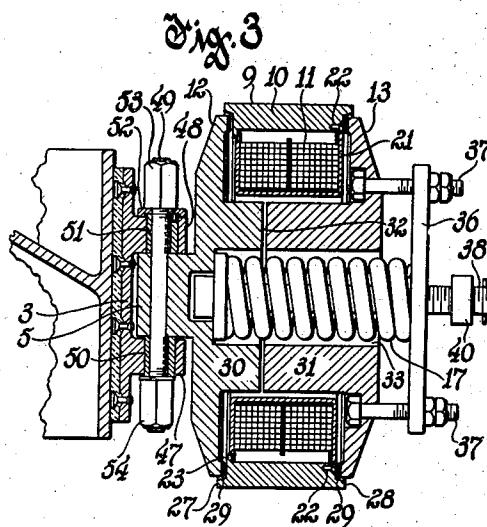
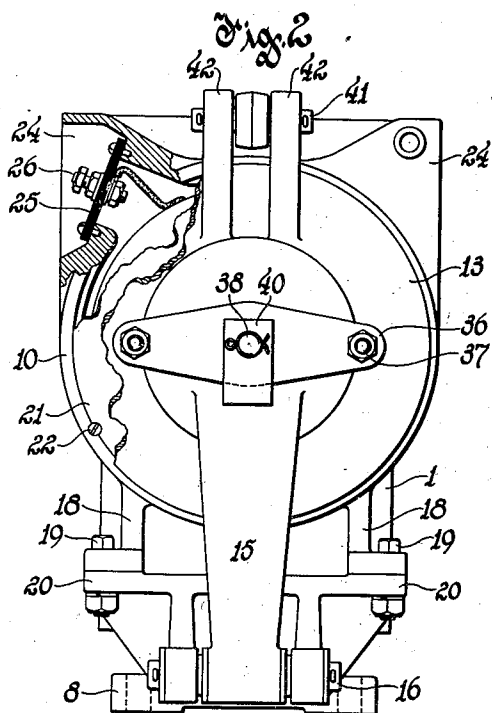
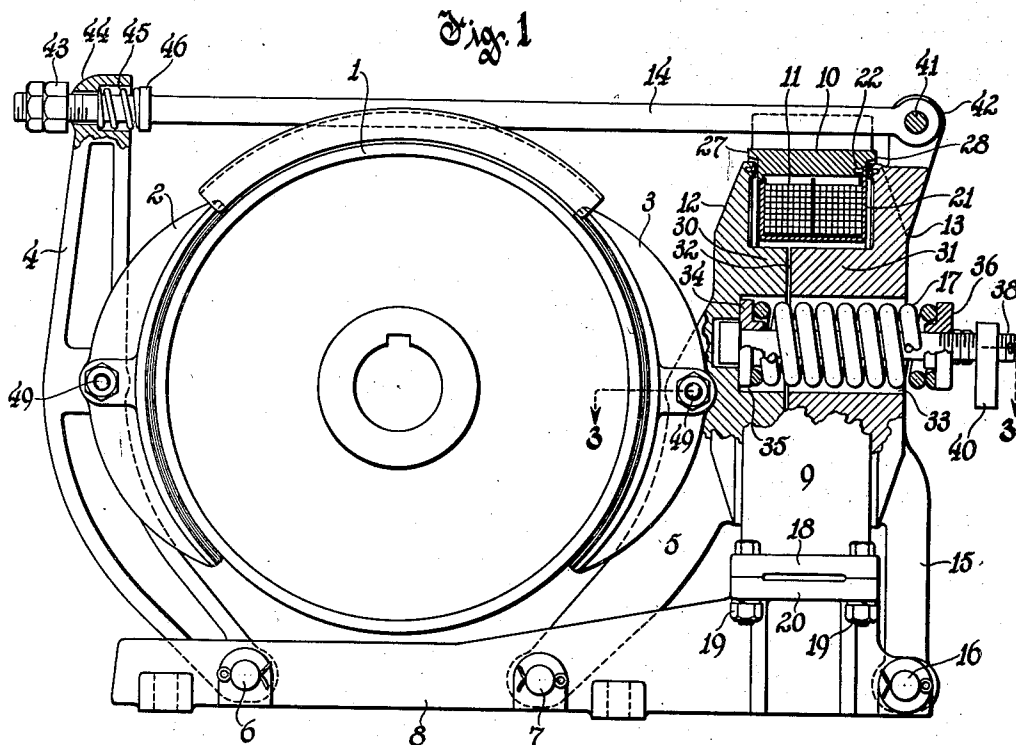
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H. E. HODGSON

2,087,478

ELECTROMAGNETIC BRAKE

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Inventor
Howard E. Hodgson
By Frank H. Hubbard
Attorney

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ELECTROMAGNETIC BRAKE

Howard E. Hodgson, Wauwatosa, Wis., assignor
to Cutler-Hammer, Inc., Milwaukee, Wis., a
corporation of Delaware

Application February 6, 1933, Serial No. 655,422

7 Claims. (Cl. 188—171)

This invention relates to improvements in electromagnetic brakes.

The patent to Bernhard E. Fernow, Jr., No. 1,410,395, issued March 21, 1922, discloses an electromagnetic brake having various desirable characteristics, as for example simplicity, ruggedness, large braking capacity in proportion to its overall dimensions, and arrangement of the actuating parts to minimize the required movements thereof. However, it has been found that brakes of this type are open to various objections. For example, the field member of the operating magnet moves upon operation of the brake, and in practice it has been found that this sometimes results in breakage of connections for the energizing winding and also renders it difficult to install conduits for water-tight enclosure of such connections.

The present invention has among its objects to provide an improved brake having the various desirable characteristics of the brake disclosed in the aforementioned Fernow patent and which overcomes the aforementioned disadvantages thereof.

Another object is to provide an electromagnetic brake having improved adjusting means associated therewith.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates an embodiment of the invention which will now be described, it being understood that the embodiment illustrated may be modified in various respects without departing from the spirit and scope of the appended claims.

In the drawing,

Figure 1 is a side elevational view of a brake embodying the invention, the operating magnet being shown partially in section.

Fig. 2 is an end view of the brake shown in Fig. 1, a portion of the operating magnet being broken away and shown in section, and

Fig. 3 is a sectional view on line 3—3 of Fig. 1.

Referring to the drawing, the same illustrates a brake drum 1 to be secured to a motor or other device to be braked, opposed brake shoes 2 and 3 for frictionally engaging said drum on opposite sides thereof, and vertically arranged levers 4 and 5 supporting said shoes respectively. The lower ends of the levers 4 and 5 are pivotally mounted upon pins 6 and 7, respectively, carried by a base 8, and an electromagnet 9 mounted upon said base provides for operation of said levers.

Electromagnet 9 is provided with a field element including a stationary magnet frame 10 provided with an energizing winding 11, and said magnet frame has cooperating armature members 12 and 13 arranged on opposite sides thereof. Armature 12 is integral with lever 5, and armature 13 is operatively connected to lever 4 by a link 14, and is provided with a downwardly projecting arm 15 having its lower end pivotally mounted upon a pin 16 carried by base 8. Thus the armatures 12 and 13 are connected to the brake shoes 2 and 3, respectively, and a coil spring 17 held under compression between said armatures serves to bias the latter apart to effect setting of said brake shoes against the drum 1. Upon energization of winding 11 the armatures 12 and 13 are attracted towards each other against the action of spring 17, to thereby release the brake shoes 2 and 3 from drum 1.

More specifically, magnet frame 10 is of annular form, and is provided with projecting feet 18—18 on the under side thereof which are secured by bolts 19 to a pedestal 20 formed on base 8. Said magnet frame is arranged with its axis at substantially right angles to the axis of drum 1, and the same is of such diameter as to be substantially included within the vertical space required by said drum. The winding 11 is wound upon an insulated bobbin 21 which is secured within the opening in magnet frame 10 by screws 22 associated with said frame. As shown in Fig. 3, the screws 22 are provided with flat heads which engage the right end wall of bobbin 21 to hold the same within a counterbore in the right hand face of magnet frame 10, and the left end wall of said bobbin abuts a shoulder 23 formed on the interior of said magnet frame. Winding 11 is preferably impregnated and sealed in the magnet frame 10 with a water-proof insulating compound, and the terminals for said winding are passed through spaced openings in the upper side of said magnet frame into oppositely disposed pocket projections 24 formed on the periphery of said frame. One of the pocket projections 24 is shown in section in Fig. 2, and each of said pockets has an insulating plate 25 mounted within the same which carries a binding post 26 for connection to one of the winding terminals.

Magnet frame 10 is provided with annular projections 27 and 28 on opposite sides thereof which overhang the outer edges of armatures 12 and 13, respectively, and each of said armatures has a non-magnetic annular shim 29 secured to the face thereof to prevent sealing of the latter with

said magnet frame. The armatures 12 and 13 are also provided with centrally arranged cylindrical pole projections 30 and 31, respectively, which project into the opening in bobbin 21, and are of such length as to provide a relatively narrow air gap 32 between the inner ends thereof.

As is apparent, numerous advantages are obtained by arranging the parts of the magnet in the manner above described. Stationary mounting of the magnet frame 10 and its associated winding 11 tends to prevent breaking of the winding connections and also facilitates installation of conduits for water-tight enclosure of such connections. Also by arranging the parts of the magnet in the manner above described a magnetic circuit of low reluctance is obtained which tends to increase the efficiency of the magnet.

Spring 17 is arranged within a central opening 33 in pole projection 31 and the inner end of said spring bears against a washer 34 seated within a shouldered recess 35 in the face of armature 30 while the outer end of said spring bears against a cross bar 36 which is adjustably secured to armature 13 by bolts 37. A bolt 38 arranged with spring 17 is provided for effecting manual release of the brake. Said bolt extends through openings in the washer 34 and cross bar 36, and the inner end thereof is provided with a head which abuts the washer 34, and is held against turning within the recess 35 in armature 12. The outer end of said bolt has an adjustable nut 40 associated therewith, and as is apparent by screwing said nut inwardly against the cross bar 36 spring 17 may be compressed to release the brake.

As hereinbefore stated, armature 13 is operatively connected to lever 4 by a link 14. Said link has one end pivotally mounted upon a pin 41 carried between projecting lugs 42 on the upper side of armature 13, and the opposite end of said link passes through an opening in the upper end of lever 4 and has an adjustable nut 43 associated therewith which engages a curved surface 44 upon said lever. Nut 43 is held in engagement with the surface 44 by a spring 45 held under compression between lever 4 and a collar 46 on link 14, and as is apparent adjustment of said nut varies the angular position of lever 4 with respect to armature 13 to thereby vary the throw of brake shoe 2 upon energization of the magnet 9.

To provide for equalization of the travel of the brake shoes 2 and 3 each of the same is adjustably secured to its associated supporting lever. As shown in Fig. 3, brake shoe 3 is provided with spaced lugs 47 and 48 on the outer side thereof which straddle lever 5, and the same is adjustably secured to said lever by a bolt 49. Bolt 49 is rotatably mounted within an opening in lever 5 and has a pair of eccentric bushings 50 and 51 keyed thereto which are rotatable within aligned openings in lugs 47 and 48, respectively. The bushings 50 and 51 are arranged in corresponding angular positions on bolt 49, and as is apparent by adjusting the angular position of said bolt, brake shoe 3 is adjustable with respect to lever 5 to vary the travel thereof upon energization of the magnet 9. Bolt 49 has a cup washer 52 and a nut 53 associated with one end thereof, and a nut 54 is associated with the opposite end thereof. As shown, bushing 50 projects beyond the face of lug 47 so as to be engaged by the nut 54, and the cup washer 52 is arranged to clear the end of bushing 51 and to engage the face of lug 48. Thus as is apparent, upon tightening of the nuts 53 and 54 bushing 50 is clamped against one side of

lever 5 to hold bolt 49 in the required angular position and the cup washer 52 clamps the lug 51 on brake shoe 3 against the opposite side of said lever to rigidly secure said brake shoe to said lever. Means similar to that shown in Fig. 3 is also provided for adjustably securing brake shoe 2 to its associated lever 4.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a brake drum and opposed brake shoes therefor, of actuating means for said brake shoes including an electromagnet having a stationary field element and a pair of pivoted armature members arranged on opposite sides of said element, one of said brake shoes being supported by one of said armature members, and a link operating connection between the other of said armature members and the other of said brake shoes.

2. In a brake, the combination with a drum and opposed brake shoes therefor, a supporting lever for one of said brake shoes, of an electromagnet having a stationary field member and a pair of cooperating armature members pivotally mounted upon opposite sides thereof, one of said armatures supporting the other of said brake shoes, and a link connection between the other of said armatures and said lever.

3. In a brake, the combination with a brake drum and opposed brake shoes therefor, of a supporting base, a pair of levers pivotally mounted upon said base and each supporting one of said brake shoes, actuating means for said brake shoes including an electromagnet having a stationary field element mounted upon said base, and a pair of cooperating armature members arranged on opposite sides thereof, one of said armatures being supported by one of said levers, and the other of said armatures being pivotally mounted upon said base, and a link connection between said latter armature and the other of said levers.

4. In a brake, the combination with a brake drum and opposed brake shoes therefor, of a supporting base, a pair of levers pivotally mounted upon said base, and each having one of said brake shoes adjustably mounted thereon, actuating means for said brake shoes including an electromagnet having a stationary field element mounted upon said base, and a pair of cooperating armatures arranged on opposite sides thereof, one of said armatures being supported by one of said levers, and the other of said armatures being pivotally mounted upon said base, and a link connection between said latter armature and the other of said levers.

5. The combination with a brake drum and opposed brake shoes therefor, of a stationary magnet frame mounted adjacent the periphery of said drum and having an annular winding mounted within an opening therein, the axis of said winding being disposed substantially radially of said drum and in a plane perpendicular to the axis of said drum and adjacent thereto, a pair of movable armature members located at opposite sides of said magnet frame and arranged to be attracted towards each other upon energization of said winding, each of said armature members being connected to one of said brake shoes, and a spring interposed between said armature members for biasing the same apart.

6. The combination with a brake drum and opposed brake shoes therefor, of a stationary ring shaped magnet frame having an annular winding mounted within the opening therein, said magnet frame being mounted adjacent the periphery of

said drum with its axis disposed substantially radially of said drum and in a plane perpendicular to the axis of said drum and adjacent a pair of movable armature members located at opposite sides of said magnet frame and arranged to be attracted towards each other upon energization of said winding, each of said armature members being connected to one of said brake shoes and having a center pole projection thereon extending into the opening in said winding, and a spring arranged centrally with respect to said armature members for biasing the same apart.

7. The combination with a brake drum and opposed brake shoes therefor, of actuating means

for said brake shoes including an electromagnet having a stationary magnet winding of annular form mounted adjacent the periphery of said drum and a pair of movable armature members located at opposite sides of said winding and arranged to be attracted towards each other upon energization of said winding, each of said armature members being operatively connected to one of said brake shoes and said winding having its axis disposed substantially radially of said drum and in a plane perpendicular to the axis of said drum.

HOWARD E. HODGSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,087,478.

July 20, 1937.

HOWARD E. HODGSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 63, claim 5, strike out the words "and adjacent thereto"; page 3, first column, line 3, claim 6, after "drum" insert a comma; and cancel the words "and adjacent"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of October, A. D. 1937.

Henry Van Arsdale

Acting Commissioner of Patents.

(Seal)

