Sept. 8, 1959 C. R. KEATING, JR., ET AL 2,902,752

METHOD OF MAKING RAILROAD BRAKE SHOES

Filed Aug. 29, 1956 2 Sheets-Sheet 1

FIG. 1

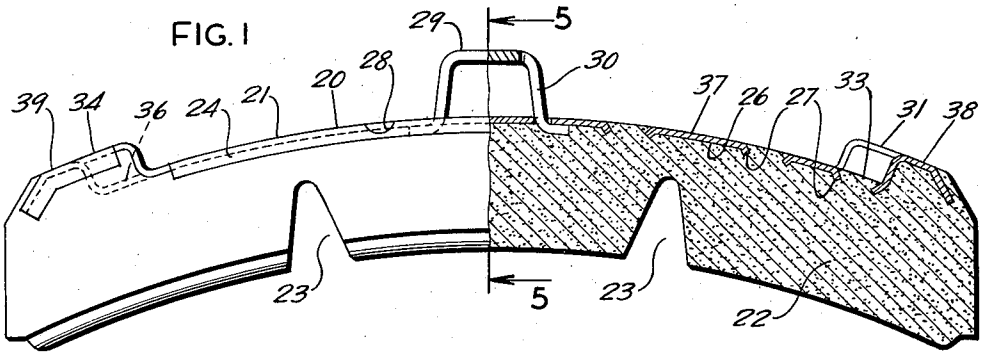
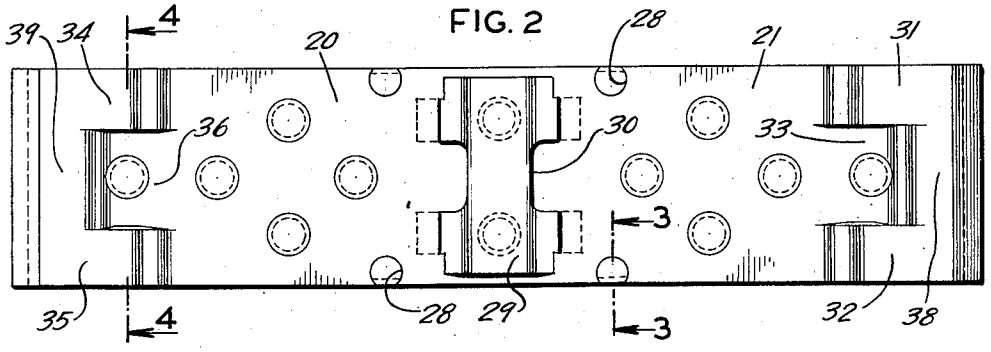


FIG. 2



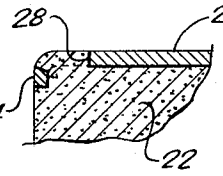


FIG. 3

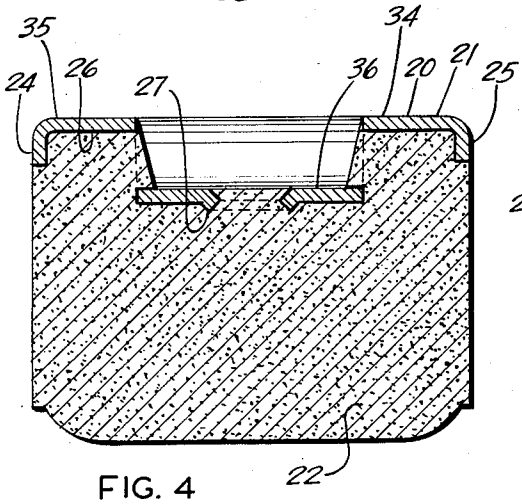
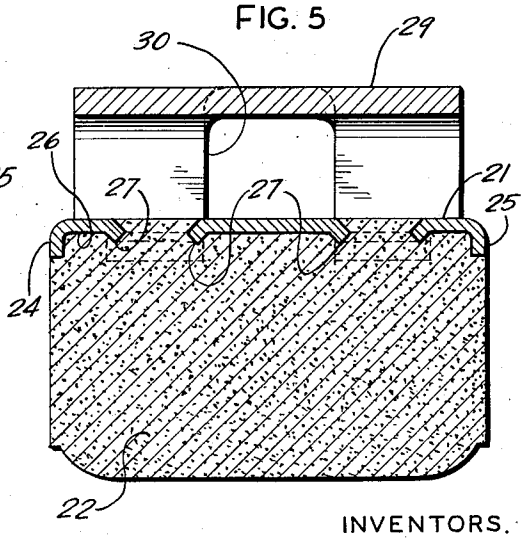


FIG. 4

FIG. 5



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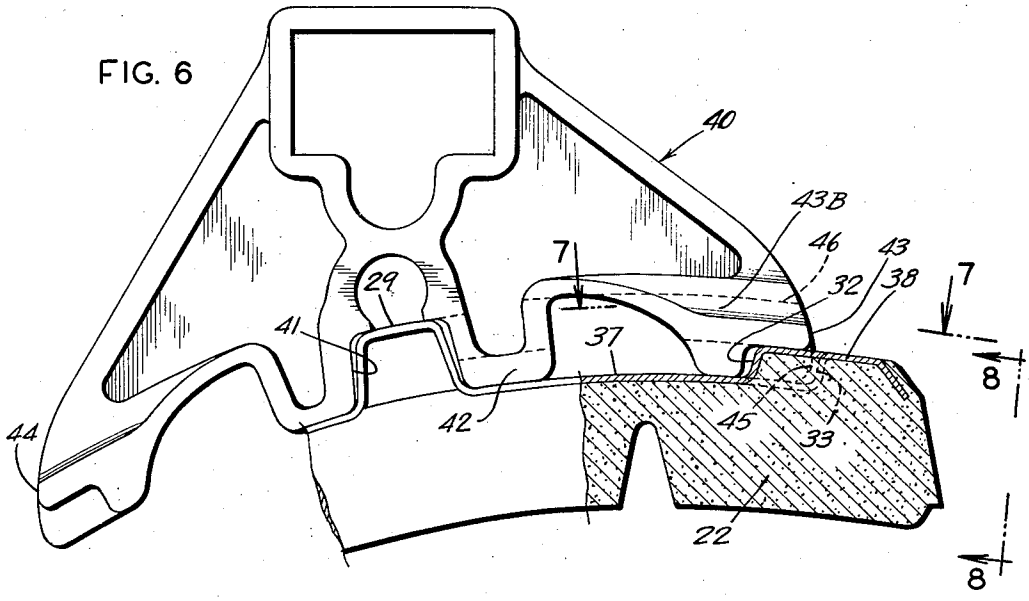
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METHOD OF MAKING RAILROAD BRAKE SHOES

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FIG. 6



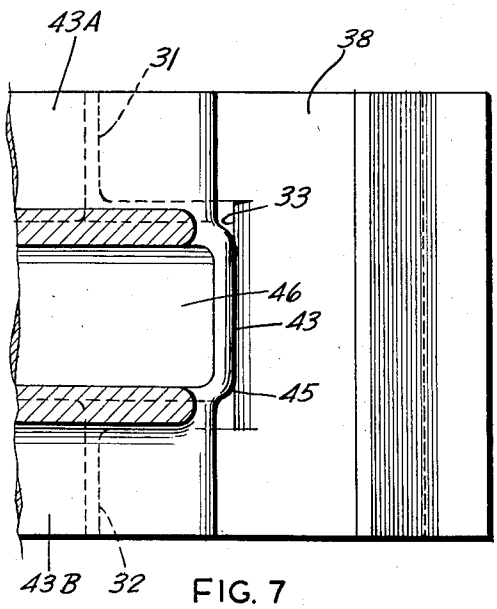


FIG. 7

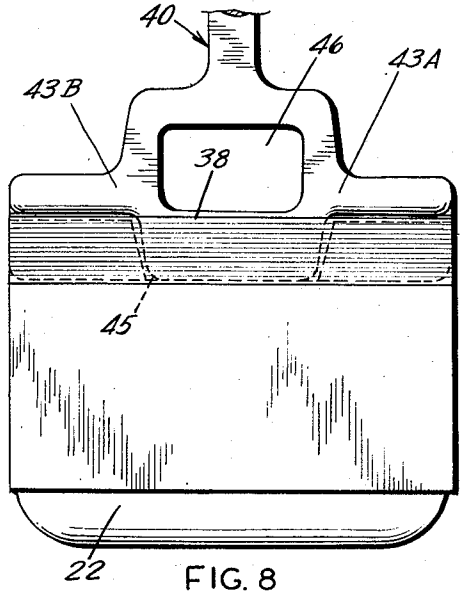


FIG. 8

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METHOD OF MAKING RAILROAD BRAKE SHOES

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Application August 29, 1956, Serial No. 606,869

2 Claims. (Cl. 29—407)

This invention relates to a method of making a new and improved brake assembly for use in a railroad braking system which utilizes composition type brake shoes instead of standard cast iron brake shoes and is particularly concerned with a brake assembly which prevents substitution of standard cast iron shoes in the system.

The brake shoe which has long been standard in the railroad industry comprises a cast iron body having a substantial thickness and having a braking surface which is curved to correspond in general to the curvature of a railroad car or locomotive wheel. The dimensions and configuration of these cast iron shoes have long been standardized in the railroad industry in accordance with standards determined by the Association of American Railroads. In this regard, reference may be made to specification M–401–44 of the Association of American Railroads and to the related drawing E–89–1938, which show and describe the standard construction in detail. The brake shoe includes a pair of end stops located at opposite ends of the back or convex surface of the shoe and a pair of toe guides extending from the end stops toward the center portion of the shoe. An attaching lug is positioned in the center portion of the brake shoe back. The brake shoe is supported upon a brake head which includes an attaching lug recess into which the center attaching lug of the brake shoe is fitted. A portion of the brake head engages the convex surface of the brake shoe, and the extremities or toes of the brake head form a pair of recesses which receive the brake shoe toe guides.

It has been proposed that composition type brake shoes be substituted for cast iron shoes in at least some railroad applications. These composition type shoes, which include a composition brake body and a metal back or support structure, provide a substantially higher retarding force per unit area of the braking surface than the standard cast iron shoes, due to the fact that the composition material affords a substantially higher coefficient of friction when brought into contact with the wheel of the car or locomotive than can be obtained with a cast iron shoe. In general, it may be stated that cast iron shoes are high-pressure low-friction devices, whereas composition shoes are high-friction low-pressure devices. Accordingly, the composition shoes may be operated at substantially lower braking pressures than the cast iron shoes and it is usually desirable to incorporate substantially smaller brake cylinders in a system adapted for use of composition shoes, due to the lower pressure requirements. Substitution of cast iron brake shoes in a system constructed for use with composition shoes, therefore, may lead to inadequate braking and consequent danger to the railroad equipment, passengers, freight, and other property.

It is an object of the invention, therefore, to prevent substitution of cast iron brake shoes in a railroad braking system adapted for use of composition brake shoes by resort to a specific brake assembly which will accept

the composition shoe and refuse the standard cast iron shoe.

A further object of the invention is a method of making a new and improved brake head essentially similar to the long proven and reliable brake heads now in use on railroad equipment but which will accept only a specific type of brake shoe structure different from the standard shoe structure. It is an important object of the invention to provide a new and improved selective brake head, adapted for use with composition brake shoes but not capable of accepting cast iron shoes, which may be conveniently and economically fabricated by modification of existing standard brake heads. An additional object of the invention is to provide a new and improved brake assembly specifically adapted for use of composition type brake shoes which is economical and convenient to manufacture.

Accordingly, the invention is directed to a method of making a selective brake assembly for preventing substitution of standard cast iron brake shoes in a railroad braking system adapted for use of composition type brake shoes and in which cast iron brake shoes produce inadequate braking. The brake assembly comprises a brake shoe including a metal support member of substantially arcuate configuration and a brake shoe body of molded composition material supported upon the concave surface of that support member. A brake shoe attaching lug is affixed to the support member and extends above the central portion of the convex surface thereof; a pair of toe guides are affixed to one end of the metal support member and extend above the convex surface thereof. These toe guides are spaced from each other to define a brake head toe extension receptacle. The brake assembly further includes a brake head having a recess for receiving the brake shoe attaching lug and a face plate for engaging the convex surface of the brake shoe support member. A toe is affixed to one end of the brake head; this toe is adapted to engage in the toe receptacle formed by the toe guides of the brake shoe but is positioned to interfere with the toe guide on a standard cast iron brake shoe, thereby preventing mounting of a cast iron shoe on the brake head.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principle thereof and what we now consider to be the best mode in which we have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is an elevation view, partly in section, of a composition type brake shoe constructed in accordance with the inventive concept;

Fig. 2 is a plan view of the brake shoe of Fig. 1;

Fig. 3 is a detail sectional view of the brake shoe taken along line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken along line 4—4 in Fig. 2;

Fig. 5 is a center sectional view taken along line 5—5 in Fig. 1;

Fig. 6 is an elevation view of a brake head constructed in accordance with the inventive concept and shows a portion of the brake shoe of Fig. 1 as supported on the brake head;

Fig. 7 is a detail sectional view of a portion of the brake head and brake shoe assembly taken along line 7—7 in Fig. 6; and

Fig. 8 is an end view of the brake shoe and brake head assembly taken as indicated by line 8—8 in Fig. 6.

The composition type brake shoe 20 illustrated in Fig. 1 comprises a metal support member 21 upon which is supported a composition brake shoe body 22. Support member 21 is preferably formed from either hot-rolled or cold-rolled steel, hot-rolled steel being usually preferred. Composition body 22 may be cast or molded from any composition material suitable for railroad braking service, depending upon the type of car or locomotive to which the brake shoe is to be applied. A preferred type of composition material, which exhibits superior characteristics with respect to heat and shock resistance and which affords a favorable ratio of wet to dry coefficients of friction, is described and claimed in the co-pending application of R. E. Spokes et al. Serial No. 491,510, filed March 1, 1955 and assigned to the same assignee as the present invention. This preferred composition comprises a comminuted friction material, selected from the sillimanite group and related aluminum silicates, distributed in a heat-stable rubber binder; additional friction material in the form of cast iron particles may also be included.

Composition body 22 may be provided with two or more vents 23 in the braking surface thereof to assist in uniform curing of the composition throughout its thickness and to aid in the diffusion of heat during braking service. Preferably, the composition body is effectively clamped between a pair of longitudinal flanges 24 and 25 which may be formed as an integral part of support member 21. In addition, the composition body and support member may be interlocked with each other by means of a plurality of individual metal projections formed integrally with and extending from the lower or concave surface 26 of support member 21 into composition body 22. As illustrated in Figs. 4 and 5, these individual metal anchor elements may be conveniently formed by a plurality of countersunk punched sections 27 in support member 21. Moreover, additional interlocking of the composition body and the support member may be achieved by punching out a series of apertures 28 in the corners of the flanged support member so that individual sections of composition body 22 extend through the support member to provide additional anchor points; this detail of the shoe construction is illustrated in Fig. 3. This general type of composition brake shoe construction is described and claimed in the copending application of E. Ellsworth Caton et al., Serial No. 603,405, filed August 10, 1956. In addition, the brake shoe may be provided with a separate metal reinforcing member in accordance with the construction disclosed in the co-pending application of Rosser L. Wilson, Serial No. 603,403, filed August 10, 1956; both of these applications are assigned to the same assignee as the present invention.

A center attaching lug 29 is clenched or otherwise affixed to support member 21 and extends above the central portion of the convex surface thereof; as indicated in Figs. 2 and 5, attaching lug 29 is provided with a keyway 30 which is utilized in mounting the brake shoe upon a brake head. In addition, at one end of the brake shoe, a pair of spaced lugs or toe guides 31 and 32 are affixed to metal support member 21 and extend above the convex surface of the support member. Preferably, toe guides 31 and 32 are fabricated by punching out individual portions of the end of support member 21, so that the toe guides form an integral part of the metal support member. Toe guides 31 and 32 are spaced from each other to define a brake head toe receptacle 33 which is essential to the invention, as will be explained in detail hereinafter in connection with Figs. 6–8. An additional pair of toe guides 34 and 35 are located at the opposite end of support member 21 and define a second toe receptacle 36 which is preferably essentially similar in dimensions to toe receptacle 33. Toe receptacle 33 may be closed at its outside end by an additional lug or end stop element 38, and a similar end stop element 39 may be provided at the end of receptacle 36.

In Fig. 6, the brake shoe 20 of Figs. 1–5 is shown mounted on a brake head 40. In most respects, brake head 40 is essentially similar to the standard brake head construction employed for cast iron shoes; consequently, its individual elements are not described in detail except as they relate to modifications effected in accordance with the inventive concept. Brake head 40 has a recess 41 which receives brake shoe attaching lug 29 in the usual manner. The brake head further includes a face plate 42 which engages convex surface 37 of the brake shoe support member. As in the conventional brake head and brake shoe assembly, the extremities 43 and 44 of the brake head 40 engage the end stops of the brake shoe to prevent longitudinal movement of the brake shoe with respect to the brake head when the brakes are applied.

As thus far described, brake head 40 is entirely conventional and, in accordance with one feature of the inventive concept, preferably has much the same dimensional configuration as a standard brake head employed in conjunction with conventional cast iron brake shoes. In addition, however, and in accordance with the invention, brake head 40 is provided with at least one toe 45 which is affixed to and comprises a part of end 43 of the brake shoe and is adapted to engage in toe receptacle 33 of the brake shoe, as best illustrated in Figs. 6 and 7. Toe 45 may comprise a separate element welded between the two separate sections or toe members 43A and 43B of the brake head (see Figs. 7 and 8). The modified brake head will not accept a cast iron brake shoe, inasmuch as toe 45 would interfere with the toe guide on a standard cast iron shoe, in which the toe guide constitutes a continuation of the end stops and extends along convex surface 37 of the standard shoe in a position essentially similar to that occupied by brake head toe 45 in the inventive structure.

Preferably, however, toe 45 is formed as an integral part of brake head 40. The preferred construction comprises a single steel casting in which the toe is cast integrally with toe members 43A and 43B. As in conventional brake assemblies, brake head 40 is locked to brake shoe 20 by means of a key (not shown) which engages a keyway 46 (Fig. 8) in the brake head structure and which passes through the corresponding keyway 30 in center attaching lug 29 (see Fig. 5). Preferably, two individual toes are formed at the respective ends of brake head 40 to fit into the two toe receptacles 33 and 36 of brake shoe 20. It is also possible to employ conventional construction at one end of the brake head without departing from the invention, although this arrangement does not permit reversal of the brake shoe when one end of the shoe is provided with a conventional toe guide to engage the conventional end of the brake head and further does not provide as satisfactory resistance to lateral motion of the shoe in relation to the head when a toe guide is not provided on the one end of the shoe.

The illustrated embodiment of the invention retains all of the desirable qualities of standard brake assemblies with respect to resistance to shock and protection against undue movement of the brake shoe in relation to the brake head. At the same time, and most importantly, it prevents substitution of standard cast iron brake shoes in a braking system intended for use with composition type shoes and thereby avoids the difficulties and damage which would almost inevitably result from such a substitution due to the inherently lower braking force provided by cast iron shoes. In addition, the substantially different toe guide construction utilized on the brake shoe member of the brake assembly effectively inhibits the use of that shoe in a system designed to utilize standard cast iron shoes, since the composition brake shoe would be inherently loose when mounted upon a conventional brake head and would give an immediate and obvious warning

to the workman installing the brake shoe that the shoe was not intended for use with a conventional brake head.

Hence, while we have illustrated and described the preferred embodiment of our invention, it is to be understood that this is capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

We claim:

1. In the manufacture of components for a specialized railroad braking system comprising a plurality of composition-type brake shoes subject to excessive wear and damage when incorporated in a standard system constructed for utilization of standard cast iron brake shoes, in which specialized braking system cast iron shoes provide inadequate braking, the method of fabricating component parts for said specialized system to prevent substitution of standard cast iron shoes therein and to prevent incorporation of said composition-type shoes in a standard system comprising; affixing a center mounting lug to each of the composition-type shoes intended for use in said specialized braking system, said center mounting lug substantially corresponding to the center lug on a standard cast iron shoe, forming a pair of toe guides on one end of each of the composition-type shoes, said toe guides being spaced from each other to define a brake head toe receptacle in a position corresponding to the toe guides on a standard cast iron shoe, whereby the composition-type shoes cannot be properly mounted on a standard brake head in the normal manner, forming a center lug receptacle in each of the brake heads for said specialized braking system, said center lug receptacle substantially corresponding to the receptacle in a standard brake head, and affixing a toe to one end of each of the brake heads for said specialized braking system in position to interfere with the toe guides on a standard cast iron shoe and prevent mounting of a cast iron shoe on the brake head.

2. In the manufacture of components for a specialized railroad braking system comprising a plurality of composition type brake shoes subject to excessive wear and damage when incorporated in a standard system constructed for utilization of standard cast iron brake shoes, in which specialized braking system cast iron shoes provide inadequate braking, the method of fabricating component parts for said specialized system to prevent substitution of standard cast iron shoes therein and to prevent incorporation of said composition-type shoes in a standard system comprising; affixing a center mounting lug to each of the composition-type shoes intended for use in said specialized braking system, said center mounting lug substantially corresponding to the center lug on a standard cast iron shoe, forming a pair of toe guides on each end of each of the composition-type shoes, said toe guides being spaced from each other to define a brake head toe receptacle in a position corresponding to the toe guides on a standard cast iron shoe, whereby the composition-type shoes cannot be properly mounted on a standard brake head in the normal manner, forming a center lug receptacle in each of the brake heads for said specialized braking system, said center lug receptacle substantially corresponding to the receptacle in a standard brake head, and forming a toe on each end of each of the brake heads for said specialized braking system said toes each comprising an integral part of said brake head and being in position to interfere with the toe guides on a standard cast iron shoe and thereby prevent mounting of a cast iron shoe on the brake head.

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