

### **BICYCLE BRAKE SHOE PAD**

This invention relates to bicycle brakes and more particularly to bicycle brake shoe pads for bicycles having a brake system urging a brake shoe against the rim of the bicycle wheel.

Some bicycles have brake assemblies mounted to the frame for gripping of the rim in response to operator manipulation of brake levers. Such brake assemblies generally include brake shoes which are movably mounted on caliper assemblies which bridge the rim, with such brake shoes having a brake pad of friction material for abuttingly and frictionally engaging the rim for slowing or stopping of the bicycle. The majority of such brake pads have some form of design in the engaging surface to promote friction, somewhat similar to the tread design of tyres.

The material composition of the brake shoe contributes to its ability to stop the bicycle. In some prior art brake shoes, the composition is a friction material such as plastic or rubber impregnated with metal particles. Another prior art brake shoe employs two adjacent brakes on each caliper lever, with the brake shoes arranged for use in opposing pairs (U.S. Patent No. 4,470,483). One pair of brake shoes is formed of a material suitable for use in dry weather. Prior to operation of the bicycle, the rider manually positions one pair of opposing shoes for use on that ride for either wet or dry weather. To use the other pair of brake shoes, the rider must again make a manual adjustment to place the other pair of shoes in contact with the bicycle rim.

Such devices are illustrative of the many and varied arrangements whereby attempts have been made to improve the braking of bicycles. Many of the prior art brake pads tend to squeal or chatter upon application, and in virtually all instances provide uneven wear of the brake pads at the point of engagement resulting in uneven

application of force to the rim. Such brake pads are generally rectangular in configuration with the fastening stud at the mid-point thereof.

It is an object of the present invention to provide a new and improved brake shoe pad for a bicycle.

It is another object of the present invention to provide a new and improved brake shoe pad with improved braking and wear.

According to the present invention there is provided a brake shoe pad for a bicycle having a brake system urging a brake shoe against a wheel rim of the bicycle, the brake shoe pad having first and second pad portions, each pad portion having a rim engaging surface substantially coplanar with the other whereby the surfaces engage the rim substantially simultaneously, said pad portions being formed of different elastomeric compounds for imparting a different characteristic to said brake shoe pad.

According to one embodiment of the invention, the foregoing and other objects of the invention are accomplished by providing a brake shoe having a metallic support or backbone member with a brake pad formed of at least two portions, each of a separate composition to effect a separate result. The portions are configured, arranged and dimensioned so that each (and all) portions have a braking surface in contact with the rim substantially simultaneously. The portioned or partitioned brake pad is formed of different combinations of multi-rubber or elastomers, not a particular combination, to improve wet and dry braking with one and the same pad. The selection of multi-rubber or elastomers could be used to stop squealing and grabbing, while also giving the pad stopping power at the same time; or a different combination could be used in wet and dry conditions, or a combination of compounds may be utilised for different partitions for racing conditions, or the like.

Other objects, features and advantages of the invention will become apparent from a reading of the specification, when taken in conjunction with the drawings, in which like reference numerals refer to like elements in the several views.

Specifically, embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:-

Figure 1 is side elevation view of a brake shoe having a multiple portion brake pad according to the invention;

Figure 2 is a side elevational view, partially exploded, of an alternative embodiment of a brake shoe having a multiple portion brake pad according to the invention;

Figure 3 is an end view of the brake shoe of Figure 2;

Figure 4 is a bottom view of the brake shoe of Figure 2; and

Figure 5 is a bottom view of yet another alternative embodiment of a brake shoe having a multiple portion brake pad according to the invention.

Referring now to the drawings, and particularly to Figure 1, there is shown a brake shoe, generally designated 10, and includes a fastening means, such as a threaded stud member 12 secured to a support member, such as a backbone portion 14 of the brake shoe 10. The brake shoe 10 has pad means in the form of pad, generally designated 16, having first and second pad portions 16a (shown plain) and 16b (shown with cross-hatching), each formed of a different compound of friction material cured or moulded to the backbone portion 14 at the same time. The pad portions are in alignment on the support member or backbone portion 14 and in alignment relative to the direction of travel of the rim of the bicycle. In accordance with the present invention, the pad portions 16a and 16b are each formed of a compound which provides a desired characteristic.

For example, the left pad portion 16a may be formed of a compound which provides squeal and grabbing control stabilisation while the right pad portion 16b may be formed of a compound which provides high friction stopping power. Correspondingly, the compound selected for the particular characteristic may vary according to whether one wants the brake pad 16 to be used primarily under wet weather conditions or dry weather conditions.

As shown in Figure 1, the leftmost (as viewed in the drawings) pad portion 16a covers a greater proportion of the length of the brake shoe pad 16 (approximately 60%, for example). In any event, the lower surface of the pad 16 is generally co-planar, as indicated by line 20, that is the braking surfaces, or rim-engaging surfaces of the two pad portions 16a and 16b lie in a common plane, or substantially in a common plane, so that the required effect of each pad portion 16a, 16b is accomplished on generally simultaneous engagement with the rim by both brake pad portion surfaces.

By reference to Figures 2 through 4, an alternative embodiment of brake shoe pad is shown, the pad having a main body pad portion 26 which encompasses the periphery and a major part of the body of the volume available for a brake shoe pad. The main body pad portion 26 is provided with a moulded formed opening 28 configured and dimensioned for receiving a second pad portion 30, which is formed as a separate and separable snap insert. The pad portion 30 has a small upper dimension at 30a, with a peripheral recess 30b therebelow, with the bottom surface 30c being generally planar.

The recess or opening 28 is configured for mating detenting coacting engagement with the portions 30a and 30b of the pad portion 30 with the surface 30c being generally coplanar with the planar braking surface 26a of the pad portion 26 on insertion. With an insert arrangement, the main body portion of the pad, that is, pad portion 26 may be formed of a compound for stopping power, while the insert pad portion may be formed of a compound suitable for squeal or grabbing stabilisation. In addition, the insert pad portion 30 may be formed of different colours as a means of colour coding a plurality of different inserts, each being formed of a different compound for different desired characteristics. The insert pad portion, as shown in Figures 2 and 4 is generally square shaped with the geometric centre thereof on in alignment with the axial centreline of the stud member 12, this line ordinarily being the line of greatest force on application of the brakes.

Figure 5 shows a bottom view of yet another brake shoe pad embodiment, in which the pad includes a main body portion 40, with first and second pad portions 42

and 44, each at different locations and each of a compound different from the other and different from the main body portion 40.

For compound selection of the pad portions any form of a multi-rubber or elastomeric compound may be utilised, with different combinations of multi-rubber or elastomers, not a particular combination, to improve wet and dry braking with one brake shoe pad. The multi-rubber elastomers could be used to stop squealing and grabbing, while giving the pad stopping power at the same time. Alternatively, a different combination could be used in wet and dry conditions, or a combination of compounds for racing conditions, or the like, when the brake shoe pad is engaging the bicycle rim using such multi-rubber or elastomer pads. It is to be understood that both pads for a given rim would be identical, and would engage the rim substantially at the same time.

A pad of only one compound or composition engaging a rim has a short-coming of not being able to stop a bicycle in the same manner for both wet and dry weather conditions, that is, controlling squeal (grabbing) and stopping, or cleaning the rim and stopping, etc. A single compound brake shoe pad can only do one or the other.

In accordance with the invention as herein described, the portioned or apportioned or portioned pad, unitarily formed or with one or more inserts, with a pre-selected variety of multi-rubber or elastomers compound can do multi-service with one pad in contact with the rim. The wet braking or high friction compound controls the stopping power or friction by the proportion in area to the dry compound and the amount of silicon dioxides or friction abrasives in the wet compound. The compound selected for the dry braking condition keeps the wet braking compound from grabbing (squealing) or slipping by selectively using clay or graphite in the dry compound. This controls the grabbing of the high friction compound with the rim. The dry braking compound controls the grabbing by smoothing out the stopping and controlling the friction. This control is achieved by the hardness of the compound selected and the clay or graphite, the clay or graphite preventing the grabbing.

Thus the two interacting compounds in the right proportions give the best compromise in stopping in wet and dry stopping conditions. Squeal and grabbing stabilising of wet compound is accomplished with a rubber or elastomers base made with clay and graphite fillers to control squealing and friction grabbing, and can be made in red or other colours to identify the compound from others. The wet braking or high friction compound or compounds are for stopping power in wet conditions and can be made with a rubber or elastomers base with an abrasive of silicon dioxides or iron dioxides or other abrasives and made blue or other colours to identify the compound from others.

All compounds will preferably have some form of curative (sulphur or others), an anti-ageing chemical, and common heat stabiliser. The compound will be moulded to a desired shape and cured with heat to form the unitary partitioned pad or the pad portions and pad insert.

In accordance with the present invention, there has been shown and described a brake shoe pad, in which, by portioning, or by means of one or more inserts in a main pad body portion, individual parts can be formed of different compositions, each providing some desired characteristic to the braking of the bicycle. While there has been shown and described preferred embodiments, it is to be understood that various other adaptations and modifications may be made within the scope of the invention.



### **CLAIMS**

1. A brake shoe pad for a bicycle having a brake system urging a brake shoe against a wheel rim of the bicycle, the brake shoe pad having first and second pad portions, each pad portion having a rim engaging surface substantially coplanar with the other whereby the surfaces engage the rim substantially simultaneously, said pad portions being formed of different elastomeric compounds for imparting a different characteristic to said brake shoe pad.
2. The brake shoe pad according to claim 1 wherein said first and second pad portions are moulded as a unitary member.
3. The brake shoe pad according to claim 1 wherein said first pad portion is formed as a main body portion of said brake shoe pad with a recess therein, and said second pad portion is formed as an insert, said recess and said second brake pad portion being configured for mating coacting engagement.
4. The brake shoe pad according to claim 2 wherein said brake shoe pad includes a support member and said first and second pad portions are aligned relative to one another and relative to said support member.
5. The brake shoe pad according to claim 4 wherein said first and second pad portions are of different lengthwise dimensions.
6. The brake shoe pad according to claim 3 wherein said main body portion has a second recess configured, dimensioned and arranged for receiving a third pad portion matingly coacting therein.



7. The brake shoe pad according to claim 1 wherein the composition of one of the said pad portions is selected for stopping power and the composition of the other of said pad portions is selected for grabbing control.
8. The brake shoe pad according to claim 1, wherein said brake shoe pad has a plurality of pad portions, each having a rim engaging surface substantially coplanar with each other to engage the rim simultaneously and each being formed of a different elastomeric compound, each compound being pre-selected for imparting a different characteristic to said brake shoe pad, one of said plurality of pad portions being formed as a main body portion of the brake shoe pad with at least one recess therein, and at least one other of said plurality of pad portions is formed as an insert, said recess and said one other pad portion being configured for mating coacting engagement.
9. The brake shoe pad according to claim 8 wherein said brake shoe pad includes a support member and said plurality of pad portions are aligned relative to one another and relative to said support member.
10. The brake shoe pad according to claim 8 wherein each of said plurality of pad portions has a braking surface area different from any other portion.
11. The brake shoe pad according to claim 8 wherein there are three pad portions said main body portion has a first and second recess configured, dimensioned and arranged for receiving other pad portions matingly coactingly therein.
12. The brake shoe pad according to claim 8 wherein the composition utilised for one of the pad portions is selected for stopping power and the compound utilised for the other of said portions is selected for grabbing control.



13. A brake shoe pad as claimed in claim 7 or claim 12 wherein said composition selected for stopping power includes friction abrasive.
14. A brake shoe pad as claimed in any one of claims 7, 12 or 13 wherein said composition selected for stopping power includes silicon dioxide.
15. A brake shoe pad as claimed in any one of claims 7 or 12 to 14 wherein said composition selected for grabbing control includes clay.
16. A brake shoe pad as claimed in any one of claims 7 or 12 to 15 wherein said composition selected for grabbing control includes graphite.
17. A brake shoe pad as claimed in any preceding claim wherein said characteristic is a friction characteristic.
18. A brake shoe for a bicycle having a brake system urging a brake shoe against a wheel rim of the bicycle, comprising a brake shoe pad as claimed in any preceding claim and an elongate support member, wherein each pad portion is affixed to the support member.
19. A brake shoe pad substantially as hereinbefore described with reference to and as illustrated in Figure 1 of the accompanying drawings.
20. A brake shoe pad substantially as hereinbefore described with reference to and as illustrated in Figures 2 to 4 of the accompanying drawings.
21. A brake shoe pad substantially as hereinbefore described with reference to and as illustrated in Figure 5 of the accompanying drawings.