

Bicycle Brake Shoe

This invention relates to bicycle brakes and, more particularly, to a bicycle brake shoe adapted to provide rim cleaning with uniform braking and wear.

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 calliper 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 the tyres. In addition, some brake shoes have incorporated therein some water diverting, or rim cleaning devices in advance of the main brake pad.

Exemplary of a prior art brake with a water diverting device is U.S. patent 5113975 entitled "Bicycle Rim Water Deflecting Apparatus".

Another attempt at removing moisture at the engaging surface of the brake pad is shown in U.S. patent 5107965, which discloses a brake member being formed of a main body, hinge portion and scraper element formed integrally of plastics material. Separable brake pads are attached into walled openings in the main body which are provided with projections for frictionally retaining the pads therein.

Such prior art devices are neither rugged nor capable of withstanding the rigours of hard bike riding, such as racing or mountain bike riding. With separable brake pads, there is always the possibility of separation of the pad from its supporting opening.

The present invention is concerned with a new and improved bicycle brake shoe having dissimilar first and second brake pads moulded onto a flexible backbone support member to enable cleaning of the rim by one pad and braking by both pads.

According to the present invention there is provided: a brake shoe for urging against the rim of a bicycle wheel, the brake shoe comprising:

a metallic backbone support member comprising an elongate channel member;

the support member having a deflectable tongue portion extending substantially axially from the base of said channel member, said tongue portion being oriented at an angle relative to the axis of the channel member;

a fastener member secured and extending substantially perpendicular to the base of the channel member; and

a first brake pad moulded about the free end of the tongue portion and a second brake pad moulded about the remainder of the support member, the material of the second brake pad having a greater co-efficient of friction than the material of the first brake pad;

wherein upon movement of said brake shoe towards said rim of said bicycle wheel, said first brake pad is initially brought into contact with said rim for removal of debris from the rim, and upon continued movement of said brake shoe towards said rim, said first brake pad is deflected until said second brake pad is also brought into contact with said rim.

The present application further comprises a brake shoe for contact with a rim of a bicycle wheel, said shoe comprising: a metallic backbone support member comprising an elongate channel member, the support member having a deflectable tongue portion which extends substantially axially from the base of the channel member and oriented at an angle relative to the axis of the channel member, which tongue portion is flexible relative to said channel member, a first brake pad moulded about the free end of

said tongue portion; a second brake pad moulded about the remainder of said backbone support member; and a fastening member secured and extending substantially perpendicular to the base of said channel member, said first and second brake pads being formed of dissimilar frictional materials and partially separated by a recess to permit flexing of said first brake pad at said recess, said tongue portion being orientated such that upon movement of the brake shoe towards the rim of the bicycle wheel, the first brake pad is initially brought into contact with the rim and upon continued movement of the brake shoe towards the rim, the first brake pad is deflected until the second brake pad is also brought into contact with the rim. The backbone support member may be formed by stamping, with the first and second brake pads moulded about the backbone support member respectively.

An embodiment of the invention will now be described, by way of example only, with reference to the drawings, in which like reference numerals refer to like elements, in which:

Figure 1 is a side elevational view, partially cross-sectioned, showing the interior construction of a friction material moulded about the backbone support member of Figure 2 to form the brake shoe according to the invention;

Figure 2 is a top plan view of the stamping from which the backbone support member of the brake shoe of Figure 1 is made;

Figure 3 is an end view of the brake shoe taken from the trailing edge of the brake shoe as shown in Figure 1; and

Figure 4 is a bottom view of the brake shoe shown in Figure 1.

Referring now to the drawings, and particularly to Figures 1 and 2, there is shown a brake shoe generally designated 10, which includes a fastening member, such as a threaded stud member 12, secured to a backbone support member, generally designated 20, which is shown in cross-section in Figure 1 and

more clearly in Figure 2. The backbone support member 20 is constructed from a metal, such as spring steel, and formed by stamping, that is, an operation which cuts and forms the three-dimensional configuration of the backbone support member 20 in a continuous operation. The backbone support member 20 is stamped and formed into a longitudinally extending elongate clamshell shape with first and second brake pads 40 and 38 respectively, formed by moulding about the backbone support member 20. The second brake pad 38 is further divided into two portions 38a and 38b and separated by a notch 44.

For rigidity and to provide the surface area to promote maximum adhesion during moulding of the brake pad materials about the backbone support member 20, the support member 20 is essentially divided into a generally channel-shaped member 20a, with a closed substantially cup-shaped heel portion 20b, and a flexible tongue portion 20c which is best illustrated in Figure 2.

Referring back to Figure 1, tongue portion 20c is oriented at an angle relative to the axis of the channel shaped member 20a, the angle being such that the region of the tongue portion 20c is pointed in the direction of the rim (not shown) and the first brake pad 40 moulded about the tongue portion 20c extends below a plane 50 defined by the second brake pad 38, as will be described. Tongue portion 20c is centred on the longitudinal axis of the backbone support member 20 and formed as a generally planar strap-shaped extension with minimum contouring to enable flexure under force of application with the brake shoe 10.

As shown in Figure 2, the backbone support member 20 also includes first and second generally parallel arm projections 20d and 20e, generally co-extensive with the sidewalls of the main body 20a and generally parallel to the tongue portion 20c with slots therebetween.

The spacing between the proximate facing edges of the arm projections 20d and 20e, is greater than the width of the tongue portion 20c, in order to provide room for a friction material to be located in the slots intermediate the tongue portion 20c and the projections 20d and 20e, during (and after) the moulding process. The friction material acts in part as a frictional or resilient webbing for providing additional support during flexure of the tongue 20c during use. The arm projections 20d and 20e extend in the same direction as the tongue portion 20c, are of shorter length, and are essentially mirror images of one another with a contoured configuration; that is, they are not planar.

Apertures are also provided in the backbone support member 20, such as apertures 23-25 in the main surface of the backbone support member and apertures 27-29, formed in the tongue portion 20c. These apertures enable fluid material to pass therethrough during moulding of the first and second brake pads about the backbone support member 20 to thereby provide a brake shoe with maximum adhesion of the moulded brake material to the backbone support member 20.

As shown in Figures 1 and 4, and to some degree in Figure 3, the brake shoe 10 has a second brake pad 38 comprising two portions 38a and 38b respectively, formed of a friction inducing material, moulded about the backbone support member 20. A first brake pad 40 is likewise formed about the tongue portion 20c.

By reference to the Figures 1, 2 and 4, the leftmost end of the brake shoe 10 will be referred to as the leading end while the rightmost end will be referred to as the trailing end, that is, the relative motion of the bicycle rim will be from left to right as viewed in the drawings, with the first brake pad 40 (which is moulded about tongue portion 20c) coming into contact with the bicycle wheel rim prior to the second brake pad 38 coming into contact with the rim.

The first and second brake pads 40 and 38 respectively are moulded of a friction material suitable for their purpose. The leading brake pad portion 40, is formed of a compound moulded over the tongue portion 20c; and to enhance the durability of the second brake pad 38, the second brake pad is formed of a material of a more durable composition, such as of a different hardness, to assist in the uniform and even wear of the brake shoe 10 during use.

Moulding material completely surrounds all surfaces of the backbone support member 20; that is the backbone support member 20 is embedded within the moulding material, with the upper surface (as viewed in Figures 1 and 4), being contoured to the general configuration of the upper surface of the backbone support member 20.

The individual portions 38a and 38b of the second brake pad 38, are partially separated by a first notch 44, while the first brake pad 40 and the brake pad portion 38a of the second brake pad 38, are separated by a V-shaped notch 48. The first notch 44 assists in the dispersal of moisture or rain during use, while the V-shaped notch 48 does likewise but also helps with the spring flexure as the first brake pad 40 comes into contact with the rim to deflect to its dotted line position 40', as shown in Figure 1.

After moulding, as shown in Figure 1, the contact surfaces of the brake pad portions 38a and 38b of the second brake pad 38, lie in a common plane denoted by the broken line 50, which defines the plane to be placed in contact with the bicycle rim. The free end of the first brake pad 40 depends below this line to enable initial contact of the first brake pad 40 and the rim, under low friction to clean mud, water and other debris from the rim, prior to contact with the rim of the second brake pad 38 of brake shoe 10.

In other words, the first brake pad 40 will contact and clean the rim with relatively low friction generated between the first brake pad 40 and the rim. Continued application of the

brakes will flex the spring means provided by the tongue portion 20c of the backbone support member 20 to allow the whole of second brake pad 38 to contact the rim for stopping the bicycle, this brake pad therefore being applied to a cleaner rim for more efficient stopping power. Since the first brake pad 40 is of long wearing material and generates less friction when applied to the rim this, when combined with its spring flex characteristics, results in less wear than that experienced by the second brake pad 38.

As an additional feature and as best shown in Figure 1, the tongue portion 20c of the backbone support member 20 may be formed with an upturned portion at the leading edge thereof. Thus, with any wearing away of the moulding material of brake pad 40 to expose the metal of tongue portion 20c, the metal of tongue portion 20c would be deflected away from, and would not dig into, the bicycle wheel rim.



CLAIMS:

1. A brake shoe for urging against the rim of a bicycle wheel, the brake shoe comprising:
a metallic backbone support member comprising an elongate channel member;
said support member having a deflectable tongue portion extending substantially axially from the base of said channel member, said tongue portion being oriented at an angle relative to the axis of the channel member;
a fastener member secured and extending substantially perpendicular to the base of said channel member; and
a first brake pad moulded about the free end of said tongue portion and a second brake pad moulded about the remainder of said support member, the material of said second brake pad having a greater co-efficient of friction than the material of said first brake pad;
wherein upon movement of said brake shoe towards said rim of said bicycle wheel, said first brake pad is initially brought into contact with said rim for removal of debris from the rim, and upon continued movement of said brake shoe towards said rim, said first brake pad is deflected until said second brake pad is also brought into contact with said rim.
2. A brake shoe according to claim 1, wherein said backbone support member further comprises first and second integrally formed arm projections spaced one on each side of said tongue portion and in general alignment with said tongue portion.
3. A brake shoe according to claim 1 or 2, wherein said tongue portion is formed as a generally planar deflectable strap member.



4. A brake shoe according to claim 3, wherein said tongue portion comprises an upturned substantially curved portion at the leading edge thereof, whereby when said first brake pad wears to expose said tongue portion, said tongue portion will be deflected away from said rim.
5. A brake shoe according to any of claims 1 to 4, wherein said support member is formed by stamping and includes aperture means therethrough for maximising adhesion of said first and second brake pads moulded about said backbone support member.
6. A brake shoe according to any of claims 1 to 5, which includes a V-shaped notch situated intermediate said first and second brake pads.
7. A brake shoe for contact with a rim of a bicycle wheel, said shoe comprising:
 - a metallic backbone support member comprising an elongate channel member, said support member having a deflectable tongue portion which extends substantially axially from the base of said channel member and is oriented at an angle relative to the axis of the channel member which tongue portion is flexible relative to said channel member;
 - a first brake pad moulded about the free end of said tongue portion;
 - a second brake pad moulded about the remainder of said backbone support member; and
 - a fastening member secured and extending substantially perpendicular to the base of said channel member, said first and second brake pads being formed of dissimilar frictional materials and partially separated by a recess to permit flexing of said first brake pad at said recess, said tongue portion being orientated such that upon movement of said brake shoe towards the rim of said bicycle wheel,



said first brake pad is initially brought into contact with said rim and upon continued movement of said brake shoe towards said rim, said first brake pad is deflected until said second brake pad is also brought into contact with said rim.

8. A brake shoe according to claim 7, wherein said second brake pad comprises a material having a greater coefficient of friction than the material of said first brake pad.
9. A brake shoe according to claim 7 or 8, wherein said backbone support member is formed by stamping, said first and second brake pads being subsequently moulded about the backbone support member.
10. A brake shoe according to any of claims 7 to 9, wherein said tongue portion includes an upturned substantially curved portion at the leading edge thereof, whereby any wearing of the moulded material to expose said tongue portion, said tongue portion will be deflected away from, and not dig into, said rim.
11. A brake shoe for a bicycle, substantially as hereinbefore described with reference to the accompanying drawings.