

Sept. 24, 1940.

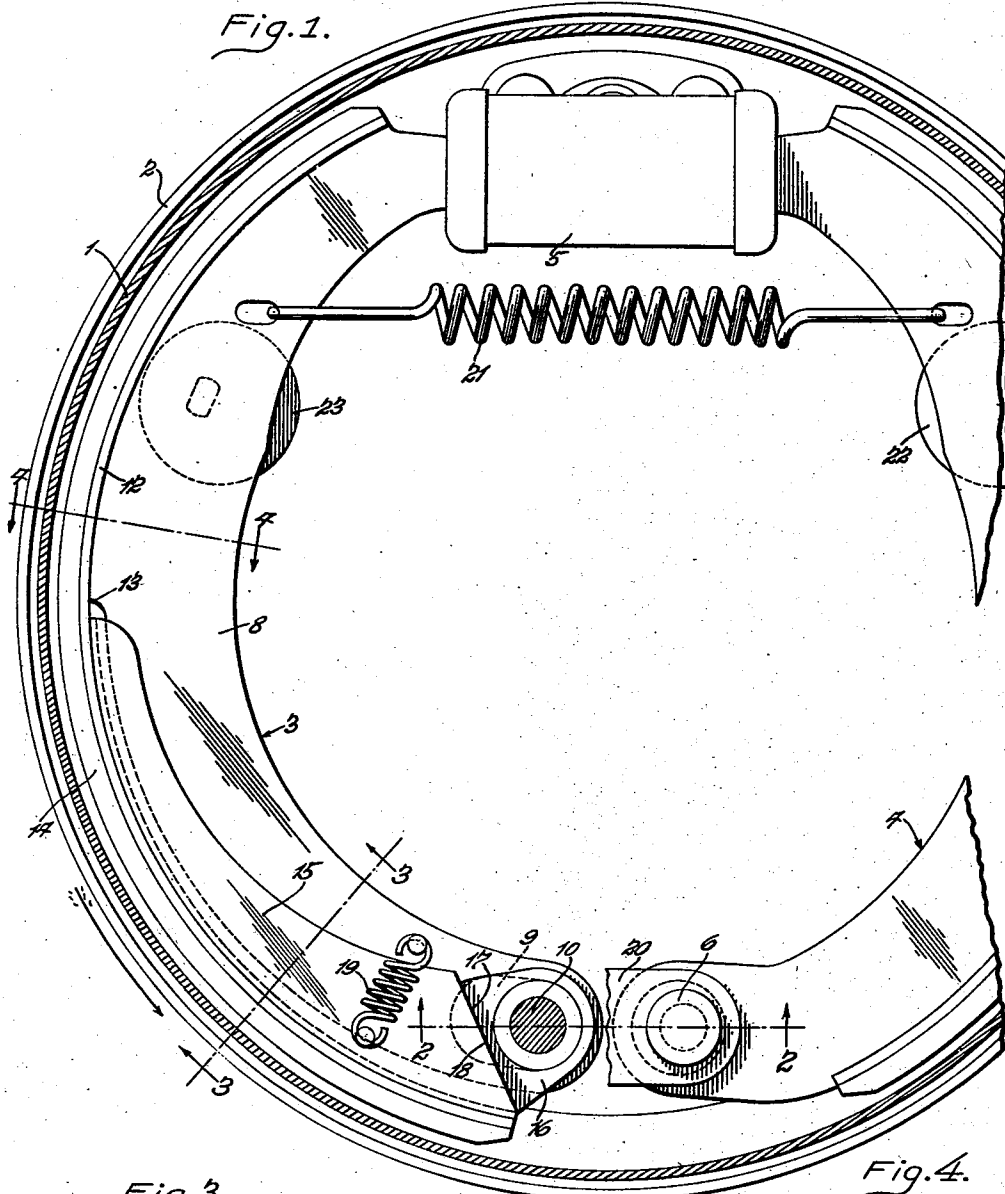
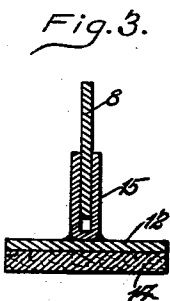
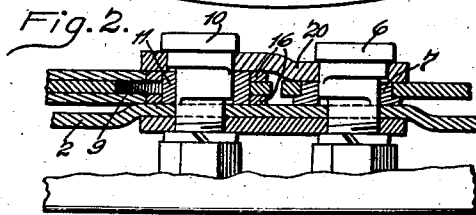
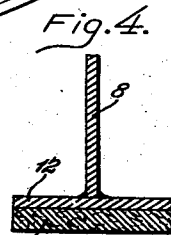
S. SCHNELL

2,215,567

BRAKE SHOE CONSTRUCTION

Filed July 13, 1939

2 Sheets-Sheet 1



INVENTOR
S. Schnell
BY
E. Huffman
His Attorney

Sept. 24, 1940.

S. SCHNELL

2,215,567

BRAKE SHOE CONSTRUCTION

Filed July 13, 1939

2 Sheets-Sheet 2

Fig. 6

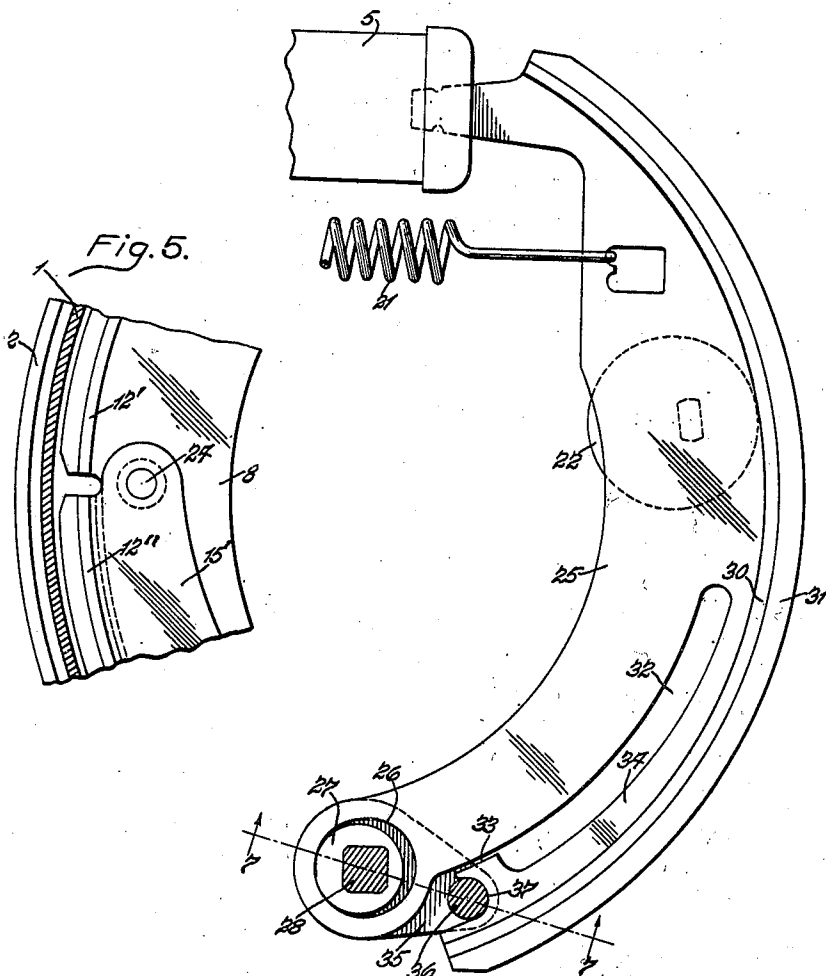
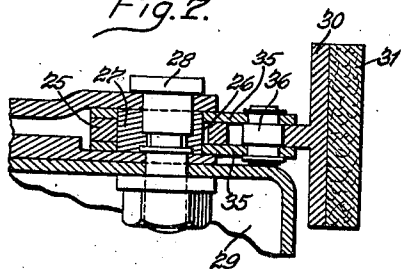


Fig. 7



Inventor
Steve Schnell
By E. E. Huffman
His Attorney

UNITED STATES PATENT OFFICE

2,215,567

BRAKE SHOE CONSTRUCTION

Steve Schnell, Overland, Mo., assignor to Wagner Electric Corporation, St. Louis, Mo., a corporation of Delaware

Application July 13, 1939, Serial No. 284,186

17 Claims. (Cl. 188—78)

My invention relates to braking mechanism and more particularly to an improved brake shoe construction.

One of the objects of my invention is to produce an improved brake shoe construction of the pivoted type which will permit its heel end to be actuated into engagement with the drum by a wedging action and which will also be stable and controllable during application to and release from the drum and also during braking action.

Another object of my invention is to provide an improved brake shoe and mounting means therefor which will permit the shoe to produce maximum braking action while at the same time allowing the shoe to be actuated into and out of engagement with the drum by a pivotal movement about a fixed axis positioned at the heel end of the shoe.

Other objects of my invention will become apparent from the following description taken in connection with the accompanying drawings in which Figure 1 is a view of a brake assembly showing my improved shoe construction embodied therein; Figures 2, 3 and 4 are cross-sectional views showing details and being taken on the lines 2—2, 3—3 and 4—4 of Figure 1; Figure 5 is a view showing a modified construction; Figure 6 is a view of another modified construction embodying the invention; and Figure 7 is a cross-sectional view taken on the line 7—7 of Figure 6.

Referring to Figures 1 to 4 in detail, numeral 1 indicates the drum of a brake and 2 the backing plate secured to a fixed part of the vehicle. Within the drum are two shoes 3 and 4 actuated into engagement with the drum by a fluid motor 5. The shoe 4 is the normal "reverse" shoe of the brake and is pivotally mounted at its heel end to the backing plate by means of an adjustable eccentric anchor pin 6 and a bearing sleeve 7 positioned in an opening in the shoe as is common practice.

The brake shoe 3 is the normal "forward" shoe and is of a special construction embodying my invention. This shoe comprises an arcuate web member 8 provided at its lower end with an arcuate slot 9 which is mounted on an eccentric adjustable anchor pin 10 carrying a bearing sleeve 11. The width of the arcuate slot is the same as the diameter of the sleeve and, therefore, the end of the web is prevented from any radial movement toward the drum but because of the length of this slot, it is permitted to have circumferential movement. A continuous flange 12

extends over substantially the entire length of the web 8 and is secured to the web, preferably by welding, over that portion of the web between an intermediate point 13 and the toe end of the web which is actuated by the fluid motor 5. The remaining portion of the flange between the point 13 and the pivoted end of the web is free of the web for movement relative to the web and toward the drum. Since the flange is made in the form of a flat strip, it has a certain degree of flexibility and because of this, the unsecured portion of the flange is in effect hinged to the secured portion at the point 13. The flange 12 is provided with the usual lining 14.

The unsecured portion of the flange has secured thereto, preferably by welding, a U-shaped reinforcing member 15, the legs of which receive the web 8 as best shown in Figure 3. Two plates 16 are mounted on the bearing sleeve 11 of the anchor pin on opposite sides of the web and each has an edge surface 17 inclined to a radius of the drum. The surfaces 17 cooperate with inclined surfaces 18 on the ends of the legs of the reinforcing member 15 and are maintained in contact by a spring 19, one end of which is hooked to the reinforcing member and the other end to the web.

The anchor pins 6 and 10 for the two shoes are connected together by a plate 20, thus permitting each pin to reinforce the other. The shoes are retracted from the drum to their "off" position by a coil spring 21 connected to the shoes and when in "off" position, shoe 4 engages an adjustable stop 22 and shoe 3 engages an adjustable stop 23.

When the drum is rotating in the direction indicated by the arrow and the shoes are applied to the drum by the fluid motor, shoe 4 will act as an ordinary "reverse" shoe. Shoe 3, when brought into engagement with the drum, will tend to be carried with the drum. Since the slot 9 permits the web 8 of the shoe to have circumferential movement, the shoe will anchor on the backing plate through the member 15 and the plates 16 on the anchor pin 10. The force acting on the reinforcing member when the shoe is applied is in a circumferential direction and since the surfaces 17 and 18 are positioned at an angle to this direction of force, a wedging action will take place which will create an outward radial force on the free end of the flange 12, thus causing the lining over that portion of the flange from the point 13 to the mounted end of the shoe to be engaged with the drum with greater intensity than would be the case if the

shoe were of the ordinary pivoted type like shoe 4. It is thus seen that by means of the shoe construction and mounting shown, the heel end portion of the shoe is caused to have a greater braking action and, therefore, the torque output of the shoe is increased. The toe portion of the shoe is not affected by the wedging action since the web is restrained from radial movement toward the drum by the slot 9 and the anchor pin. There is no possibility of the shoe becoming "locked" with the drum as would be the case if the web of the shoe were free to move toward the drum at the anchor pin. The shoe is easily controllable and may be readily applied and released from the drum under the action of the fluid motor.

In the modification shown in Figure 5, the U-shaped reenforcing member 15' is shown as pivotally mounted by means of a pin 24 to the web 8 of the shoe. Such a construction permits the lining carrying flange to be made in two pieces, the piece 12' being secured to the toe portion of the shoe and the piece 12'' being secured to the pivoted reenforcing member 15'. The operation of the modified brake shoe is the same as shoe 3 shown in Figure 1.

In the modification shown in Figure 6, the brake shoe comprises a web portion 25 which is formed with an arcuate slot 26 at its lower end for receiving the bearing 27 mounted on the anchor pin 28 secured to the backing plate 29. The slot 26 permits the web to have circumferential movement in addition to pivotal movement. The web 25 has an integral lining carrying flange 30 which extends over and is secured to the entire length of the web and carries a continuous lining 31. The lower half of the web has a cut out slot 32 and a saw cut 33 for freeing the portion 34 of the web from the main body of the web so that this portion 34 and the flange and lining carried thereby can have relative outward movement with respect to the web. In order to obtain a radial force on the web portion 34 when the shoe is applied to the drum and the web is caused to have a circumferential movement, the bearing 27 on the anchor pin has pivotally mounted thereon arms 35 positioned on opposite sides of the web. The ends of the arms carry a pin 36 which engages a surface 37 on the lower end of the web portion 34. Since the arm is at a wedging angle to circumferential force acting on the web when the shoe is applied, the lever arm will force the web portion 35 and the lining carried thereby outwardly into engagement with the drum. It is thus seen that the action of the shoe is the same as shoe 3 shown in Figure 1.

Being aware of the possibility of other modifications in the particular structure herein described without departing from the fundamental principles of my invention, I do not intend that its scope be limited except as set forth by the appended claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising a member mounted at one end for permitting swinging movement of the member toward the drum and also mounted at said end for circumferential movement with the drum but restrained from radial movement toward the drum, said shoe being provided with a drum engaging means which is so secured to

the member that it is free to move relatively to the member and outwardly toward the drum at the mounted end of the member, and means operable by circumferential movement of the member when the shoe is applied to the drum for forcing the free portion of the drum engaging means toward the drum and relatively to the mounted end of the member.

2. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising a member mounted at one end on the support for pivotal movement and for circumferential movement with the drum but restrained from radial movement toward the drum, drum engaging means secured to the member at a point spaced from the mounted end and capable of circumferential movement with the member but free to move relatively to the member and outwardly toward the drum over the portion of the member between said point of securement and the pivoted end of the member, and means operable by the circumferential movement of the member when the shoe is applied to the drum for forcing the drum engaging means toward the drum and relatively to the mounted end of the member.

3. In braking mechanism, a support, a brake drum, an anchor pin on the support, a brake shoe mounted on the anchor pin for cooperation with the drum, said shoe comprising an arcuate member mounted at one end on the pin for pivotal movement and for circumferential movement with the drum, drum engaging means carried by the member for circumferential movement therewith but free to move relatively to the member and outwardly toward the drum over at least a portion of the member extending from the pivoted end of the member toward the other end, and means operable by the circumferential movement of the member when the shoe is applied to the drum for forcing the drum engaging means toward the drum.

4. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum but restrained from radial movement toward the drum, drum engaging means hinged to the web at a point circumferentially spaced from the mounted end and free of the web from said point to the mounted end of said web, and means operable by circumferential movement of the web when the shoe is applied to the drum for forcing the drum engaging means toward the drum and relatively to the mounted end of the web.

5. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum but restrained from radial movement toward the drum, a lining carrying flange secured to the web for circumferential movement therewith but free of the web for relative outward movement toward the drum from an intermediate point on the web to the mounted end, and means operable by circumferential movement of the web when the shoe is applied to the drum for forcing the free part of the lining carrying portion toward the drum and relatively to the mounted end of the web.

6. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the

drum, said shoe comprising a web mounted at one end on the support for pivotal movement and for circumferential movement with the drum but restrained from radial movement toward the drum, a lining carrying flange extending over the major portion of the web and being secured to a portion of the web from an intermediate point to the free end of the web and so associated with the remaining portion of the web that it is free to move relatively to the web and outwardly toward the drum, and means operable by circumferential movement when the shoe is applied to the drum for forcing the free portion of the lining carrying flange toward the drum and relatively to the mounted end of the web.

7. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum but restrained from radial movement toward the drum, a continuous lining carrying portion extending over the major portion of the web and being secured to the web from an intermediate point to the free end of the web, and means operable by circumferential movement of the web when the shoe is applied to the drum forcing the unsecured part of the lining carrying portion toward the drum and relatively to the mounted end of the web.

8. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum but restrained from radial movement toward the drum, a lining carrying member extending over at least a portion of the web and having its end remote from the mounted end of the web pivotally mounted to said web, and means operable by circumferential movement of the web when the shoe is applied to the drum for forcing the free end of the pivotally mounted lining carrying member toward the drum and relatively to the mounted end of the web.

9. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum, drum engaging means secured to the web over that portion extending from a point intermediate the ends of the web to the free end of the web, other drum engaging means secured to the web at an intermediate point and extending over and free of the web from said point to the mounted end of the web, and means operable by circumferential movement of the web when the shoe is applied to the drum for forcing the free portion of the last named drum engaging means toward the drum.

10. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising a member mounted at one end on the support for pivotal movement and for circumferential movement with the drum, drum engaging means secured to the member at a point spaced from the mounted end and capable of circumferential movement with the member but free to move relatively outward toward the drum over the portion of the member between said point of securement and the pivoted end of the member, and cooperating cam means on the drum engaging means and on the

support for forcing the former toward the drum when the shoe is applied.

11. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum, a lining carrying flange secured to the web for circumferential movement therewith but free of the web for relative outward movement toward the drum from an intermediate point on the web to the mounted end, and cooperating cam means carried by the free end of the flange and by the support for forcing said free end toward the drum when the shoe is applied.

12. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum, a lining carrying member extending over at least a portion of the web and having its end which is remote from the mounted end pivotally connected to the web, and cooperating cam means on the free end of the lining carrying member and on the support for forcing the former toward the drum when the shoe is applied to the drum.

13. In braking mechanism, a support, a brake drum, a brake shoe for cooperation with the drum, said shoe comprising an arcuate web mounted at one end on the support for pivotal movement and for circumferential movement with the drum, drum engaging means secured to the web over that portion extending from a point intermediate the ends of the web to the free end of the web, other drum engaging means secured to the web at an intermediate point and extending over the web from said point to the mounted end of the web and being free of the web except at the point of securement, and means operable by circumferential movement of the web when the shoe is applied to the drum for forcing the free portion of the last named drum engaging means toward the drum, said means comprising a lever having one end pivoted to the support and its other end cooperating with said last named drum engaging means.

14. In braking mechanism, a support, a brake drum, an anchor pin on the support, a brake shoe mounted on the anchor pin for cooperation with the drum, said shoe comprising an arcuate web mounted on the pin for pivotal movement and for circumferential movement with the drum, drum engaging means secured to the portion of the web remote from the pivoted end, other drum engaging means connected at one of its ends to an intermediate part of the web and extending over the portion of the web between said point of connection and the pivoted end but free to move relatively to the web and outwardly toward the drum, and means carried by the pin and cooperating with the last named drum engaging means and operable by the circumferential movement of the web when the shoe is applied to the drum for forcing the last named drum engaging means toward the drum.

15. In braking mechanism, a support, a brake drum, an anchor pin on the support, a brake shoe mounted on the anchor pin for cooperation with the drum, said shoe comprising an arcuate web mounted on the pin for pivotal movement and for circumferential movement with the drum, drum engaging means secured to the web at a point circumferentially spaced from the pivoted

end and being free of said web from the point of
securement to the mounted end of the web,
means carried by the pivot pin and provided
with a cam surface, and a cooperating cam sur-
5 face carried by the free end of the drum engaging
means, said cam surfaces causing the free end of
the drum engaging means to be forced outwardly
toward the drum by a circumferential movement
of the web when the shoe is applied to the drum.
10 16. In braking mechanism, a support, a brake
drum, a brake shoe for cooperation with the
drum, said shoe comprising an arcuate web
mounted at one end on the support for pivotal
movement and for circumferential movement
15 with the drum, a lining carrying portion secured
to the web at a point circumferentially spaced
from the mounted end and free of said web from
said point of securement to the mounted end of
the web, means operable by circumferential
20 movement of the web when the shoe is applied to
the drum for forcing the free part of the lining

carrying portion toward the drum, and a spring
for biasing said free part of the lining carrying
portion toward the web.

17. In braking mechanism, a support, a brake
drum, a brake shoe for cooperation with the
5 drum, said shoe comprising an arcuate web
mounted at one end of the support for pivotal
movement and for circumferential movement of
the drum, said web having a portion extending
from an intermediate point to the mounted end 10
which is free to move relatively outward toward
the drum, a continuous lining carrying flange
extending over and secured to the web, and means
comprising a lever having one end pivotally
15 mounted on the support and the other end coop-
eratively engaging the portion of the web that is
free to move outwardly toward the drum for forc-
ing the latter and the lining carrying flange se-
cured thereto toward the drum when the shoe is
applied.

STEVE SCHNELL.