

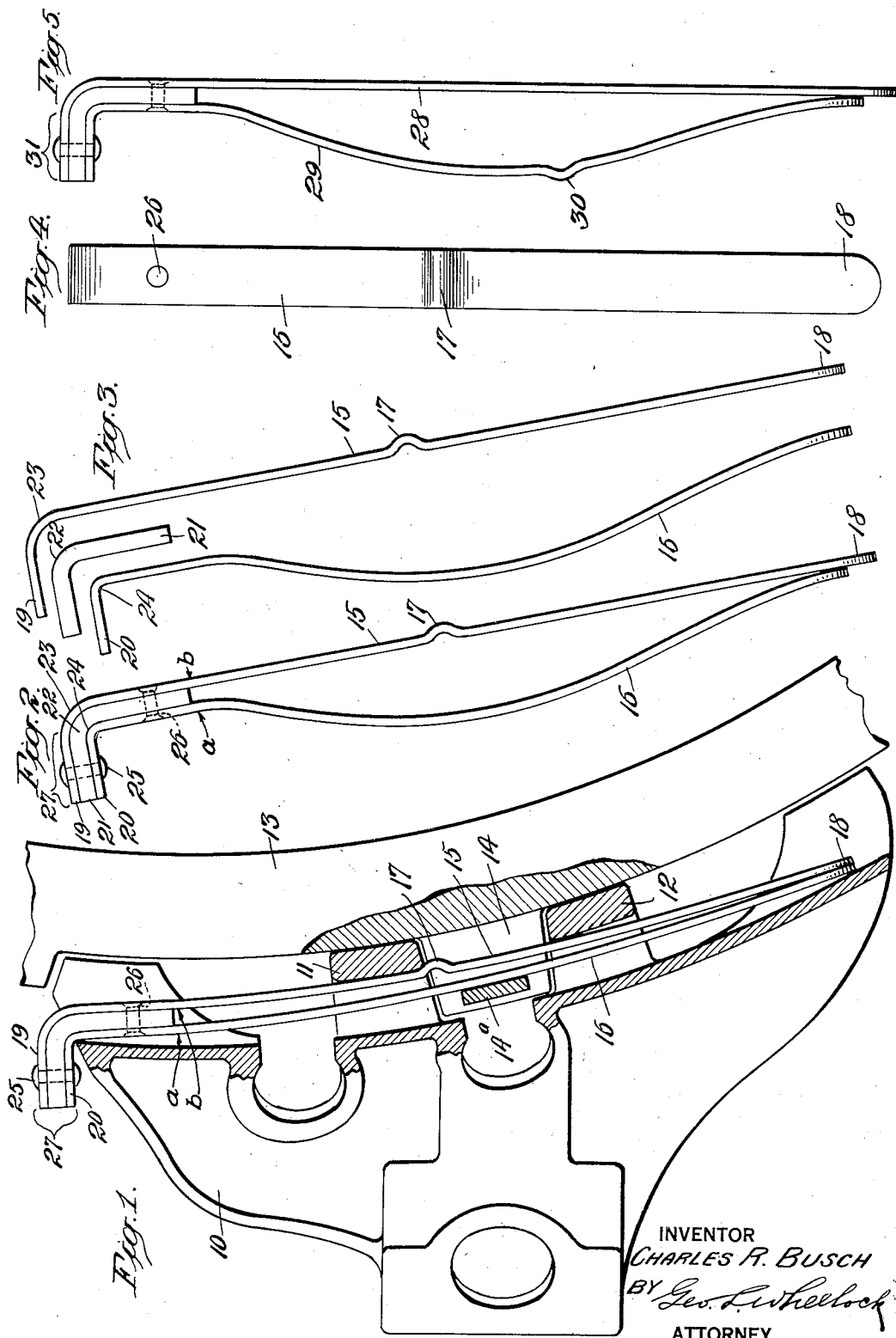
Sept. 10, 1935.

C. R. BUSCH

2,013,981

BRAKE SHOE KEY

Filed June 27, 1932



INVENTOR
CHARLES R. BUSCH
BY *Geo. L. Wheelock*
ATTORNEY

UNITED STATES PATENT OFFICE

2,013,981

BRAKE SHOE KEY

Charles R. Busch, Orange, N. J., assignor to Buffalo Brake Beam Company, New York, N. Y., a corporation of New York

Application June 27, 1932, Serial No. 619,472

11 Claims. (Cl. 188—243)

The present invention relates to certain improvements in brake shoe keys of the type shown, described and claimed in my application Serial No. 550,661, filed July 14, 1931, and objects of the present invention are generally to provide a non-vibrating and self-locking key of the type referred to in said application wherein two resilient or spring legs are employed, the legs of the present invention being in a measure simpler and being laid out along somewhat different lines.

Other objects of the invention are to eliminate the punishment which is wrought upon brake shoe heads by keys of the ordinary construction; to tend to reduce if not to entirely obviate breakages of the crosspiece of the lug of the brake shoe; and also to provide a key which itself holds up in use and may if desired be used over and over.

One of the objects of the present invention, and which may be resorted to in connection with connected resilient legs one in advance of the other, is to provide suitable means for holding the legs together in assembled relation in such way that quite closely to the connecting means the legs may be fairly widely spaced apart for establishing for the free portions of the legs points of flexure, or fulcruming points as it were. In such case it is preferred and it is advantageous to provide a driving or withdrawing lug which is of a solid construction.

These being among the objects of the present invention, the same consists of certain features of construction and combinations of parts to be hereinafter described and then claimed with reference to the accompanying drawing illustrating a preferred and a modified form of the invention and wherein

Fig. 1 is a side elevation, parts broken away and in section, of a brake shoe and its head held in place by the improved key according to the present invention;

Fig. 2 is a side elevation of a preferred construction of the brake shoe key before it is applied in the position shown in Fig. 1;

Fig. 3 is an exploded side elevation of the key to clearly show the separate elements;

Fig. 4 is a front elevation of the key shown in Fig. 2; and

Fig. 5 is a side elevation of a modified construction of key.

The improved key is preferably but not necessarily composed of two suitable lengths of leaf spring steel which may be and are preferably tempered, but they may be untampered providing they have suitable resiliency. The members to

be connected by the key include a brake shoe head 10 provided with a pair of spaced apertured lugs 11, 12 and a brake shoe 13 provided with an apertured lug 14 which is preferably formed in the usual manner consisting of two rearward projections connected by a cross-piece 14a of hard steel, usually formed separately from the shoe and the main portions of the lug 14, such construction being usually required in standard railway practice. Before referring to the state or condition of flexure of the improved key when in position and connecting the brake shoe head and the brake shoe, the key before insertion will be described in connection with Figures 2, 3 and 4.

The key includes a front leg 15 and a rear leg 16, which are preferably formed of leaf spring metal extending breadthwise one in advance of the other. The free end of the leg 15 has an extension 18 beyond the rear leg 16 and is formed or provided with a shoulder 17 which may be obtained by transversely corrugating the leaf leg 15, it being located in the middle portion of such leg.

The legs 15, 16 are preferably formed in one with rearwardly bent portions 19, 20, respectively. Between the bent upper ends of the legs there is placed an L-shaped metal filler 21 which has a rounded corner 22. The bent upper ends of the legs are preformed so as to fit upon opposite faces of the L-shaped metal filler 21, in which case the leg 15 will merge with the rearwardly bent portion 19 by means of a rounded corner 23, and the other leg 16 will merge with the rearward bent portion 20 by means of a rounded corner 24.

Hence in this specific embodiment of the invention the bent upper end portion of the leg 15 will snugly receive the L-shaped filler 21, whereas the said filler receives within it the bent upper end portion of the leg 16, so that these extended portions of the legs 15, and 16 will respectively fit upon the opposite outer and inner faces of the filler. When this specific construction is employed the parts of the key referred to may be united or connected in assembled relation by means of a rivet 25 passing through the filler 21 and through the rearwardly bent end portions 19 and 20, the rivet being then headed down upon the said portions. The parts of the key are also preferably united or connected together by means of a rivet 26 which passes through the filler, and the ends are riveted down and countersunk within the extended portions of the legs 15, 16 at a point beneath the lug 27 which is formed by the corresponding portions of the filler 21

and the extended portions of the legs. Whether or not a filler is employed for obtaining some or all of the advantages, preferably a solid driving or withdrawing lug 27 is provided, and this is so whether or not the two legs are formed from separate pieces of leaf spring metal.

It will be seen that the front leg 15 is formed on substantially a straight line except that when a shoulder 17 is formed therein, such straight line is departed from to that extent. However, the front leg 15 being substantially straight and having a set such that it tends to return to its straight shape if released from flexure, has a certain amount of stiffness, which is increased by the addition of the shoulder 17. It will be seen that the driving lug 27 extends substantially at right angles to the line on which the leg 15 extends when it is free from any strain, as shown in Figs. 2 and 3. It is to be noted that in the construction shown in Fig. 2 the legs 15, 16 are fairly well separated from each other at points just below the points of connection of the legs, or specifically at points just below the adjacent end of the filler 21. When the key is put into use the two legs will fulcrum as it were or flex at about *a*, *b*, upon the points referred to, the remainder of the key being preferably solid and inflexible so as to provide a rigid and substantial driving lug.

In Fig. 2 it will be seen that the leaf spring leg 16 is bowed rearwardly considerably, that is to say in a direction away from the substantially straight front leg 15. The outward bowing of the leg 16 is shown as greatest at about the mid-length thereof, so that it will gradually curve along easy lines in both directions from the approximate mid-length thereof. Preferably the extent of the transverse bowing of the leg 16 relatively to the key, when the legs are free from tension, is about three times the front to rear dimensions of the key when the key is in use and under tension. Thus a considerable springiness is inherent in the rear leg 16. When the key is in use, the front leg has a tendency to straighten out while the rear leg has a tendency to return to its maximum bowed shape, as shown in Fig. 2. The full advantages of the improved key will be better understood in connection with Fig. 1, where the key is shown as having been applied in using position. Figure 1 will therefore now be described from such viewpoint.

In Fig. 1 the shoe 13 has been placed in the customary position upon the brake head 10, so that the lug 14 is entered between the lugs 11, 12 on the head. The improved key has been applied so as to connect the shoe with the head, by passing it through the apertured lugs 11, 14 and 12, the key being therefore located in the usual way or guide formed with the head. It will be understood that in applying the key each of the two legs 15, 16 will be placed under tension in differing degrees, said legs having at their upper ends unyielding portions, and the free remaining portions of the legs, that is those portions which are free to flex, will be caused to flex at points *a*, *b*, of flexure or fulcruming points located just at the inflexible portions, the flexure of the legs being obtained by the bearing of the upper solid or rigid end of the key against the upper end of the brake head 10 and the bearing of the leg 16 upon the under surface of the cross-piece 14a of lug 14, thereby somewhat flexing the leg 15 and causing it to bear upon the forward surfaces of the apertures of lugs 11, 12, thus forcing the shoulder 17 to interlock with the lug 11

at a point just under it. Shoulder 17 will thus serve to prevent the key from jarring upwardly out of place, as the tension of the leg 15 will hold the shoulder 17 and the lug 11 in interlocking engagement.

The action of the key when being driven into place is facilitated or improved by reason of its preferred construction. It is to be observed that as the resilient front leg 15 of the key is straight or substantially straight and as the rear leg 16 has a maximum bowing outwardly away from the straight leg, the key is provided with a considerable taper from the advance or insertion end to the middle thereof, which gives the advantage that the force used during the gradual insertion of the key may be directed in a substantially straight line along the front leg 15 until the insertion of the key is well started and until the front leg has to be flexed to an appreciable extent. The result is that during the commencement of the forcible insertion of the key there is no tendency of the driving force to deflect or bend the front leg in the wrong direction, and that thereafter, during the completion of the drive, the flexing of the straight leg having been somewhat started, such leg is flexed into a state of tension by the gradually compressing back leg, so as to assist in holding the key in place when it is interlocked with the brake head lug. It will be seen also that as the front leg 15 is of resilient metal it has a tendency to straighten out to its original condition when flexed and that to that extent the front leg has certain stiffness, which is increased by the provision therein of the corrugation or shoulder 17.

Inasmuch as the taper of the key is obtained by imparting a maximum degree of bowing to the back leg 16 in striking contrast with the straight or almost straight front leg 15, and as during the full insertion of the key the distance between the ends of the slightly flexed front leg becomes a little less and the distance between the ends of the considerably bowed back leg becomes appreciably greater, there easily might be the tendency of the inserted tip end of the back leg 16 to hit one of the lugs of the brake shoe head and so interfere with the introduction of the key unless suitable precaution be taken with respect to the arrangement of the inserted tip ends of both legs 15, 16. Hence in the practical use of a key with such specific legs, it is found desirable to lead the tip end of the front leg in advance of the corresponding tip end of the back leg, so that such advance end of the front leg forms the leader of the key or acts as a guard to prevent the tip of the back leg 16 from hitting either of the lugs of the brake shoe head, as might be the case if the tip end of the back leg was ahead of the tip end of the front leg, or would have a tendency to enter ahead of the front leg.

The resilient legs of the key are preferably composed of leaf-spring metal having a thickness of one-eighth of an inch, inasmuch as the space allowed in practice between the planes of the oppositely facing bearing surfaces of the lugs is three-eighths of an inch when the parts are new. Preferably the rear leg 16 has a maximum bowing rearwardly to such extent that when the key is unrestrained or not in use, the distance across the key at a point just below the shoulder 17 will be about three or four times the distance between corresponding parts of the key when it is in use and under tension, as shown in Fig. 1.

The driving lug 27 preferably occupies a plane identical with the plane of the mutually facing

leaf-spring legs, and as the lug is solid or unyielding, it provides a satisfactory driving element for the key.

In Fig. 5 of the drawing there is illustrated a slight modification wherein the front leg 28 is without an interlocking shoulder. However, the back leg 29 is provided with an interlocking shoulder or corrugation 30 and the two legs are connected with a solid or unyielding driving lug 31. With this modified construction it will be seen that when the key is in place to connect the brake shoe with the brake shoe head, there is provided a shoulder 30 which will interlock with the cross-piece 14a of the shoe lug at a point just below such cross-piece. In such case a shoulder 17 as in the preferred form may or may not be provided on the front leg, as may be desired. Obviously, the invention as shown and described is susceptible to further modification without departing from the scope of the appended claims.

What I claim as new is,—

1. A brake-shoe key, including two legs of leaf-spring metal, means at one end of the key for connecting the legs in breadthwise relation one in advance of the other, and means for positively spacing integral portions of the metal of the legs apart below such end and precluding flexure of such portions, and for establishing for the free remaining portions of the legs points of flexure close to the spacing means.

2. A brake-shoe key, including two legs of leaf-spring metal, means at one end of the key for connecting the legs in breadthwise relation one in advance of the other, and means for positively spacing integral portions of the metal of the legs apart below such end and precluding flexure of such portions, and for establishing for the free remaining portions of the legs points of flexure close to the spacing means, such spacing means comprising a filler located between the positively spaced metal portions.

3. A brake-shoe key, including two oppositely acting legs formed from lengths of leaf-spring metal having permanently united ends, a driving or withdrawing lug for the key, and means for positively spacing the legs apart at a point below the lug and for establishing points of flexure for the free remaining portions of the legs.

4. A brake-shoe key, including two oppositely acting legs formed from leaf-spring metal having permanently united, bent ends extending in the same direction rearwardly, for forming a driving or withdrawing lug for the key, and means for positively spacing apart the bent out ends and the bends and precluding flexure thereof, and for establishing points of flexure for the free remaining portions of the legs, which points are along the length of the key and are located close to the spacing means.

5. A brake-shoe key, including two oppositely acting legs formed from lengths of leaf-spring metal having permanently united, bent, ends extending in the same direction for forming a driving or withdrawing lug for the key, and a filler inserted between the bent out ends and the bends, for positively spacing apart the bent out ends and the bends and precluding flexure thereof, and for establishing points of flexure for the free remaining portions of the legs, which points are

along the length of the key and are located close to the spacing means.

6. A brace-shoe key, including two oppositely acting legs of spring metal connected together at one end of the key and free at the other end, one leg being formed on a substantially straight line from end to end and located in advance of the other leg, and the other leg bowed considerably between its ends, and for the greater part of its length, relatively to and outwardly from the straight leg and a solidly formed driving lug extending at substantially a right angle to the straight leg, and including integral portions of both legs.

7. A brake-shoe key, including two oppositely acting legs of leaf spring metal connected together at one end of the key and free at the other end, the legs being arranged breadthwise one in advance of the other, the advance leg being formed on a substantially straight line and the other leg bowed considerably between its ends, and for the greater part of its length, relatively to and outwardly from the straight leg, and the advance leg having a front shoulder approximately midway of its length.

8. A brake-shoe key, including two oppositely acting legs of leaf spring metal of approximately similar lengths and connected together at one end of the key and free at the other end, the legs being arranged breadthwise one in advance of the other, one of the legs having an outwardly presented corrugation across its breadth providing a shoulder directed away from the other leg and located in the middle portion of the key.

9. A brake-shoe key, including two oppositely acting legs of leaf spring metal connected together at one end of the key and free at the other end, the legs being arranged breadthwise one in advance of the other, the key having an outwardly presented corrugation providing a shoulder located in the middle portion of the front leg.

10. A brake-shoe key, including two oppositely acting legs of leaf spring metal connected together at one end of the key and free at the other end, the legs being arranged breadthwise one in advance of the other, the key having an outwardly presented corrugation providing a shoulder located in the middle portion of the rear leg.

11. A brake-shoe key, including two oppositely acting legs of spring metal, and of approximately the same thickness, connected together at one end of the key and free at the other end, one leg when free and unrestrained extending along a straight line substantially from end to end and located in advance of the other leg, and the other leg bowed considerably between its ends, and for the greater part of its length, relatively to and outwardly from the straight leg, the maximum distance between the two legs being the greatest at the approximate mid-lengths thereof, the free end of the bowed leg adapted to bear upon the free end of such one straight leg and to press on and bow such one leg towards the bowed leg when the key is being driven home to its using position, and such one leg adapted to resume its straightness when the pressure is removed.

CHARLES R. BUSCH. 70