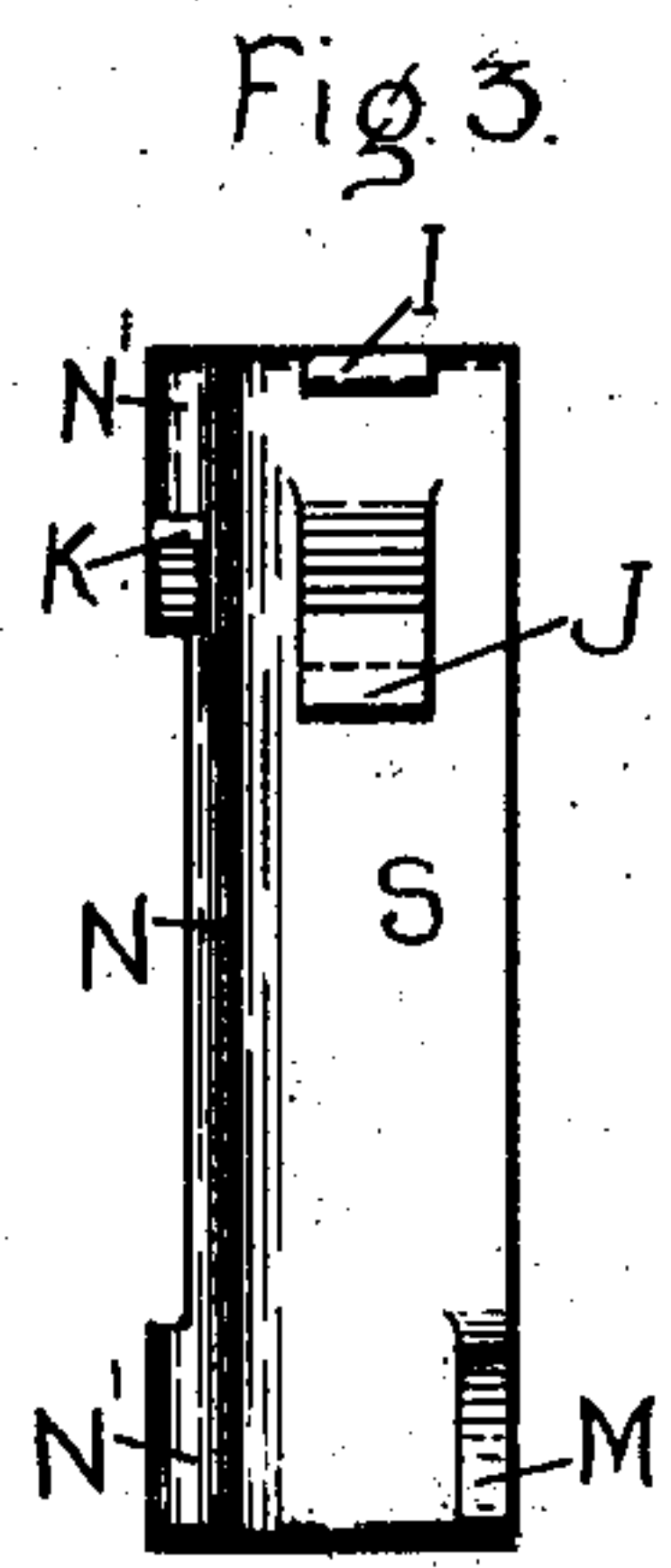
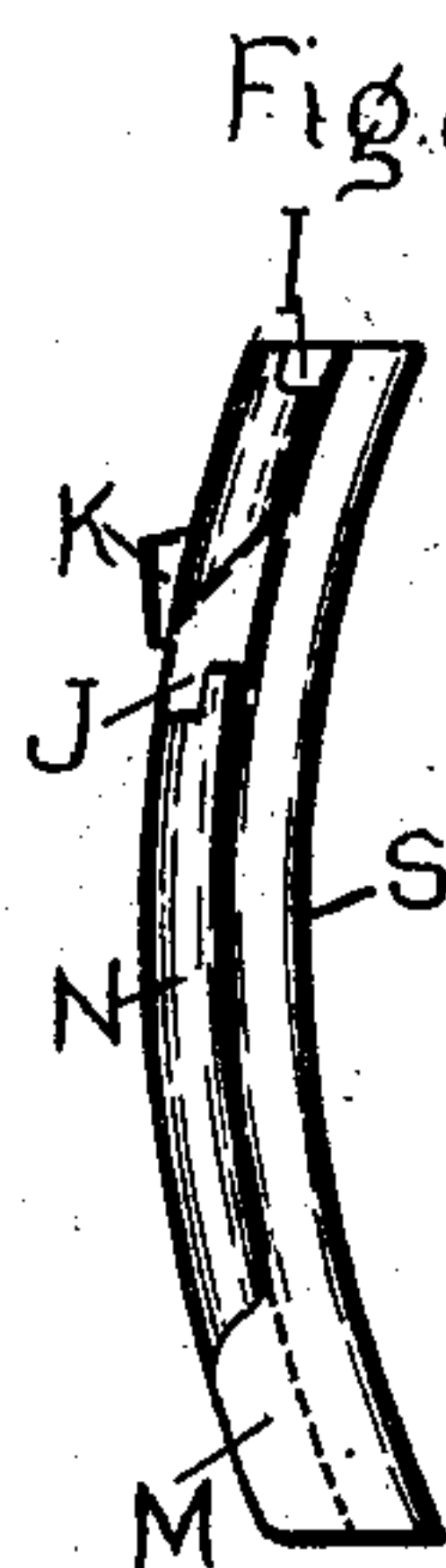
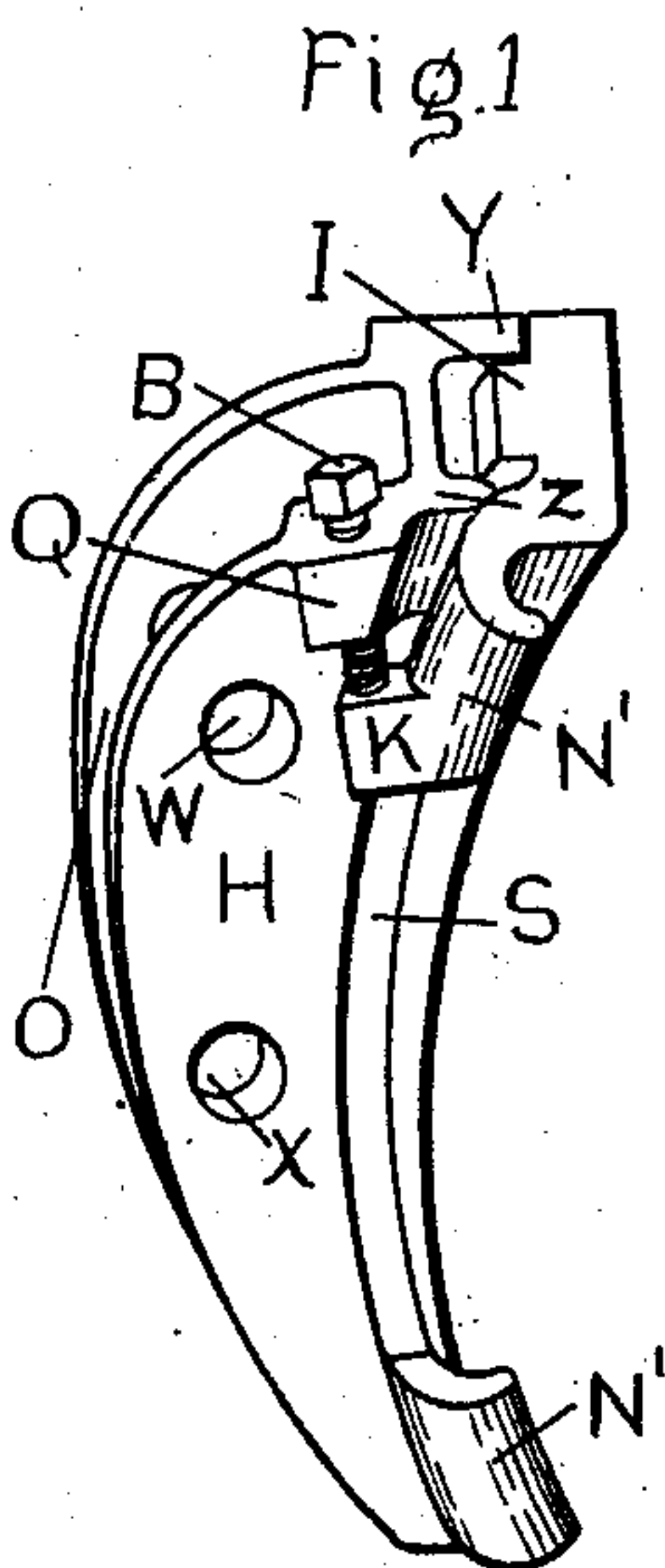
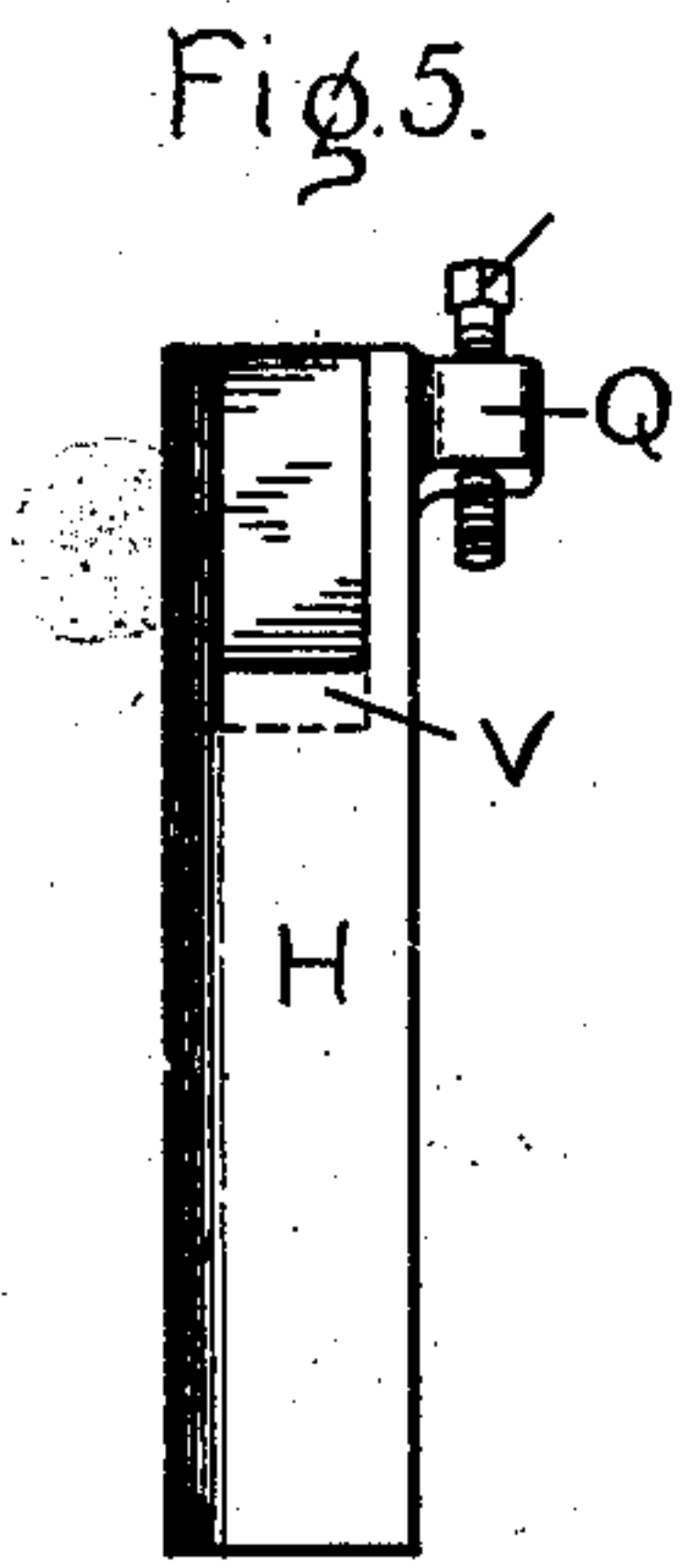
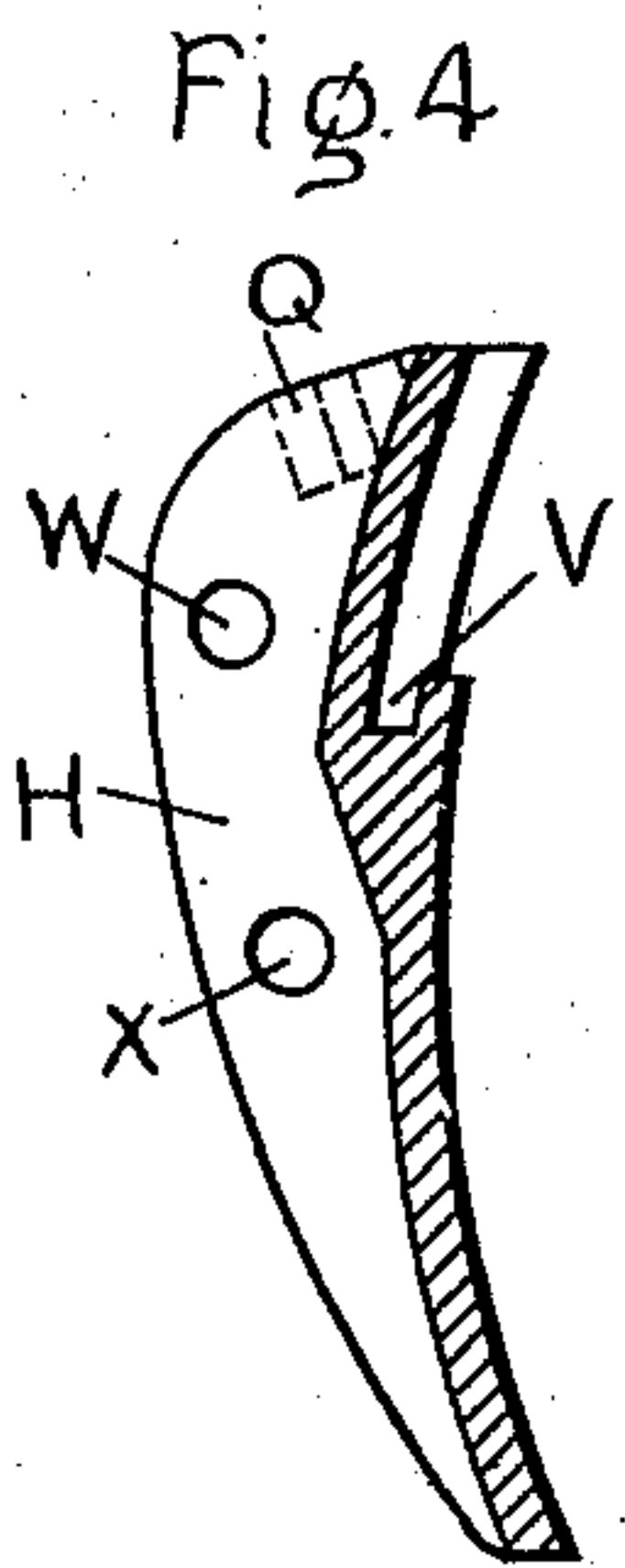
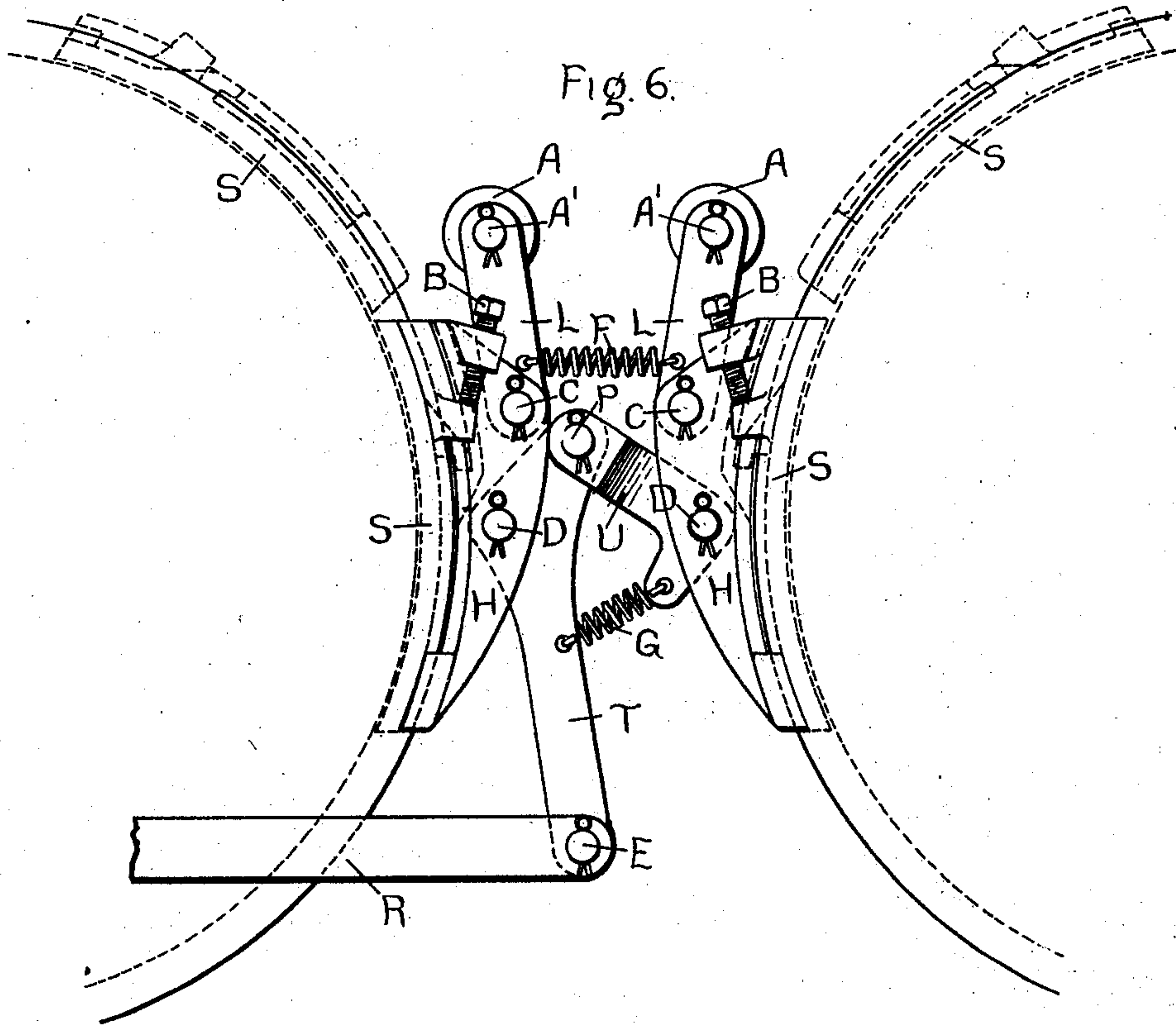


No. 745,359.

PATENTED DEC. 1. 1903.

C. W. LARSON.  
REMOVABLE BRAKE SHOE.  
APPLICATION FILED JUNE 13, 1901.

NO MODEL.



Witnesses,

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Atty.



# UNITED STATES PATENT OFFICE.

CARL W. LARSON, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## REMOVABLE BRAKE-SHOE.

SPECIFICATION forming part of Letters Patent No. 745,359, dated December 1, 1903.

Application filed June 13, 1901. Serial No. 64,364. (No model.)

*To all whom it may concern:*

Be it known that I, CARL W. LARSON, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Removable Brake-Shoes, of which the following is a specification.

This invention relates to that type of brake-shoes for vehicle-wheels which are adapted to be removed when worn and to be replaced by new shoes.

The invention consists in the construction and arrangement of such shoes and of their supports whereby when the shoes become worn they can be removed and replaced with a minimum expenditure of time and labor.

As is well known, brake-shoes which are intended to operate on the tread of vehicle-wheels are shaped to conform with the curvature of such portion of the wheels and in the operation of braking are pressed with considerable force against the wheels by any suitable mechanism. This invention relates in no wise to such actuating mechanism, but to the end of making the shoes removable independently of the mechanism.

Brake-shoes have been made removable hitherto, but they have been readily removable only under the most favorable conditions or have been removable with great difficulty under adverse conditions. Brake-shoes constructed and arranged in accordance with this invention are readily removable even under the most unfavorable conditions. Moreover, by this invention the problem is solved which has been replete with difficulties which engineers for a number of years have been attempting to overcome, and it was only after many personal failures that the end in view was successfully attained in consequence of the conception of this invention and its application in practice.

The invention has already been recognized as of great importance and revolutionary by those skilled in the art and familiar with the apparently insurmountable difficulties in the way of practical readily-removable brake-shoes.

It has been the practice hitherto to make removable brake-shoes separate from the support or head, which is in turn suitably sup-

ported on the vehicle, and to this extent the present invention is not novel. Such shoes have been provided with lugs on their rear faces, which engaged in recesses on the heads which carried them. The head could be moved away from the wheel, so that the recesses in the head were carried away from the lug on the shoe, and the shoe could then be removed. This arrangement could be used on a vehicle having a long wheel-base, because there was plenty of room for the withdrawal of the brake-shoe head. The disadvantageous feature of such a construction is that the actuating mechanism must have a sufficient range of movement to permit the head to be removed far enough from the wheel to permit the withdrawal of the shoe, whereas it is especially desirable that such mechanism should have a range of movement only sufficient to compensate for the wear of the shoe. However, there are cases in which resort cannot be had to the construction above described. In vehicles such as mining-locomotives, which are constructed with short wheel-bases—sometimes as low as fourteen inches—in order to turn sharp curves, the space between the front and rear wheels is scarcely sufficient for the actuating mechanism, and any movement of the head away from the wheel, so that the shoe could be removed, is out of the question. Consequently the head and shoe have hitherto been made in one piece in this type of vehicle, and when the shoe wore out it was necessary to practically dismantle the entire braking apparatus in order to remove the shoe. This was a matter of great practical importance, because brake-shoes wear out in a few days of active service, and frequently in much less time when considerable sand is used. When the shoes became worn, the locomotive had to be laid up as for repairs, and the services of two men for about two hours were required to refit it with new shoes, and at least one of these men was necessarily a skilled mechanic. By means of this invention the motorman or other person not a skilled mechanic can remove a worn brake-shoe and replace it with a new one in about one minute. Hence it is not necessary to put the locomotive out of commission; but, on the other hand, its op-



eration need be stopped only momentarily, as no movement of the brake-shoe head or actuating mechanism is required.

The invention can be applied most advantageously to mining-locomotives or other vehicles having short wheel-bases; but it can, however, be advantageously applied to any other vehicle desired.

Of the drawings, Figure 1 is a perspective view of a brake-shoe and its supporting-head constructed and assembled in accordance with this invention. Fig. 2 is a side elevation of the separate shoe. Fig. 3 is an end elevation of the shoe. Fig. 4 is a vertical section of the supporting-head; Fig. 5, an end elevation thereof; and Fig. 6 is a general side elevation showing a method of applying the invention in practice to the wheels of a vehicle, such as a mining-locomotive.

The invention relates solely to the disclosure of Fig. 1 and the associated figures, in which H represents the head, and S the separate shoe. As shown in Figs. 2 and 3, the shoe is shaped to conform with the curvature of the tread of a car-wheel and is formed with a portion N on its rear face which is adapted to fit the flange of such a wheel. Extending from this flange is a lug or shoulder K, and from the main portion of the rear face of the shoe extends a lug, shoulder, or hook J. Extensions N' of the flange portion N are adapted to extend over the edge of the flange in order to provide additional friction service; but the intermediate portion N is preferably cut away in order to provide space for a protecting-casing. From the lower corner of the rear face of the shoe extends a lug M to form a space or pocket between itself and the flange portion N. A lug I is formed at the top of the shoe to aid in removing the latter.

The head H is shown in detail in the sectional view of Fig. 4. The main portion of this head is shaped to conform with the curvature of the shoe and has two rearwardly-projecting portions forming an intervening space for the reception of the actuating mechanism, which is attached to these shoulders by pins which pass through the holes W and X. A suitable shoulder V is formed on the face of the head and is preferably shaped as shown, whereby it is adapted for the reception of the shoulder J on the shoe, so that the shoe is prevented from dropping from its operative position. The shoulders J and V may, however, be of any shape suitable for accomplishing the end sought. The head H is also formed with two lugs Y and Z on its front face, which form a space between them for the reception of the lug I on the shoe, whereby the shoe is prevented from relative side-wise movement. The lower portion of the head is adapted to be seated between the portions N' and M of the shoe, whereby also the shoe is prevented from relative lateral movement with respect to the head. The head H is provided on one side with a lug Q, which when the head and shoe are assembled is lo-

cated above the shoulder J on the shoe. A bolt B is seated in the lug Q, and after the head and shoe are assembled the bolt is screwed down through the lug Q to engage the top of the shoulder K, whereby the shoe is held in its operative position, its lug J resting on the shelf or shoulder V of the head. When the shoe becomes worn, the bolt B is partially unscrewed from its seat, and the shoe S can then be readily removed from its operative position by sliding along the tread of the wheel until it assumes the position shown in dotted lines in Fig. 6, when it can be lifted from the wheel and a new shoe inserted in place by a reverse operation. In sliding the shoe from its seat the lug I furnishes a convenient means for grasping the shoe. It should be remembered that in vehicles having short wheel-bases it has hitherto been customary to construct in one piece the apparatus shown in Fig. 1 as constructed in two parts.

A convenient application of the invention is shown in Fig. 6, wherein the same actuating mechanism is utilized which has been customary heretofore in connection with the brake-shoe and head when constructed in a single piece. It will be observed that with such a short distance between the front and rear wheels there is scarcely sufficient room for the actuating mechanism and that there is no possibility of a horizontal movement of the head for the purpose of removing the shoe. This invention therefore constitutes the only means of readily removing the shoes when worn without dismantling the actuating apparatus. The latter will now be described in order to disclose the embodiment which has already been found successful in practice.

A A represent bosses formed on the car-frame, and A' A' are pins which are supported in these bosses. These pins carry the actuating apparatus, the levers L L of which are held upon the pins in any suitable manner, as by the dowels shown. The brake-shoe heads H are suspended from the levers L by means of pins C, which pass through holes W in the heads, as indicated in Fig. 1. Toggle-levers T and U are pivoted to the heads by pins D, which pass through holes X in the heads, and the levers are connected by a pin P. Springs F and G serve to keep the brakes normally away from the car-wheels. The toggle is actuated through the lever R, connected to the lever T by the pin E, the lever R being actuated by the motorman in any well-known manner.

As before stated, it has hitherto been customary to have the rear face of the head itself engage the wheel, the head and shoe consisting, therefore, of but one part, and when this part became worn away beyond the range of operation of the actuating mechanism it was therefore necessary to remove the pins and take the actuating mechanism apart, put in new shoes, and reinsert the pins. This oper-



ation involved so great an expenditure of time that for a number of years engineers have been attempting to devise a shoe which could be readily removed, and this is the result accomplished by this invention. It is evident that the distance separating the wheels is so small that the head could not be moved horizontally to permit the withdrawal of a separate shoe as heretofore designed for vehicles having longer wheel-bases, and, furthermore, this invention obviates the necessity of providing a long range of movement for the lever R, which is necessary in cases where there is sufficient distance between the wheels to permit horizontal movement of the head.

It is not intended that the invention shall be limited in its application to the combination with the actuating mechanism disclosed herein, and it is considered obvious that any other suitable mechanism can be employed.

Irrespective of any actuating mechanism the invention consists, broadly, of a structure which will permit the brake-shoe to be readily removed without moving the brake-shoe head or disturbing any part of the actuating mechanism or the operating connections between the actuating mechanism and the brake. Now that this broad idea is suggested it will be very easy for skilled mechanics to change the structure shown herein so as to depart from the particular arrangement of lugs, shoulders, and bolts; but the invention consists in a shoe removable by itself, and any structure wherein substantially equivalent means is employed to accomplish this result is regarded as being within the field of the invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a brake-shoe head, of a separate brake-shoe, said head and shoe being interlocked to prevent free relative movement of the shoe in one direction with respect to the head, and a bolt adjustably mounted in the head and arranged to press against the shoe, to hold the latter from free relative movement in the other direction with respect to the head.

2. The combination with a brake-shoe head, of a separate brake-shoe, means for removably supporting the shoe upon the head, whereby the shoe can be readily removed from the head without moving the latter, and a device adapted to be forced into engagement with said shoe to maintain the same against displacement in an upward direction.

3. The combination with a brake-shoe head, of a separate brake-shoe, actuating mechanism therefor, means for connecting said mechanism with the head, said head and shoe being constructed so that the shoe is prevented from falling, and so that it can be removed without moving the head or disturbing the means which connects the head with the actuating mechanism, and an adjustable device adapted to press upon the shoe with any de-

sired pressure to prevent it from being forced upwardly.

4. The combination with a brake-shoe head, of a separate brake-shoe, said parts being provided with a mechanical interlock, whereby the shoe is supported upon the head, so that it can be removed therefrom without moving the head, and a device adjustably seated in the head, and constructed to press downward upon said shoe with any desired degree of pressure to prevent its upward movement.

5. The combination with a brake-shoe head, of a separate removable brake-shoe, said head and shoe being constructed so that the shoe is prevented from falling, and a bolt seated in the head, and pressing downwardly upon the shoe to prevent the shoe from being forced upwardly.

6. The combination with a brake-shoe head, of a separate removable brake-shoe, said head and shoe being constructed so that the shoe is prevented from falling, a lug on the head, a lug on the shoe, and a bolt seated in the lug on the head, and bearing downwardly upon the lug on the shoe, to keep the latter from being forced upwardly.

7. The combination with a brake-shoe head, of a separate removable brake-shoe, said head and shoe being constructed so that the shoe is prevented from falling, a lug on the side of the head, and a bolt seated in said lug, and arranged to bear downwardly upon the shoe to prevent the latter from being forced upwardly.

8. The combination with a brake-shoe head, of a separate brake-shoe, a lug on the side of the head, a lug on the rear face of the shoe, which lug extends under the lug on the side of the head, and a bolt seated in the lug on the head, and adapted to engage the lug on the rear face of the shoe.

9. The combination with a brake-shoe head, of a separate brake-shoe, said head and shoe being constructed so that the shoe is prevented from falling, and so that it can be removed from its operative position without moving the head, a bolt seated in the head, and bearing downwardly upon the shoe, and a lug on the shoe, by which the shoe can be grasped in order to slide it along the wheel away from the head.

10. The combination with a brake-shoe head, of a separate brake-shoe, said head and shoe being constructed so that the shoe is prevented from falling, and so that it can be removed without moving the head, and a bolt seated in the head and arranged to bear downwardly upon the shoe, said head being provided with raised portions or lugs between which the shoe lies, in order to prevent lateral movement of the shoe with respect to the head.

11. The combination with a brake-shoe head, of a separate brake-shoe, said head and shoe being constructed so that the shoe is prevented from falling, and so that it can be re-



moved without moving the head, a bolt seated in the head and arranged to bear downwardly upon the shoe, a lug on the shoe by which the latter can be removed, and raised portions or lugs on the head between which said  
5 lug on the shoe lies, so that the shoe is prevented from lateral movement with respect to the head.

12. The combination with a brake-shoe  
to head, of a separate brake-shoe shaped to the tread and flange of a car-wheel, a shoulder extending from the portion of the shoe which

engages the wheel-flange, and a bolt seated in the head, and adapted to engage said shoulder.

13. The combination with a brake-shoe 15 head having the parts V, Q and B, of a separate removable brake-shoe having the parts J and K, in substance as described.

In witness whereof I have hereunto set my hand this 10th day of June, 1901.

CARL W. LARSON.

Witnesses:

BENJAMIN B. HULL,  
FRED RUSS.