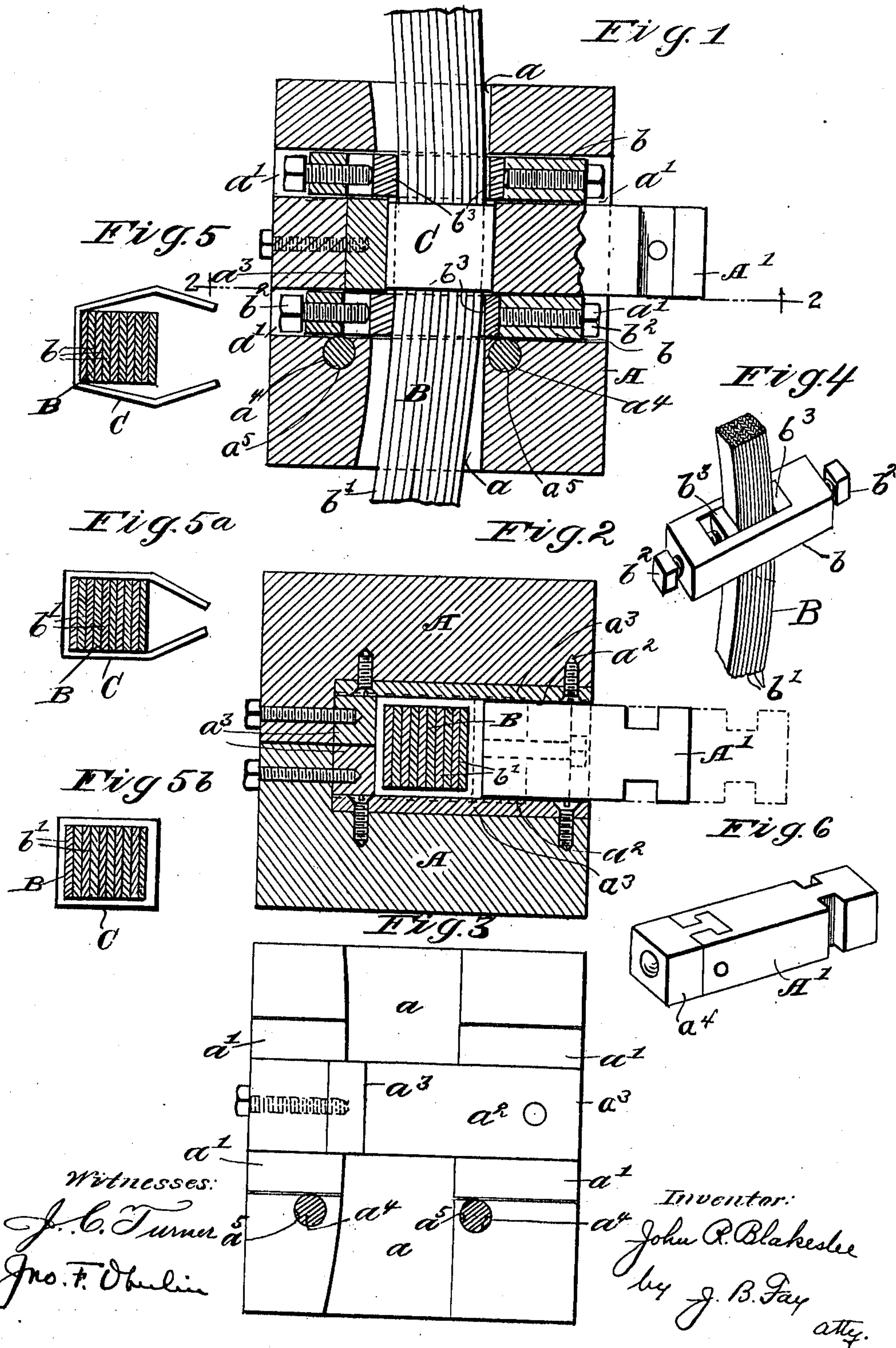


J. R. BLAKESLEE.  
 ART OF APPLYING BANDS ONTO LEAF SPRINGS.  
 APPLICATION FILED APR. 28, 1909.

988,432.

Patented Apr. 4, 1911.





# UNITED STATES PATENT OFFICE.

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## ART OF APPLYING BANDS ONTO LEAF-SPRINGS.

988,432.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed April 28, 1909. Serial No. 492,623.

*To all whom it may concern:*

Be it known that I, JOHN R. BLAKESLEE, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in the Art of Applying Bands onto Leaf-Springs, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, while applicable, at least in certain of its aspects, to forging operations in general, has been devised with the applying of clips or bands onto leaf springs as the object more immediately in view. The springs in question, as is well understood, are composed of superposed leaves of successively greater length, forming in other words the familiar elliptic (either full or half) spring so largely used in connection with vehicles of various kinds. In heavier types of vehicles, such as those employed on railways and particularly in railway locomotives, not only are such component leaves apt to be very heavy, but it is necessary that they be bound together very securely and to this end accordingly a forging in the form of a band is placed about said leaves. Such band likewise provides one point of attachment or bearing, between the spring and vehicle frame. It has long been the prevailing practice to forge or otherwise prepare this band independently of the spring and then slip the same on to the assembled leaves of the latter under hydraulic or other equivalent pressure so as thus to bind them firmly together. This method of manufacture obviously renders it difficult to obtain a tight fit for the band and so it has been found necessary to hammer the opposite faces of the band, after it has been placed in position, in order to compress it upon the spring. All this is objectionable not only because of the multiplicity of operations involved, but also by reason of the fact that any prolongation of the contact of the band while in heated condition, with the spring, is apt to injuriously affect the temper of the latter.

The object of the present invention is the provision of a method of manufacturing bands of this type whereby such bands may be formed or forged in place upon the

spring, thereby not only much expediting the manufacturing and assembling of springs of the character in hand, but also rendering them of superior strength and durability; while by reason of the expedition with which the operation is carried on, the band may be cooled before the spring can be unduly heated therefrom.

To the accomplishment of the foregoing and related end, said invention then consists of the steps hereinafter fully described and particularly pointed out in claims.

The annexed drawing and the following description set forth in detail one mode of operation embodying the invention, such disclosed mode constituting, however, but one of various ways in which the principle of the invention may be used.

In said annexed drawing:—Figure 1 is a vertical section through the dies and other operative parts of an apparatus for carrying out my improved method, such parts appearing in their final operative positions, and a spring of the character referred to above being shown as held by such dies; Fig. 2 is a transverse section of the same on the line 2—2, Fig. 1; Fig. 3 is an elevational view of the inside of one such die; Fig. 4 is a perspective view of a clamp member forming a feature of the apparatus in question; Figs. 5, 5<sup>a</sup> and 5<sup>b</sup> represent successive views of the band or clip in the course of the operation, involving the forging of the same onto the spring; and Fig. 6 is a perspective view of the upsetting head or plunger.

It will be understood, of course, that in thus presenting one specific adaptation or use of the invention, this is done without implying any limitation of the usefulness of the invention to such single field; in other words, the reference to a locomotive spring as the specific object dealt with may be regarded as being by way of illustration only. Furthermore, in illustrating the apparatus employed in the carrying on of such invention, it has not been deemed necessary to show more parts than those directly associated in the forging, or upsetting, operation proper. The apparatus thus illustrated, forming a machine for applying bands onto leaf springs, has been required to be divided out of the present case, and so forms the subject matter of a divisional application filed November 16, 1910, Serial No. 592,646.



Such apparatus, then, referring to Figs. 1, 2 and 3, particularly, will be seen to comprise two similar members A movable toward and from each other, as will be readily understood, to clamp between them the spring B and the band C that is to be forged upon said spring. Said die members, with this in view, have their respective inner faces recessed, preferably vertically, as at  $a$  to receive the spring disposed in corresponding vertical position; while transverse recesses  $a'$  in the dies are adapted to receive the two clamp members  $b$   $b$ , whereby the leaves  $b'$  composing such springs are desirably clamped together. Transverse recesses  $a^2$  in the dies furthermore form an opening through which the forging or upsetting head A' may be introduced. This head, it will be understood, is carried by the usual reciprocable block or plunger (not shown) and is actuated by any suitable means to alternately advance the head from the position indicated in dotted lines to the one shown in full lines, and thence back to its normal position again.

The clamps  $b$  whereby the leaves  $b'$  of the spring are held in their assembled condition are of general rectangular form, (see Fig. 4) and are adapted to be pressed against the spring leaves by set bolts  $b^2$ , that bear against blocks  $b^3$  slidably held in the clamp. The inturned face of at least one block moreover is corrugated or otherwise formed so as to prevent the clamp from slipping upon the spring. In this way I am enabled to adjust the same set of clamps to springs of different thicknesses, but separate sets of clamps require to be provided for different widths of spring. In order to accommodate the dies A, to different thicknesses and widths of spring those portions of their faces designed to contact with, or assist in forming the band or clip, by which the leaves are bound together, are provided with removable liners  $a^3$  mounted, or held in the dies in any approved fashion, as will be readily understood. The forging or upsetting head A' similarly may be interchanged not only to provide for variation in the position finally assumed by its front face with respect to the spring, but also to permit of the use of heads having the front face  $a^4$  variously formed to produce the several different shapes employed by spring builders in their spring bands or clips, in connection with the mountings or holders provided for such springs in the locomotive or other vehicle frame.

In operation, the spring vertically positioned and with its parts held together by means of the two clamps aforesaid, is swung in between the two dies, so that the latter lie on opposite sides of said spring and in substantial alinement with the clamps, such clamps being spaced apart just the proper

distance to permit introduction therebetween of the band. Pending such introduction, the lowermost of the two clamps rests on a pair of pins  $a^4$   $a^4$ , which project horizontally from the face of one of the dies, the other die being formed with apertures  $a^5$  for the reception of such pins when the two dies are brought together. Prior to thus forcing the dies together, however, the band C, which has been previously raised to the proper forging temperature, is applied to the spring, such band being of general U-form with its outer ends preferably somewhat bent in, as indicated in Fig. 5. The effect of the inward movement of the dies is to press the sides of such band against the sides of the spring, the outer edge of the band being supported by the two clamp members, which it will be seen bound in effect a portion of the general die-space. Thereupon the inward movement of the head is caused to take place, the result of which is the doubling in and welding or upsetting of the ends of the band, so as to form an integral forging of the band, that is in all particulars as strong and resistant to strain as though it had been forged entirely apart from the spring in the usual fashion. Obviously, however, the further tedious and difficult operations of forcing the band endwise onto the spring and thereupon hammering or compressing it heretofore necessary are entirely eliminated. The relative ease and simplicity of the operation of securing the band or clip onto a spring of the character in hand, by my improved method, is hence readily evident, involving as it does, a minimum amount of handling of the parts, and but a single machine operation. Both of these items contribute largely to the factory cost of articles, as need not be explained.

It will be understood of course, that any suitable clamping means may be employed to hold the leaves of the spring together pending the closing of the die parts around the same and the forging of the band thereon. Particularly, the clamp members need not necessarily be employed to define or bound the die space in which the upsetting operation takes place; but the dies may be relied on wholly for this purpose. In such case the clamps can be removed entirely from the spring after the latter has been placed in the main dies; and, for that matter, the dies may be themselves utilized as clamp members. It is preferred, however, to employ two clamps of the character illustrated one on each side of the space to be subsequently occupied by the band, since thereby the leaves of the spring may be very securely held together and any looseness of fit avoided. It should, perhaps, be remarked that the successive leaves of a spring of this kind are not only shorter



but also formed on curves of increasing sharpness, so that, as a result, a very considerable force is necessary to properly retain them in assembled condition while the band is being applied. An additional objection, hence, to the prevailing method of applying bands, which I now overcome, is the restriction to the use of but a single clamp, since the one end of the spring has had to be left clear for the band to be slipped thereover.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mode herein disclosed, provided the steps stated by any of the following claims or the equivalent of such stated steps be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. The improvement in the art of applying bands to leaf springs, which consists

in assembling the leaves of such a spring in close relation, applying thereto an open band in properly heated condition, and then applying pressure to weld together the ends of such band and simultaneously compress the latter around the spring.

2. The improvement in the art of applying bands to leaf springs, which consists in assembling the leaves of such a spring, maintaining said leaves in close relation by clamping the same together on each side of the space to be occupied by the band, applying to said leaves an open band in properly heated condition, and then applying pressure to weld together the ends of such band and simultaneously compress the latter around the spring.

Signed by me this 5th day of April, 1909.

JOHN R. BLAKESLEE.

Attested by—

ANNA L. GILL,

JNO. F. OBERLIN.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

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