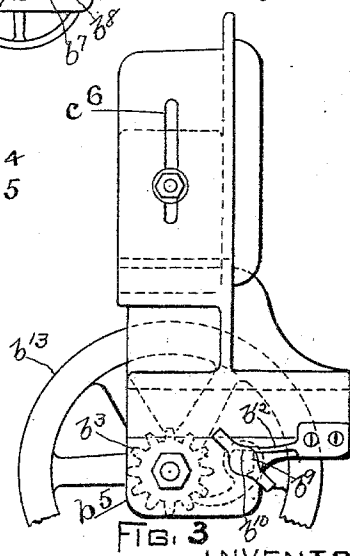
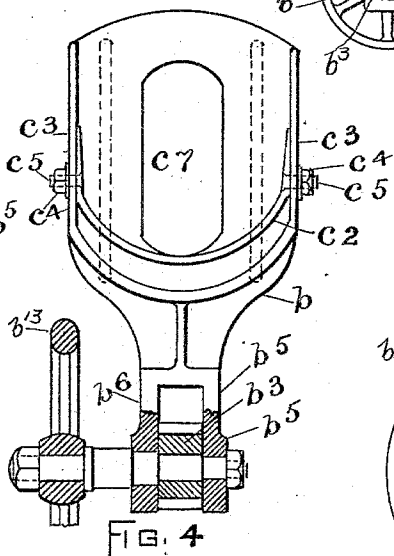
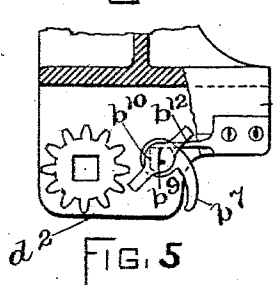
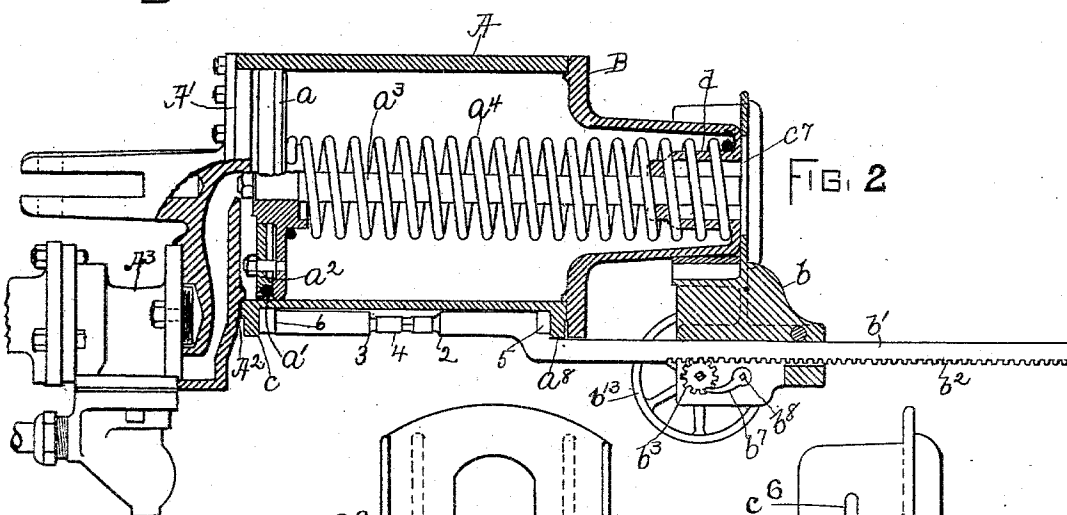
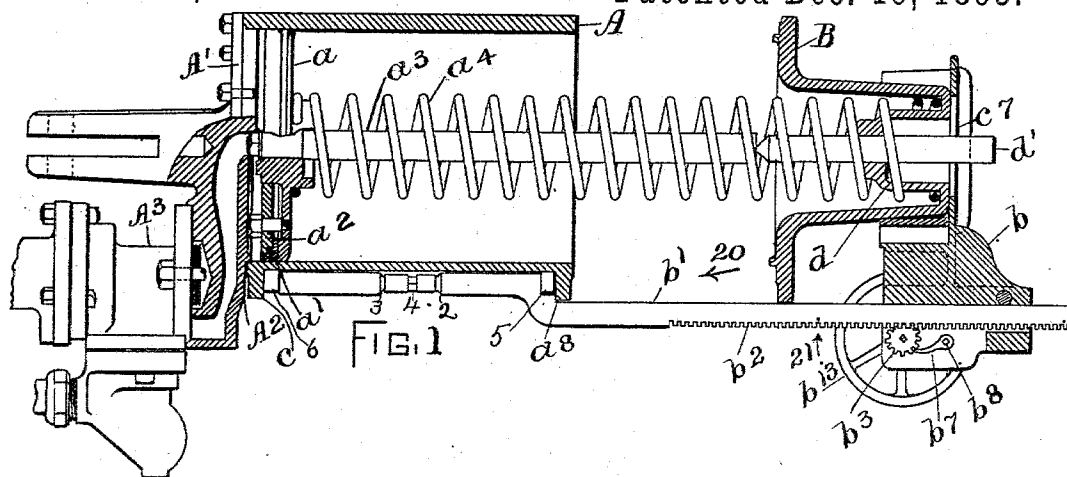


E. E. CHAIN.
SPRING COMPRESSING APPARATUS.

No. 510,956.

Patented Dec. 19, 1893.



WITNESSES,

Benjamin Lewis.
J. Adams

INVENTOR,

Elmer E. Chain
by *Jas. H. Churchill*
Atty.

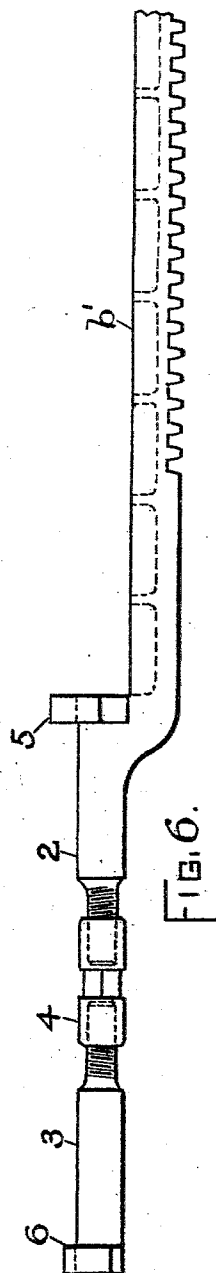
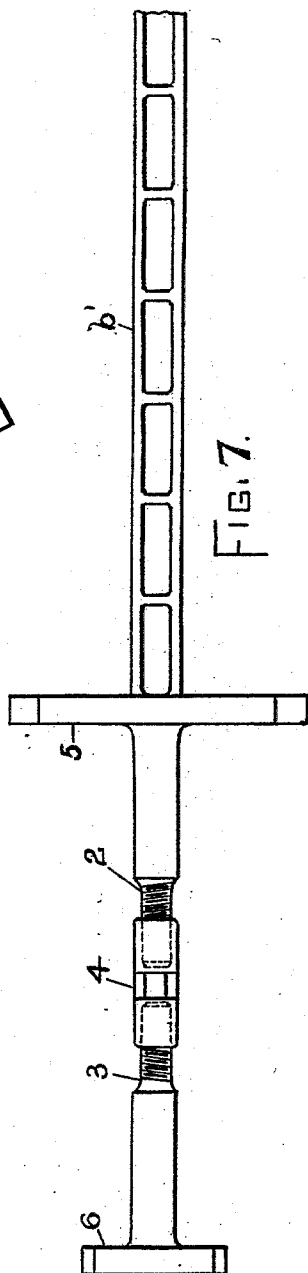
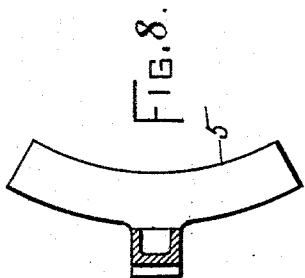
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

ELMER E. CHAIN, OF BOSTON, MASSACHUSETTS.

SPRING-COMPRESSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 510,956, dated December 19, 1893.

Application filed May 8, 1893. Serial No. 473,386. (No model.)

To all whom it may concern:

Be it known that I, ELMER E. CHAIN, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Cylinder-Packing Formers and Spring-Compressing Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to a device or apparatus especially adapted to be used in replacing the cylinder head, of a cylinder having its piston moved in one direction by a substantially heavy spiral spring, which is required to be compressed in order that the cylinder head may be attached to the cylinder.

My present invention is more particularly adapted to be used in refitting the cylinders of power brake operating mechanisms, as for instance, steam and air brake mechanisms, such as commonly employed on railway cars.

My present invention has for one of its objects to provide a device or mechanism by which the piston is enabled to be inserted into the cylinder from its rear end, thereby obviating the necessity of removing the front cylinder head and breaking the steam and air tight joint between the same and the cylinder. The cylinder referred to contains a piston which in practice, is moved in one direction by a substantially strong and large spiral spring, which, in the normal position of the piston at the inlet end of its cylinder, must be compressed in order to enable the rear cylinder head to be secured to the cylinder. The compression of the spiral spring referred to, as now commonly practiced, is effected by hand and usually requires the services of two men, to compress the said spring and hold the same in its compressed position, while the rear cylinder head is being bolted or otherwise secured to its cylinder.

It is one of the objects of this invention to provide a mechanism by which the spiral spring referred to, may be easily and quickly compressed with substantially little power or labor, and may be held by the said mechanism in this compressed position, while the rear cylinder head is being secured to its cylinder, which operation may be effected by one man. The mechanism referred to, for effect-

ing the compression of the spring, consists of a traveling carriage in which the rear cylinder head is supported, the said traveling carriage moving on a suitable guide-way, which is adjustably secured to the cylinder as will be described. The movable carriage is preferably constructed as will be described so as to enable the said carriage to be used with cylinders of different diameters, and the guide-way upon which the said carriage moves is also preferably made adjustable or extensible to enable it to be attached or secured to cylinders of different lengths. These and other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1, represents in section and elevation a sufficient portion of a power brake cylinder, and the spring compressing apparatus to enable my invention to be understood, the movable carriage being represented in its starting position. Fig. 2, is a partial section and elevation of the apparatus shown in Fig. 1, with the spring compressed and the rear cylinder head fitted to its cylinder, the movable carriage being shown in its forward position. Fig. 3, is a side elevation on an enlarged scale of the removable carriage; Fig. 4, a front elevation and section of the carriage shown in Fig. 3 looking toward the right, the operating crank being shown in section; Fig. 5, a detail to be referred to; Fig. 6, a side elevation on an enlarged scale of the guide-way shown in Fig. 1; Fig. 7, a top or plan view of the guide-way shown in Fig. 10, and Fig. 8, a detail to be referred to.

The cylinder A provided with the front head A' and the interposed packing ring A² forming a steam and air tight joint between the said cylinder and its head A', and the pipe connections A³, may be of any usual or well-known construction, such as now commonly used on railway cars for operating the brake-mechanisms. The cylinder A normally contains within it a piston a having an annular packing ring a' secured to it in any suitable manner, as by the clamping disk or ring a², the said piston being provided with the piston rod a³, which is normally encircled by the spiral spring a⁴. The piston a is made to fit substantially tight within its cylinder A, and the tight joint is effected between the piston and its cylinder by the packing ring

a' , which, before the piston a is placed in its cylinder, extends beyond the periphery of the piston in a radial line, that is, when the packing ring a' is first applied to the piston a , it is of greater diameter than the piston and the bore of the cylinder A. After the piston and its attached packing, herein shown, have been inserted into the cylinder A the spring a^4 which, in practice, is employed to return the piston to its normal position, and assists in releasing the brakes on the railway car, is placed over the piston rod a^3 , and owing to the power required of the spring a^4 , the latter is made strong and substantially long, so that, when not compressed as shown in Fig. 1, the spring extends or projects beyond the cylinder and also beyond the end of the piston rod a^3 .

As now commonly practiced, the spring a^4 is compressed by hand and requires the services of at least two men, owing to its substantially great stiffness, and it is one of the objects of this invention to effect a compression of this spring by mechanism, so that the rear cylinder head B may be readily, quickly and easily applied to its cylinder A by one man. To effect this result, the movable carriage b , in which is placed the cylinder head B is adapted to travel on a guide-way, herein shown as a bar b' , provided on its under side with rack teeth b^2 , which are engaged by a gear or pinion b^3 attached to the movable carriage b , the said gear, as shown in Fig. 3, being mounted upon a shaft b^4 between the forks or arms b^5 b^6 of the carriage b . The gear b^3 has co-operating with it a holding pawl b^7 , mounted upon a pivot b^8 extended through the arms b^5 b^6 and provided at one end with an enlargement or hub provided with flat faces b^9 b^{10} (see Fig. 5), with which co-operates a locking spring b^{12} secured to the fork or arm b^5 , the locking spring when engaged with the flat face or surface b^9 , acting to hold the pawl b^7 out of engagement with the gear b^3 , and when engaged with the flat face b^{10} , as represented in Fig. 3, serving to hold the pawl in engagement with the said gear. The gear b^3 may be rotated to produce travel of the carriage b on its guide-way b' by a crank or wheel b^{13} .

The guide-bar b' is secured to a stationary support preferably to the cylinder A, the said guide-bar being provided with a screw-threaded section 2 coupled to an oppositely threaded section 3 by a coupling nut 4, the ends of the threaded section being respectively provided with cross bars 5, 6, which are adapted to be forced against the flanges a^8 and c on the cylinder A to thereby firmly secure the guide-bar b' to the cylinder. In Figs. 10 and 11, the guide-bar b' is represented as cored on its upper surface for sake of lightness, so that the bar may be readily handled.

The movable carriage b is constructed to receive and support the end of the cylinder

head B, which, in practice, also rests upon the guide-bar b' .

The support for the cylinder head B is preferably made as represented in Fig. 4, it consisting of a curved seat c^2 adjustably secured to side plates or wings c^3 in any suitable manner, the said seat being herein shown as adjustably secured to the side wings c^3 by nuts c^4 screwed upon threaded bolts or studs c^5 extended from the seat c^2 through suitable slots c^6 in the sides or wings c^3 . The back or rear portion of the movable carriage is provided with a substantially large slot or opening c^7 , for a purpose as will be described.

When it is desired to compress the spring a^4 to secure the cylinder head B to the cylinder A, the guide-bar b' is clamped or attached to the cylinder A by means of the adjusting nut 4, which is turned to engage the cross bars 5, 6 with the flanges a^8 and c . The movable carriage b is then fitted upon the guide-bar b' and the cylinder head B is mounted in the said carriage, the outer end of the head resting upon the seat c^2 , while the flange of the head rests upon the guide-bar b' . The carriage b may then be moved forward or in the direction indicated by arrow 20 Fig. 1, until the end of the spiral spring a^4 extends over an inwardly extended boss d of the cylinder head, and the end of the piston rod a^3 is then supported by means of a centering pin or rod d' extended through a central hole in the boss d and adapted to engage the end of the piston rod. The operator or workman then turns the crank or wheel b^{13} in the direction indicated by arrow 21 Fig. 1, so as to move the carriage b and the parts sustained by it, toward the cylinder A or in the direction of arrow 20 Fig. 1. As the carriage b is moved toward the cylinder, the spring a^4 is compressed until the cylinder head B has been brought into contact with the open end of the cylinder A, and at such time, the movable carriage may be locked from its backward movement by the operator turning the handle d^2 on the pivot b^8 so as to engage the pawl b^7 with the gear or pinion b^3 , and the said pawl will be held in engagement with the said gear by the spring b^{12} co-operating with the flat surface b^{10} as represented in Fig. 3. The locking pawl b^7 holds the movable carriage b firmly in place against the action of the spring a^4 , thereby leaving the operator free to use both hands in securing the cylinder head B to the cylinder by the usual bolts, not herein shown. The forward position of the movable carriage with the spring a^4 compressed and the cylinder head B in contact with the cylinder A is represented in Fig. 2.

I prefer to provide the movable carriage b with an adjustable seat or support c^2 for the outer end of the cylinder head B, as by that means the apparatus may be used with cylinders of various diameters or sizes, and by making the guide-bar extensible, as herein

represented, the said guide-bar may be secured to cylinders of varying lengths.

I have herein represented my improved spring compressing mechanism as used with a power brake mechanism, but I do not desire to limit my invention to the particular use described, as it is evident that the said mechanism may be used to compress spiral springs into any other form of cylinder or socket. In the present illustration, the piston *a* forms a stop against which abuts one end of the spring, and the cylinder head *B* forms a support for the other end of the said spring. The back of the movable carriage *b* is provided with a slot *c'* to permit the centering pin to be inserted through the boss *d* and also for the purpose of attachment to the piston rod, of parts of the brake-mechanism after the manner now commonly practiced and not herein shown, as they form no part of this invention.

I claim—

1. In an apparatus for compressing springs into cylinders, the combination of the following instrumentalities; viz:—a guideway constructed to be attached to the cylinder within which the spring is compressed, a carriage movable on said guideway, and means to move said carriage, substantially as described.

2. In an apparatus for compressing springs into cylinders, the combination of the following instrumentalities; viz:—a guideway constructed to be attached to the cylinder within which the spring is compressed, a carriage movable on said guideway, a support for the cylinder head on said carriage and means to move the said carriage on its guideway to compress the spring into the cylinder and

bring the cylinder head into position to be affixed to the cylinder, substantially as and for the purpose specified.

3. In an apparatus for compressing springs into cylinders, the combination of the following instrumentalities, viz:—a guideway constructed to be attached to the cylinder within which the spring is compressed, a carriage movable longitudinally on said guideway, a support for the cylinder head adjustable toward and away from the guideway, and means to move said carriage, substantially as described.

4. In a spring compressing apparatus, the combination of the following instrumentalities, viz:—a movable carriage, a guide way on which said carriage travels consisting of a rack bar provided with an extensible portion having cross bars, a gear on said carriage in mesh with said rack bar and means to rotate said gear, substantially as described.

5. In an apparatus for compressing springs into cylinders, the combination of the following instrumentalities; viz:—a guideway provided with an extensible portion constructed to be attached to the cylinder within which the spring is compressed, a carriage movable on said guideway, a support for the cylinder head on said carriage, and means to move said carriage on its guideway, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELMER E. CHAIN.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.