

June 23, 1953

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2,642,958

GUN MOUNT BRAKE MECHANISM

Filed June 28, 1944

3 Sheets-Sheet 1

Fig. 1.

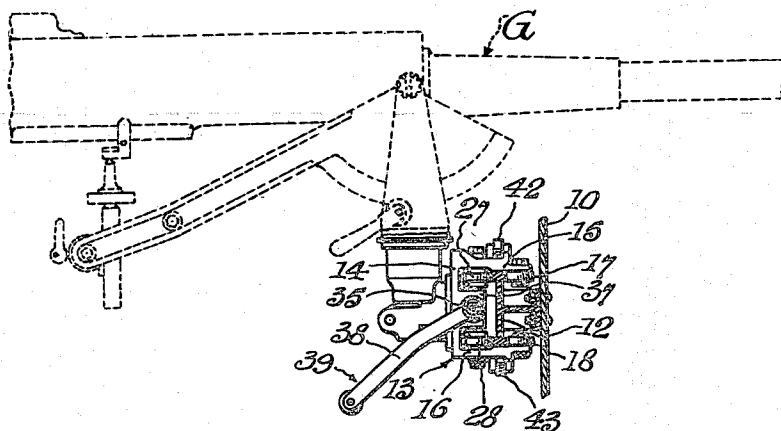
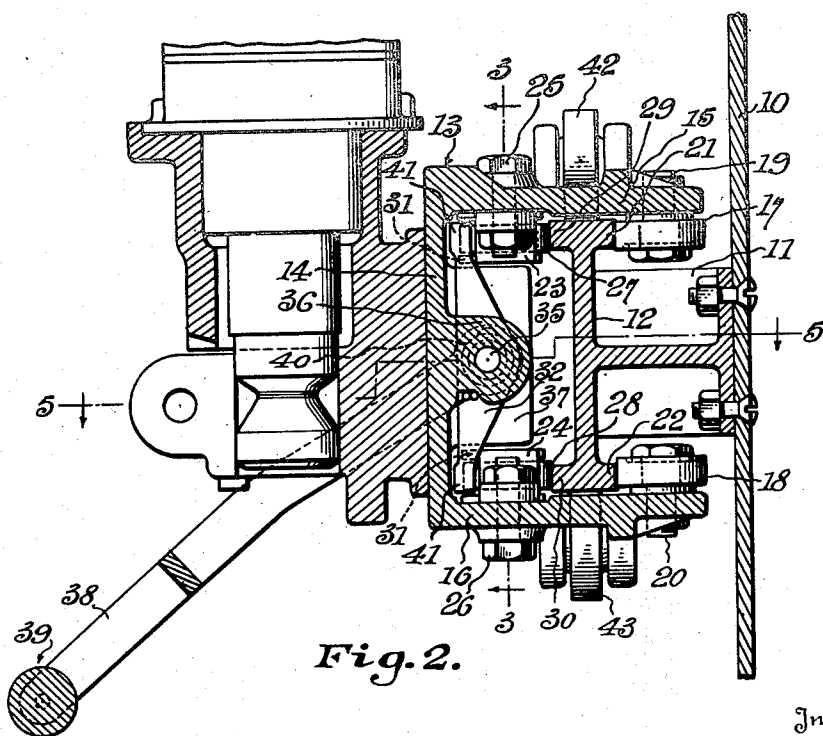


Fig. 2.

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3 Sheets-Sheet 2

Fig. 3.

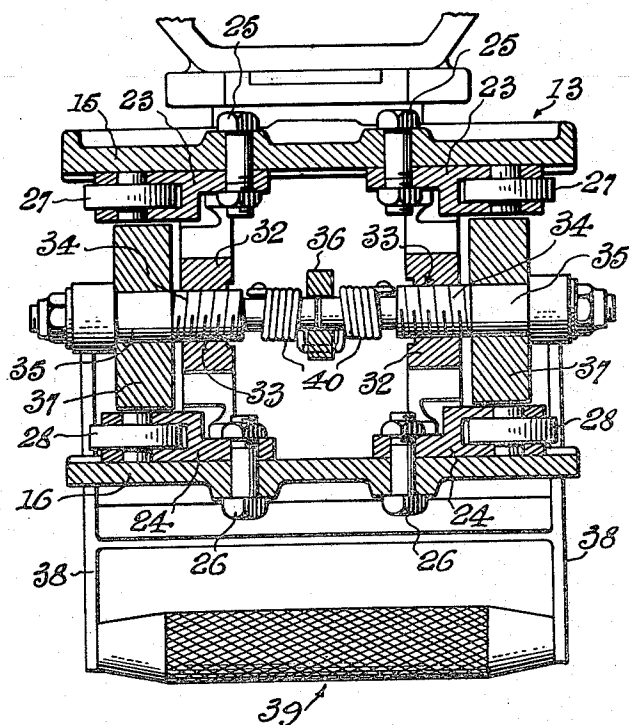
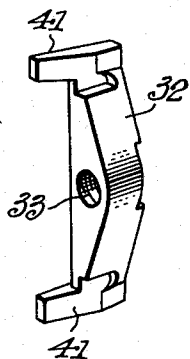


Fig. 6.

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3 Sheets-Sheet 3

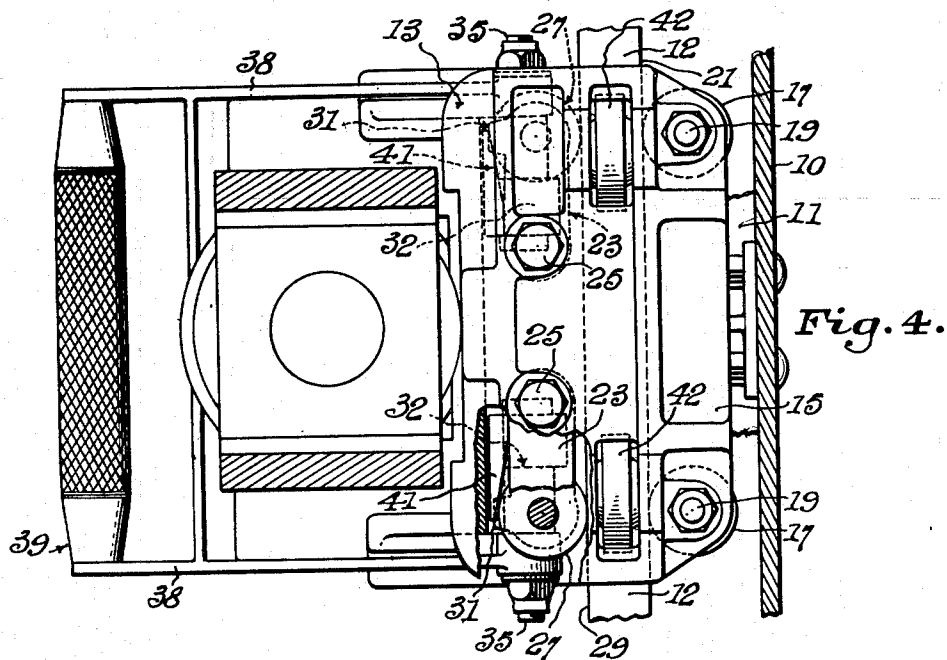


Fig. 4.

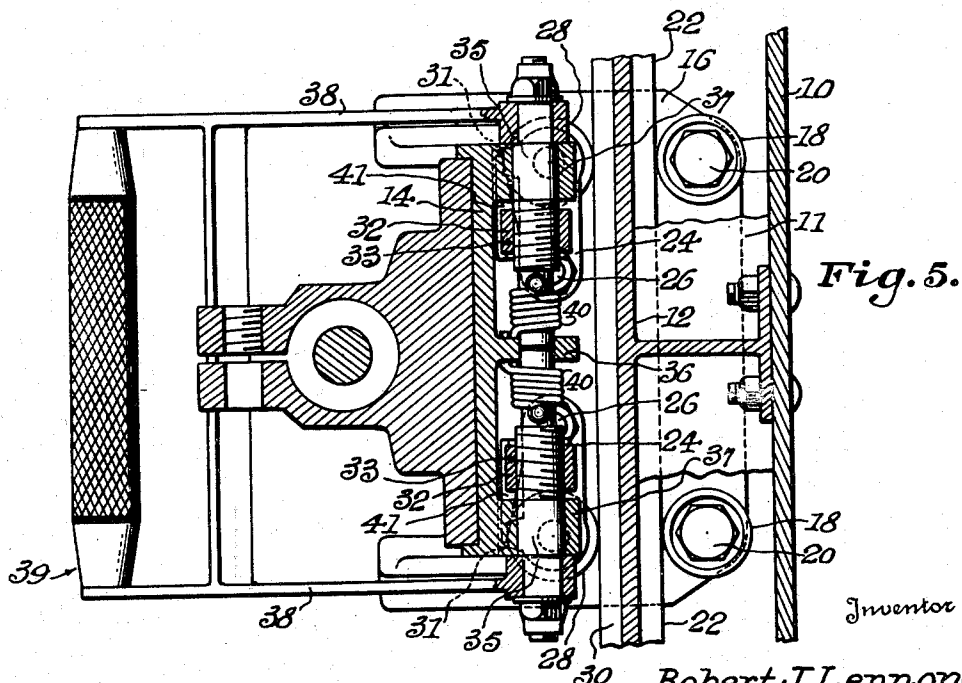


Fig. 5.

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UNITED STATES PATENT OFFICE

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GUN MOUNT BRAKE MECHANISM

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Application June 28, 1944, Serial No. 542,593

12 Claims. (Cl. 188—42)

(Granted under Title 35, U. S. Code (1952),
sec. 266)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a gun mount brake mechanism; more specifically it is particularly concerned with brake mechanisms for gun mounts of the skate type which are movable on a track or rail.

Comparatively recent developments in the field of gun mounts have included the provision of a carriage adapted to be movably mounted upon a track or annulus having the general cross section of a rail or I-beam. Such assemblies find useful application on armored vehicles, trucks, scout cars, boats, aircraft and the like. The arrangement is such that rotatable rollers carried by the carriage engage portions of the rail to locate the carriage thereon and control its movement on the rail. The carriage may be moved completely around the periphery of the vehicle body so that each gun has an all-around field of fire and all guns may be distributed or converged as the occasion requires.

Although such mounts have received acclaim because of their adaptability, some difficulty has been experienced in controlling the position of the carriage while the firearm mounted thereupon is being operated. Normally the procedure is for the carriage to be moved into the desired position on the annulus and locked there before firing is commenced; however, the experience in the past has been that it is very difficult to effect a positive lock of the carriage to the rail and that there is an exceedingly potent force tending to cause the carriage to travel upon the rail while the firearm is being operated, due to recoil or kickback; especially is this the case when the direction of fire is such that the length of the gun is at an angle to the rail substantially greater or less than a right angle.

It is an object of this invention to provide a brake mechanism which is adapted to substantially prevent movement of a gun carriage of the type mentioned, upon an annulus or the like.

Another object of this invention is to provide such a brake mechanism which may be readily engaged and disengaged.

A further object of this invention is to provide on a gun carriage a brake which tends normally to restrain the carriage from movement so that no attention is required from the gunner to maintain the carriage stationary during firing.

Yet another object of this invention is to provide a novel brake mechanism for a gun mount.

2

In general, in its preferred form my invention comprises provision of movable rollers for engagement of the inner edges of the inner flanges of a rail together with means for placing said rollers in non-rotating and non-slipping engagement with said edges.

In order that a clear and concise disclosure of my invention may be made, the accompanying drawings are included as a part of this specification. In these:

Figure 1 is a side elevational view of a gun carriage incorporating the preferred form of my invention, a machine gun and cradle being shown in dotted lines as mounted thereon and the stationary carriage support structure being shown in cross section;

Figure 2 is a longitudinal sectional view of the principal portion of the assembly shown in Figure 1;

Figure 3 is a cross sectional view of the carriage taken on line 3—3 of Figure 2;

Figure 4 is a plan view of the carriage including several adjunct members, certain parts being broken away in order to more clearly reveal the construction;

Figure 5 is a horizontal sectional view taken on line 5—5 of Figure 2; and

Figure 6 is a perspective view of one of the jaw members employed in the preferred form of my invention.

Referring now more specifically to the drawings the reference character 10 designates a support member which would normally be attached to a vehicle or the like adjacent the top thereof. Brackets 11 which are adapted to be attached to support member 10 extend inwardly and are integrally formed with I-beam rail 12. Although no view thereof as such is shown, rail 12 normally has the form of an annulus within which a man may stand and operate the firearm G. The carriage frame of the particular embodiment of my invention shown comprises the channel-shaped member 13 having a web or back plate 14 from which an upper flange or plate 15 and a lower flange or plate 16 project. The upper and lower flanges 15 and 16 carry identical sets of rollers 42 which extend through slots in said flanges 15 and 16 and into engagement with the adjacent surfaces of flanges 21 and 22 of rail 12 as clearly shown in the Figures 2 and 4 of the drawing. Adjacent the extended edges of the flanges 15 and 16 sets of rollers 17 and 18 are mounted upon fixed pintles 19 and 20 and engage the exposed edges or faces of the outer flanges 21 and 22 of the rail 12. Adjacent the web 14 but spaced somewhat there-

3

from are yokes 23 and 24 pivotally mounted upon the carriage flanges 15 and 16 by pintles 25 and 26. In the forks of the yokes 23 and 24 sets of rollers 27 and 28 are rotatably mounted which are adapted to engage the exposed edges or faces of the inner flanges 29 and 30 of the rail 12. Bosses or lugs 31 (Figure 4) are provided on the yokes 23 and 24 and are adapted to engage the channel face of the web 14 to limit the rotation of said yokes upon their respective pintles and to space the respective rollers 27 and 28 from the said web. These bosses may, of course, be in the form of protuberances on the web, adapted to engage the yokes. It will be apparent that the said bosses 31 thus serve, not only to confine the movement of the carriage 13 transversely of the rail 12 but also to prevent undesired braking action which would occur upon the carriage having moved outwardly sufficiently far to cause the rollers 27 and 28 to be pressed between the rail flange edges which they engage and the channel face of the web 14.

As means for at times halting rotation of the rollers 27 and 28 and for forcing said rollers into intimate engagement with the flange edges to which they are respectively proximate, I provide a pair of jaw members 32 having tapered bearings 33 adapted to screwably engage the threaded portions 34 of aligned shafts 35. As shown in the drawing the shafts 35 have their adjacent ends received in a bearing provided in the lug 36 protruding from the channel face of the web 14. Their opposite general end portions are received in suitable bearings provided in the brackets 37 also projecting from the channel face of the said web 14. Adjacent their outer ends the shafts 35 are engaged in keyed or fixed junction by arms 38 of the double lever 39. Proximate their inner ends said shafts 35 receive coil springs 40 each having one of its end in engagement with the lug 36 and its other end suitably attached to one of the said shafts 35. As will be apparent the lever 39 provides for rotation of the shafts 35 against the resistance of the springs 40 and the springs 40 normally urge the said shafts in one direction of their rotation.

The jaws 32 being in threaded engagement with the shafts 35 and having their rear or inner faces in substantial abutment with the channel face of the web 14, rotation of the said shafts 35 necessarily effects translation of the said jaws. In the particular assembly shown the direction of one of the threads 34 is opposite to that of the other so that rotation of the two shafts 35 in similar direction causes said jaws 32 to move either toward one another or away from one another depending on the direction of rotation of said shafts.

As is shown to advantage in Figure 6 the jaws 32 are provided with outwardly directed wedge members 41 which, as may be seen clearly in Figure 4, are adapted to project at times into the space between the rollers 27 and 28 and the web 14 to halt rotation of the said rollers and to force them into intimate and gripping contact with the rail flange edges to which they are respectively proximate. While such is not at all essential since they may be otherwise reinforced or may be adequately rigid in themselves, the normal arrangement is for these wedges to be bolstered by the web 14 as they urge the rollers 27 and 28 against the rail flanges.

I have found it to be of advantage to so arrange the torque of the springs 40 and the construction in general that said springs normally

4

urge the shafts 35 in such a direction of rotation that the double lever 39 is maintained in a depressed condition except when being manually operated and such that the wedges 41 are normally in intimate engagement with the rollers 27 and 28 whereby said rollers are held against rotation and are pressed intimately against the rail flanges. Manual upward movement of the double lever 39 rotates the shafts 35 to withdraw the wedges 41 from engagement with the rollers 27 and 28 whereupon the carriage may be freely traversed along the rail 12.

Although the pivoted yoke arrangement described is much preferred, the same effect may, in a measure, be obtained by providing hubs in the rollers 27 and 28 which are of slightly larger diameter than are the pintles upon which they are respectively mounted or the pintle bearings may be loose. In fact my invention may employ rollers with ordinary bearings and pintles provided the placements of the pintles are such that they do not prevent the respective rollers from being forced transversely to an extent sufficient to attain non-slipping contact with the respective rail flange edges. In the event that the device is precision built to such an extent that the rollers 27 and 28, mounted upon stationary pintles, continually engage the rail flange edges in positively non-slipping contact, my wedged jaws may be used to effect a complete braking of the carriage by simply forcing them into non-slipping engagement with these rollers.

On the other hand, means other than wedged jaws may be employed to halt rotation of the rollers 27 and 28 and to force said rollers into non-slipping contact with the rail. Again the number of force applicators may be varied and it is not positively essential that all of the rollers 27 and 28 be employed in the braking operation. The mountings and positions of the jaws or their substitutes also, may, of course, be altered and any suitable mechanism may replace the shafts 35-double lever 39-springs 40 assembly and its mounting, or parts thereof, for engaging and disengaging said jaws or their substitutes with and from the rollers 27 and 28. The springs 40 or their substitutes may be eliminated when it is desirable that the device be operated entirely manually and conversely power may be provided for operating the jaws in both of their directions of motion. If the shaft 35 arrangement be employed, a single shaft may be used, in which case the support structure is normally modified, and if the jaws 32 be retained they need not necessarily be provided with wedge-shaped projections.

In connection with the rollers 27 and 28, if these are mounted in pivoted structures, such structures may be materially varied from the yokes 23 and 24. Again, both the rollers 27 and 28 and rollers 17 and 18 may be replaced by other suitable rotors or friction reducers.

The support structure mounting a carriage embodying my brake obviously may be of any suitable nature and need not include an I-beam type rail nor have the form of an annulus. Further, the brake may be employed on carriages in addition to those mounted on armored vehicles, trucks, scout cars and boats.

While I have described a particular embodiment of my invention, together with certain modifications thereof, for illustrative purposes, it is clear that one skilled in the art will be able to make alterations and eliminations in the specific structure mentioned and this without de-

parting from the spirit and scope of my invention. I wish, therefore, to be limited herein only by the prior art and the appended claims.

I claim:

1. In a gun mount, a carriage comprising a back plate, an upper plate and a lower plate, fixedly mounted rollers carried by the upper and lower plates, movably mounted rollers carried by the upper and lower plates, a pair of aligned screw shafts mounted in the back plate, a pair of jaws each threadedly mounted on one of the screw shafts, each jaw having a pair of outwardly directed wedges for engaging the movably mounted rollers, means for rotating the shafts to separate the jaws, and manually operable means for counterrotating the shafts to withdraw the jaws.

2. In a gun mount, a carriage, sets of vertically and laterally spaced rollers mounted by the carriage, a pair of aligned screw shafts mounted in the carriage, a pair of jaws each threadedly mounted on one of the screw shafts, each jaw having a pair of outwardly directed wedges for engaging the rollers, means for rotating the shafts to separate the jaws, and manually operable means for counterrotating the shafts to withdraw the jaws.

3. In a gun mount, a carriage, sets of track-rollers mounted by the carriage, a pair of aligned screw shafts mounted in the carriage, a pair of jaws each threadedly mounted on one of the screw shafts, a lever for rotating the shafts to move the jaws out of engagement with the rollers, and a torque spring for each shaft for counterrotating the shafts to cause the jaws to engage the rollers.

4. In a gun mount, a carriage, opposed sets of track rollers mounted on said carriage, said rollers having substantially horizontal axes and being adapted to engage the upper and lower faces of a track, a set of guide rollers carried by substantially vertical pintles fixed on said carriage, said guide rollers being adapted to engage a side face of a track, a set of brake rollers in opposition to said guide rollers, said brake rollers being carried on substantially vertical pintles movably mounted on said carriage, said brake rollers being adapted to engage a side face of said track opposed to that engaged by said guide rollers, and brake means on said carriage and adapted to be moved into engagement with said brake rollers to restrain rotation thereof and to constrain the same into gripping engagement with a track.

5. In a gun mount, a carriage, opposed sets of rollers mounted on the carriage for engagement with a track, one of said sets being movably mounted, a pair of aligned screw shafts mounted in the carriage, a pair of jaws one of which is threadedly mounted on each shaft whereby when the shafts are rotated the jaws are moved, means normally acting to rotate the shafts to operate the jaws to cause them to engage the movably mounted rollers and force them into engagement with the track, and manually operable means for counterrotating the shafts to retract the jaws to facilitate traversing of the carriage on the track.

6. In a gun mount, a carriage, opposed sets of horizontally arranged rollers mounted on the carriage for engagement with a track, one of said sets being movably mounted, a pair of jaws mounted on the carriage for movement to and from each other, means mounted on the carriage and acting to normally separate the jaws to cause them to engage the movably mounted rollers for a braking

action on the carriage, and manually operable means cooperating with the jaws to facilitate traversing of the carriage on the track.

7. In a gun mount, a carriage, opposed sets of rollers mounted on the carriage for engagement with a track, one of said sets being movably mounted, a pair of jaws mounted on the carriage for movement to and from each other, each jaw being provided with outwardly directed wedges for engaging the movably mounted rollers, means mounted on the carriage acting to normally separate the jaws to engage the movably mounted rollers to force them into engagement with the track for a braking action on the carriage, and manually operable means on the carriage for retracting the jaws to facilitate traversing of the carriage on the track.

8. In a gun mount, guide brake means carried by the carriage and comprising a first set of fixedly mounted rollers for engagement with one side of a track, a second set of movably mounted rollers carried by the carriage in opposition to the first set for engagement with the opposite side of the track, jaws mounted on the carriage adjacent to the second set of rollers the jaws being mounted for movement to and from each other, means on the carriage normally acting to separate the jaws for engagement with the second set of rollers to force them into engagement with the track, and manually operable means mounted on the carriage and cooperating with the jaws to retract them to facilitate traversing of the carriage on the track.

9. In a gun mount, a carriage, a set of fixedly mounted rollers carried by the carriage for engagement with one face of a track, and a set of movably mounted rollers carried by the carriage and arranged to engage the opposite face of the track, a wedge-like jaw mounted for sliding movement on the carriage and adjacent a movable roller, means on the carriage normally acting to move said jaw into engagement with a movably mounted roller to cause co-operation between said rollers to grip the track, and manually operable means for retracting the jaw to facilitate traversing the carriage on the track.

10. In a gun mount, a carriage, a set of rollers fixedly mounted on the carriage for engagement with one face of a track and a set of movably mounted rollers on the carriage for engagement with an opposed face of the track, a threaded shaft mounted in the carriage, a wedge-like jaw threadedly mounted on said shaft, means normally acting to rotate the shaft to move the jaw into engagement with a movable roller to force said roller against the track, and manually operable means to counterrotate the shaft for retracting the jaw to facilitate traversing the carriage on the track.

11. In a gun mount, a carriage, opposed sets of rollers mounted on the carriage for engagement with a track, one of said sets being movably mounted, a pair of aligned screw shafts mounted on the carriage, a pair of jaws, one of which is threadedly mounted on each shaft whereby when the shafts are rotated the jaws are moved, means normally acting to separate the jaws to engage the movably mounted rollers and force them into engagement with the track, and a hand lever means fast to the shafts for counter-rotating the shafts to retract the jaws to facilitate traversing the carriage on the track.

12. A carriage for a gun or the like adapted to travel upon a support comprising frame structure, guide means on said frame structure

adapted to engage a surface of said support, a member pivotally mounted upon said frame, a rotor on said pivoted member adapted to at times rotate in contact with a surface of said support which is generally opposite to said first support surface, spacing means between said pivoted member and a part of said frame for limiting rotation of said pivoted member, means for at times preventing rotation of said rotor and for forcing it into exceedingly intimate contact with said support, and threaded shaft structure

5

10

adapted to translate said latter means into and out of the position in which said means performs these functions.

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