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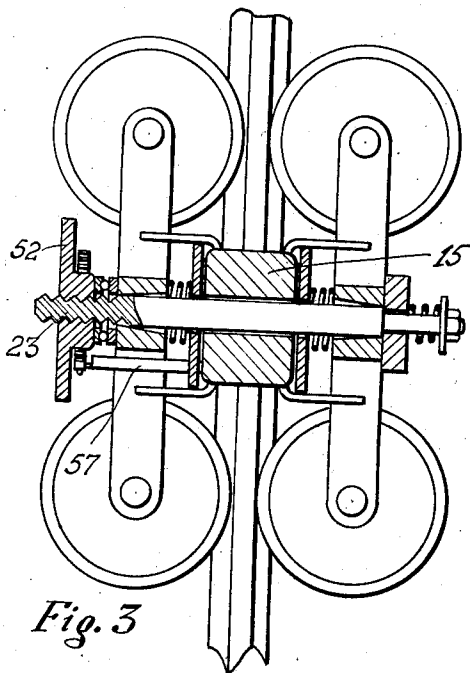
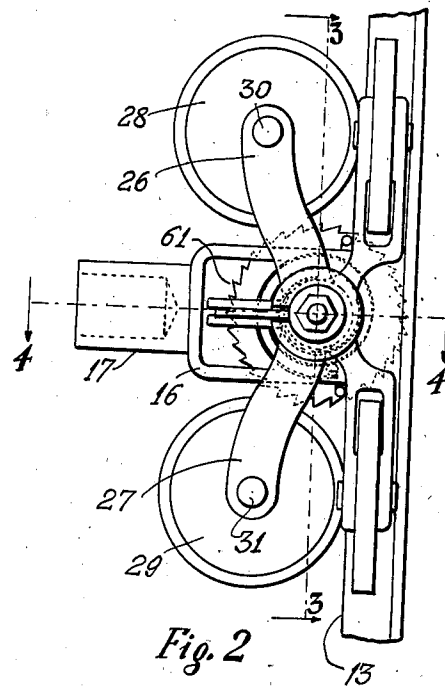
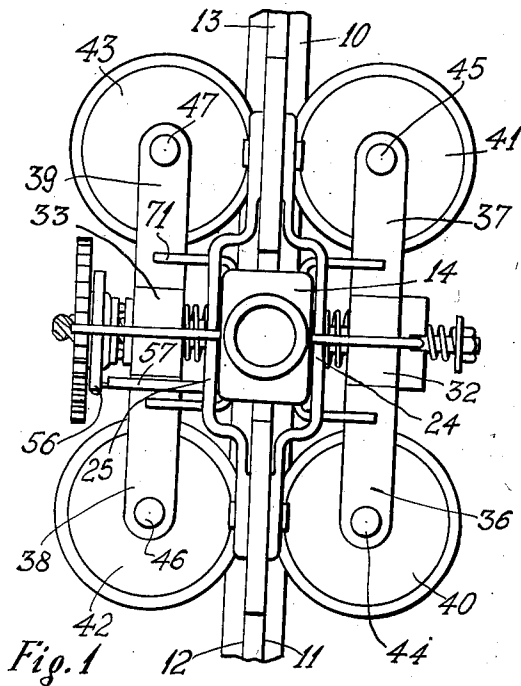
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2,265,086

PRESSURE ADJUSTING MEANS FOR ELEVATOR GUIDES

Filed Aug. 3, 1940

2 Sheets-Sheet 1



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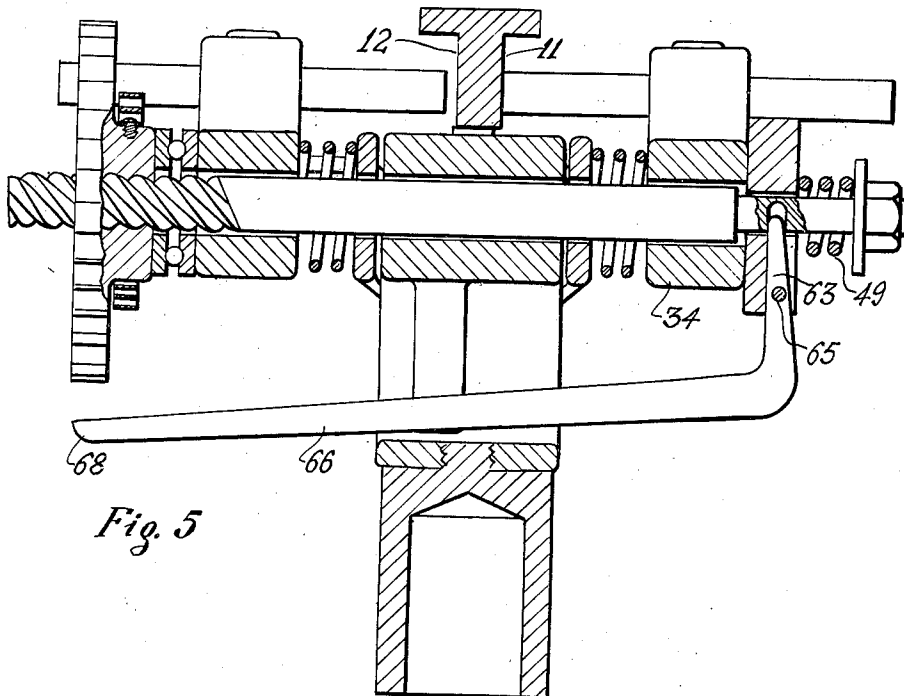


Fig. 5

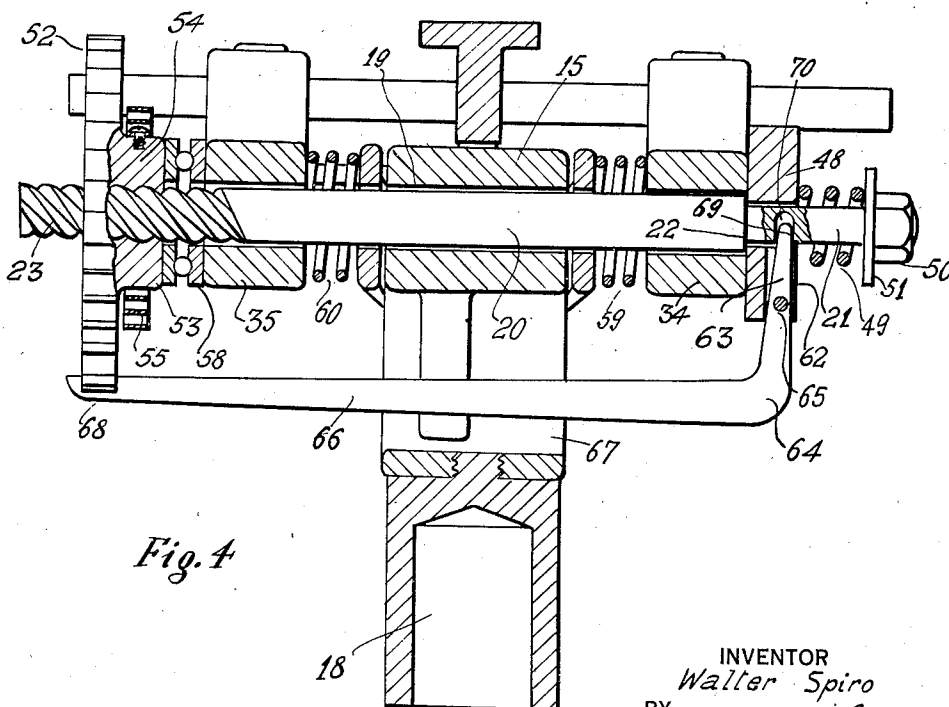


Fig. 4

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PRESSURE ADJUSTING MEANS FOR
ELEVATOR GUIDES

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Application August 3, 1940, Serial No. 350,463

7 Claims. (Cl. 187—95)

This invention relates to conveyances traveling along a guide rail, and more particularly refers to improvements in rail guides such as are used, for instance, on elevator cars.

Elevator cars are commonly provided with guides for cooperating with the guide rails in guiding the car in its movement in the shaftway. Whether the guides are of the sliding shoe or of the roller type, they always include resilient means to hold the guide members in contact with the guide rail, a mechanical spring being commonly used for this purpose.

In many elevator installations, the guide rails are not perfectly straight and smooth, so that with solid guide shoes there is a tendency for the car to sway as it travels up and down the shaftway, this tendency being more pronounced as the speed of the car increases.

The advent of the high speed elevator has made it desirable to employ guides of the roller type in preference to the sliding shoe type, especially guides where provisions are made for the automatic compensation of the bends and irregularities which may be present in the guide rails.

A roller guide of the automatic compensation type has been described and claimed by me in a copending application entitled Roller guides for elevator cars, filed May 27, 1940, Serial No. 337,477.

In said guide a good contact between the rollers and the guide rail is maintained by the action of springs pressing against the roller bearing elements. However, in such and other types of elevator roller guides in current use, in which the rollers are pressed against the guide-rail by springs or other resilient means, these springs must exert sufficient force to maintain the normal relationship between the rail and the elevator car in spite of uneven loading of the car or any other unbalanced forces. This requires a heavy spring pressure which must be withstood by the roller tire and its bearing, and the consequent heavy load upon these parts is the cause of excessive heating and premature wear, as well as excessive power consumption due to the frictional resistance developing between rollers and guide-rail, which must be overcome.

The primary object of this invention is to provide a novel and improved method of guiding a conveyance along a guide-rail by means of resiliently mounted guiding elements riding along said rail, whereby said guiding elements are normally held against the rail without subjecting them to heavy pressure, while a heavy pressure

will be applied at such times when an unbalanced load or other cause may tend to disturb the normal relationship between the guide-rail and the guiding elements.

Another object is to provide, in an elevator guide, an improved system of guiding element control, whereby under normal conditions the guiding elements are held against the guide-rail with a relatively light pressure, but when a sudden displacement of one or another of the guiding elements occurs, it will automatically give rise to the generation of an antagonistic high pressure, which will in turn instantly act to reestablish light pressure conditions.

A further object is to provide, in a guide for a conveyance riding along a guide-rail, a mechanism which holds the guiding elements in snug contact with the rail, without great pressure, whereby if excessive pressure is developed from any cause, the mechanism acts instantly to relieve it.

Other objects and advantages of the present invention will more fully appear as the description proceeds and will be set forth and claimed in the appended claims.

My invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a front view in elevation of an elevator rail-guide embodying my invention;

Fig. 2 is a side view in elevation thereof;

Fig. 3 is a vertical sectional view of the same through line 3—3 of Fig. 2;

Fig. 4 is a horizontal sectional view of the same, in an enlarged scale, through line 4—4 of Fig. 2, showing the various parts in their normal position; and

Fig. 5 is a similar view showing the effect of a sudden displacement of one of the guiding element carrying members.

Referring to said drawings, 10 designates one of the T-shaped guide-rails, such as are generally provided for the car in an elevator shaft. Guides, mounted at each end of the top and bottom cross members of the car sling, are arranged to cooperate with the guide rails to guide the car in its movement in the shaft. The guide rail has two side surfaces 11, 12, and an end surface 13, providing runways for the guiding elements, preferably rollers, forming part of the guide structure.

The guide structure comprises a frame 14, including a supporting block portion 15 and a saddle portion 16 frontwardly extending therefrom, said saddle portion being provided with the usual hub portion 17 for attachment to the car

in the customary manner. The hub portion may be blind bored, as shown at 18 in Fig. 4, to provide a housing for a spring (not shown) to hold the guide firmly against the guide rail.

The supporting block portion 15 is transversely bored, as shown at 19, to receive a shaft 20, shiftable within said bore 19 and projecting at both sides of said supporting block 15.

One of the ends 21 of said shaft is turned down to form a shoulder 22 with the body of the shaft, and the other end is threaded with a steep thread, as shown at 23.

On shaft 20 is swingingly mounted a central yoke consisting of two halves 24, 25, together forming a structure open at the center to embrace the supporting block portion 15 and having at each end a bifurcated frontwardly extending support 26, 27, carrying wheels or rollers 28, 29, rotatably mounted at 30, 31, respectively, said wheels or rollers being equipped with tires made of rubber or other resilient material. In operation, this yoke extends in front of rail 10, longitudinally thereof, and the wheels or rollers 28, 29, which are of equal diameter, are symmetrically mounted with respect to the center of the frame to ride against the end runway 13 of the guide rail.

On shaft 20 are also shiftable and tiltably mounted two yokes 32, 33, one at each side of and laterally spaced from central yoke 24—25. Said yokes 32, 33 are each formed with a hub portion 34, 35, and two bifurcated arms 36—37, 38—39, carrying wheels or rollers 40—41, 42—43, rotatably mounted at 44—45, 46—47, said wheels or rollers lying in a plane parallel to the end runway 13 of the guide rail and being arranged to ride against the side runways 11, 12.

On the turned down end 21 of shaft 20 is shiftable mounted a disk 48, normally forced against shoulder 22 by a spring 49 mounted on said turned down end 21 and held by a nut and washer 50—51, said spring exerting a relatively high pressure against disk 48.

On the threaded end 23 of the shaft is mounted a ratchet disk 52, having a hub portion 53, said hub portion being connected at 54 to the inner end of a spiral spring 55, the outer end of which 56 is attached to an anchoring bar 57 laterally extending from supporting block 15.

Said spring 55, which is normally under tension, tends to rotate the ratchet disk in a counterclockwise direction with respect to Fig. 2, that is, in the direction in which said ratchet disk will move inwardly along shaft 20.

A thrust ball bearing 58 is preferably interposed between hub 53 of ratchet disk 52 and hub 35 of yoke 33. Two spacing light springs 59, 60 are also preferably interposed between yoke 24—25 and yoke 32 and between yoke 24—25 and yoke 33, respectively.

It will be understood that by virtue of the mechanism so far described, spring 55 will act to normally maintain the rollers or wheels 40—41, 42—43, of yokes 32, 33, respectively, in contact with runways 11, 12, of the guide rail, with a relatively light pressure, quite insufficient to overcome the pressure exerted by spring 49 against pressure disk 48.

The teeth 61 of ratchet disk 52 are directed so that a pawl engaging said teeth will not prevent rotation of the ratchet disk in the direction in which it is urged by spring 55 but will oppose rotation in the opposite direction, that is, in the present case in the clockwise direction with respect to Fig. 2.

Pressure disk 48 is formed with a radial slot 62 in which is housed the arm 63 of a crank lever 64, which is pivotally mounted within said slot at 65, the other arm 66 of said crank lever extending across the through opening 67 formed by saddle portion 16 of the frame and across the entire structure to a point where its tip end 68 normally engages one of the teeth 61 of ratchet disk 52, as shown in Fig. 4.

Fig. 5 shows what happens when a higher than normal pressure, due to an unbalanced load or any other cause, is exerted against one or the other of yoke 32, 33, tending to force said yoke outwardly along shaft 20.

In said figure, a force, tending to displace the car towards the left, has caused side surface 11 of the guide rail to react against wheels 40—41 of yoke 32, so that the hub portion 34 of said yoke has forced pressure disk 48 a certain distance away from shoulder 22 against the action of spring 49.

If at the time when the extra pressure was exerted against surface 11 at the guide rail by wheels or rollers 40—41, ratchet disk 52 had been free to rotate, the effect of yoke 32 pressing against pressure disk 48 would have been to bodily displace shaft 20 axially towards the right, the reversible connection between threaded end 23 of the shaft and ratchet disk 52 causing rotation of said ratchet disk in a direction tending to increase the tension of spring 55, because the force required to increase the tension of spring 55 is much less than that required to overcome the pressure exerted by spring 49 against disk 48.

However, as stated, under normal balanced conditions ratchet disk 52 is prevented from rotating in the direction tending to increase the tension of spring 55 by the tip end 68 of arm 66 of crank lever 64; therefore, the pressure exerted by yoke 32 against pressure disk 48 will result in compression of spring 49, as shown in Fig. 5.

The tip end 69 of arm 63 of the crank lever projects within a recess 70, provided in turned down portion 21 of shaft 20, so that when pressure disk 48 is forced outwardly, as shown in Fig. 5, recess 70 will react against tip end 69 of arm 63 causing the crank lever to turn in a counterclockwise direction about its pivotal support 65, so that the tip end 68 of arm 66 will instantly release ratchet disk 52.

Spring 49 will now be free to reestablish normal light pressure conditions by forcing shaft 20 towards the right against the action of spring 55, said spring 55 being subsequently free to return ratchet disk 52 to the position where it once more will force yoke 33 to the position where its wheels or rollers 42—43 will be in contact with side surface 12 of the guide rail.

The same sequence of steps would have taken place if the unbalanced pressure had been causing the car to move towards the right, this resulting in side surface 12 of the guide rail reacting against yoke 33. Yoke 33 in this case would have bodily forced shaft 20 towards the left, causing the same condition as depicted in Fig. 5 to occur, the reaction of yoke 32 against pressure disk 48 resulting in compression of spring 49.

Suitable means, such as, for instance, restraining pins 71, may be provided to prevent rotation of yokes 32, 33 about the axis of shaft 20, whereas said yokes are mounted so as to be capable of limited tilting movement in the plane of rotation of their respective wheels in order to facilitate the possibility of their adaptation to such irregularities and bends as may occur in the guide rail.

From the foregoing it is seen that the employ-

ment of the relatively high pressures required by guides of the usual type is in the present case effectively avoided when running conditions are normal, a high pressure, however, instantly and automatically entering into play at such times when a high pressure is needed.

The constructional details of my invention may vary from those shown without departing from the inventive idea. The drawings should, therefore, be understood as being intended for illustrative purposes only and not in a limiting sense.

I, accordingly, reserve the right to carry my invention into practice in all those ways and manners which may enter, fairly, into the scope of the appended claims.

I claim:

1. In a guide for use in a conveyance riding along a guide rail having two side guiding surfaces, a frame, a transversely directed shaft mounted in said frame, two carrier members shiftably mounted upon said shaft one at each side of said frame, a guiding element carried by each carrier member, spring means exerting a relatively heavy pressure against one of said carrier members to hold it in a predetermined position along said shaft, spring means exerting a relatively light pressure against the other carrier member to normally maintain said guiding elements in contact with said guiding surfaces under light pressure conditions, means normally locking said second mentioned carrier member against movement in a direction antagonistic to that of said light pressure, and means releasing said locking means when said first mentioned carrier member is forced away from said predetermined position, against the action of said heavy pressure exerting spring means.

2. In a guide for use in a conveyance riding along a guide rail having two side guiding surfaces, a frame, a transversely directed shaft mounted in said frame, two carrier members shiftably mounted upon said shaft one at each side of said frame, a guiding element carried by each carrier member, spring means exerting a relatively heavy pressure against one of said carrier members to hold it in a predetermined position along said shaft, spring means exerting a relatively light pressure against the other carrier member to normally maintain said guiding elements in contact with said guiding surfaces under light pressure conditions, means normally locking said second mentioned carrier member against movement in a direction antagonistic to that of said light pressure, means releasing said locking means when said first mentioned carrier member is forced away from said predetermined position, against the action of said heavy pressure exerting spring means, and means controlled by the latter spring means subsequently reestablishing normal light pressure conditions.

3. In a guide for use in a conveyance riding along a guide rail having two side guiding surfaces, a frame, a transversely directed shaft shiftably mounted in said frame, two carrier members shiftably mounted upon said shaft one at each side of said frame, a guiding element carried by each carrier member, spring means exerting a relatively heavy pressure against one of said carrier members to hold it in a predetermined position along said shaft, a pressure member for the other carrier member, threaded upon said shaft, a spring interposed between said pressure member and said frame, tending to rotate said pressure member in the pressure exerting direction, thereby causing said pressure member to nor-

mally maintain said guiding elements in contact with said guiding surfaces under light pressure conditions, means normally locking said pressure member against rotation in the pressure releasing direction, and means controlled by said first mentioned carrier member, releasing said locking means, when said first mentioned carrier member is forced away from said predetermined position, against the action of said heavy pressure exerting spring means.

4. In a guide for use in a conveyance riding along a guide rail having two side guiding surfaces, a frame, a transversely directed shaft shiftably mounted in said frame, one end of said shaft being threaded with a steep thread, two carrier members shiftably mounted upon said shaft one at each side of said frame, a guiding element carried by each carrier member, a spring mounted at the unthreaded end of said shaft, exerting a relatively heavy pressure against the adjoining carrier member, to hold it in a predetermined position along said shaft, a pressure member for the other carrier, mounted upon and engaging the threaded end of said shaft, forming a reversible connection therewith, a spring interposed between said pressure member and said frame, tending to rotate said pressure member in the pressure exerting direction, thereby causing said pressure member to normally maintain said guiding elements in contact with said guiding surfaces under light pressure conditions, means normally locking said pressure member against rotation in the pressure releasing direction, and means controlled by said first mentioned carrier member, releasing said locking means, when said first mentioned carrier member is forced away from said predetermined position, against the action of said heavy pressure exerting spring means.

5. In a guide for use in a conveyance riding along a guide rail having two side guiding surfaces, a frame, a transversely directed shaft shiftably mounted in said frame, one end of said shaft being threaded with a steep thread, two carrier members shiftably mounted upon said shaft one at each side of said frame, a guiding element carried by each carrier member, a spring mounted at the unthreaded end of said shaft, exerting a relatively heavy pressure against the adjoining carrier member, to hold it in a predetermined position along said shaft, a pressure member for the other carrier formed with a ratchet disk, mounted upon and engaging the threaded end of said shaft, forming a reversible connection therewith, a spring interposed between said pressure member and said frame, tending to rotate said pressure member in the pressure exerting direction, thereby causing said pressure member to normally maintain said guiding elements in contact with said guiding surfaces under light pressure conditions, and a bell-crank lever having its fulcrum movable in unison with said first mentioned carrier member, having the end of one of its arms engaging said shaft, and the end of the other arm normally engaging said ratchet disk to prevent rotation of said pressure member in the pressure releasing direction, whereby the latter arm will release said disk, when said first mentioned carrier member is forced away from said predetermined position, against the action of said heavy pressure exerting means, due to the reaction of said shaft against the arm of said bell-crank lever engaged thereby.

6. In a guide for a conveyance riding along a

guide rail having two side guiding surfaces, a frame, a transversely directed shaft shiftably mounted in said frame, one end of said shaft being threaded with a steep thread, two yokes shiftably mounted upon said shaft one at each side of said frame, guiding elements carried by each yoke, an abutment member for the yoke adjoining the unthreaded end of said shaft, a spring mounted on said unthreaded end exerting a relatively heavy pressure against said abutment member to hold it, and said yoke, in a predetermined position along said shaft, a pressure member for the other yoke, formed with a ratchet disk, mounted upon and engaging the threaded end of said shaft, forming a reversible connection therewith, a spring interposed between said pressure member and said frame, tending to rotate said pressure member in the pressure exerting direction, thereby causing said pressure member to normally maintain said guiding elements in contact with said guiding surfaces under light pressure conditions, and a bell-crank lever fulcrumed on said abutment member, having the end of one of its arms engaging said shaft, and the end of the other arm normally engaging said ratchet disk to prevent rotation of said pressure member in the pressure releasing direction, whereby the latter arm will release said disk, when said first mentioned yoke is forced away from said predetermined position, against the action of said heavy pressure exerting spring, due to the reaction of said shaft against the arm of said bell-crank lever engaged thereby.

7. In a guide for a conveyance riding along a guide rail having two side guiding surfaces, a

frame, a transversely directed shaft shiftably mounted in said frame, one end of said shaft being threaded with a steep thread, and the other end being turned down to form a shoulder with the body of said shaft, two yokes shiftably mounted upon said shaft, one at each side of said frame, guiding elements carried by each yoke, an abutment disk shiftably mounted on the turned down end of said shaft, a spring mounted on said turned down end, exerting a relatively heavy pressure against said disk, to hold it, and the adjoining yoke, in a predetermined position along said shaft, a pressure member for the other yoke, formed with a ratchet disk, mounted upon and engaging the threaded end of said shaft, forming a reversible connection therewith, a spring interposed between said pressure member and said frame, tending to rotate said pressure member in the pressure exerting direction, thereby causing said pressure member to normally maintain said guiding elements in contact with said surfaces under light pressure conditions, and a bell-crank lever fulcrumed on said abutment disk, having the end of one of its arms engaging said shaft, and the end of the other arm normally engaging said ratchet disk to prevent rotation of said pressure member in the pressure releasing direction, whereby the latter arm will release said ratchet disk, when said first mentioned yoke is forced away from said predetermined position, against the action of said heavy pressure exerting spring, due to the reaction of said shaft against the arm of said bell-crank lever engaged thereby.

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