July 17, 1951 L. M. ARCEMENT 2,561,165

BRAKING DEVICE FOR WEB HANDLING APPARATUS

Filed March 18, 1948 2 Sheets-Sheet 1

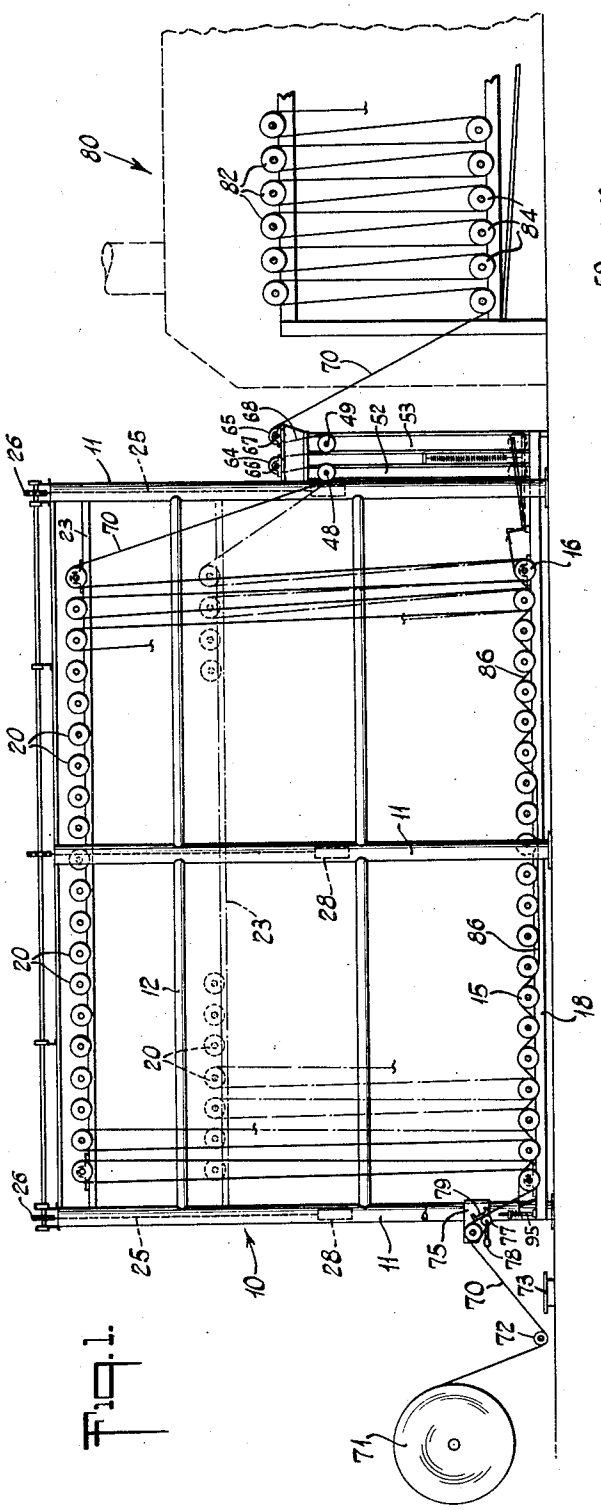

Fig. 1.

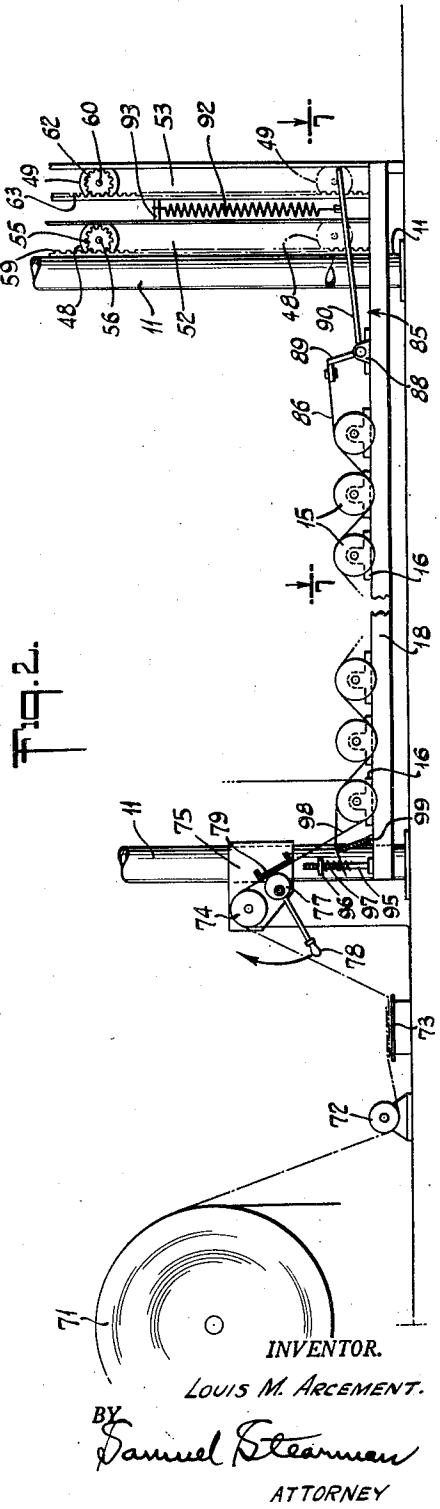

Fig. 2.

INVENTOR.
LOUIS M. ARCEMENT.
BY Samuel Steinman
ATTORNEY

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Filed March 18, 1948 2 Sheets-Sheet 2

Fig. 3.

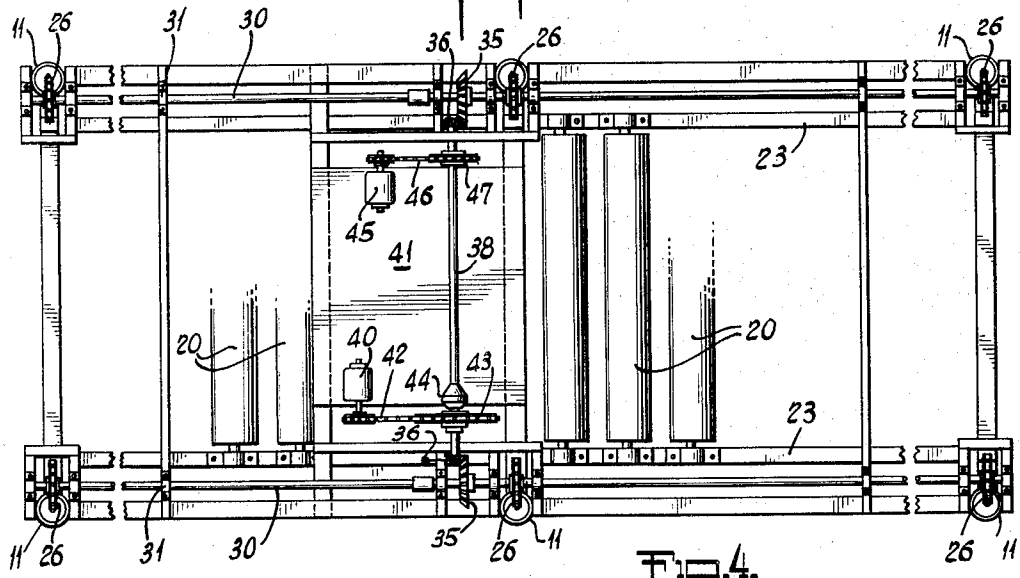


Fig. 4.

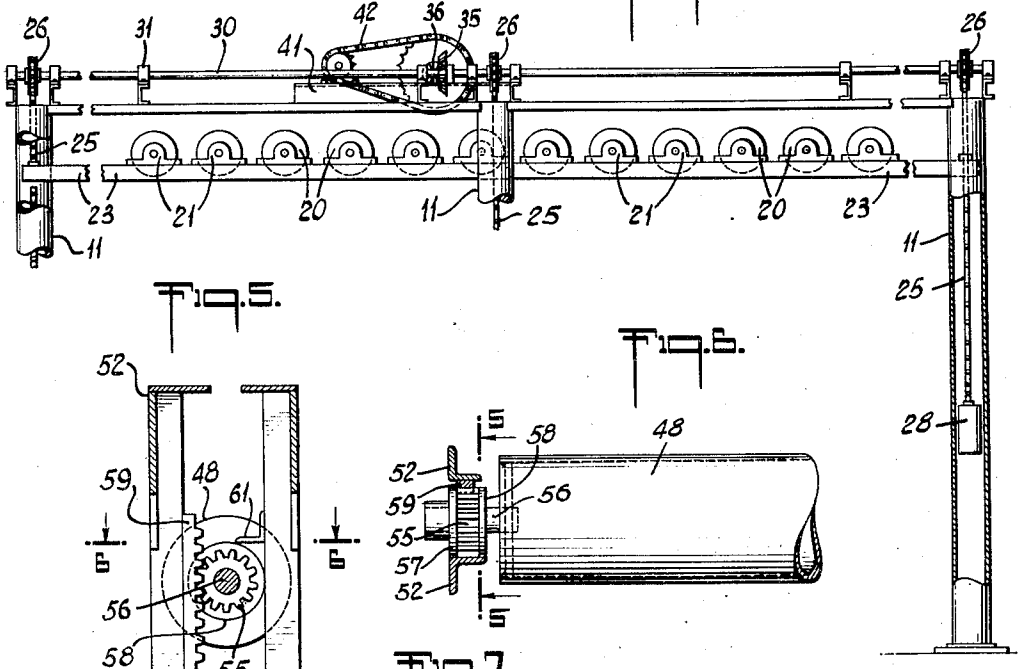
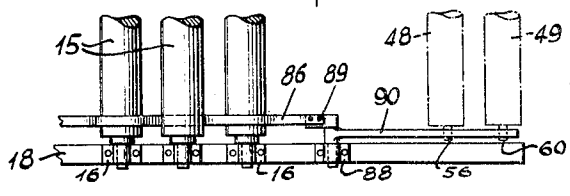


Fig. 5.

Fig. 6.

Fig. 7.



INVENTOR.
LOUIS M. ARCEMENT.
BY Samuel Steinman
ATTORNEY

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UNITED STATES PATENT OFFICE

2,561,165

BRAKING DEVICE FOR WEB HANDLING APPARATUS

Louis M. Arcement, New Orleans, La., assignor to The Patent and Licensing Corporation, New York, N. Y., a corporation of Massachusetts

Application March 18, 1948, Serial No. 15,715

5 Claims. (Cl. 271—2.2)

1

This invention relates to a braking device for a web festooning apparatus or looper. Although not confined thereto, the invention is concerned particularly with a braking device for a floating looper of the type used to maintain a continuous supply of felt to the saturating unit of a roofing machine.

In operations involving the treatment of materials in web form, such as, for example, in the manufacture of bitumen-saturated roof coverings, a web of fibrous felt is generally supplied to the saturator unit of the roofing machine from a large supply roll. When the supply roll becomes exhausted, a new roll is placed in position and the leading end of the web from the new roll is secured to, or "spliced," to the trailing end of the web from the exhausted roll. In order to insure a continuous supply of felt to the saturator at all times and particularly during the splicing operation, when the forward movement of felt from the supply roll is temporarily halted, a looper is interposed between the supply roll and the saturator. Loopers of the "floating" type, with which the invention is primarily concerned, comprise two sets of rollers lying in parallel horizontal planes. The rollers in one set are generally held in stationary mountings and the rollers in the second set are mounted upon a vertically movable floating frame. The web is threaded through the looper in such a manner that it passes alternately over each of the upper and lower rollers, and when the movable set of rollers is at its maximum distance from the stationary set, a substantial quantity of the felt web is festooned in the looper. When movement of the web into the looper is stopped for the splicing operation, the floating frame gradually approaches the stationary set of rollers thereby decreasing the length of each festoon and permitting a continuous feeding of the web to the saturator. When the splice has been made, the feeding of the web into the looper is resumed and the floating frame is gradually drawn away from the stationarily-mounted rollers and returned to its original position. In loopers of this type, each roller is freely mounted and rotates in response to the forward movement of the web as it is drawn through the looper. When the web travels at a relatively high velocity, as is commonly the case, for example, in roofing machines, the inertia in the rollers is so great that, when the forward movement of the web outside the looper is interrupted, as when a break in the web occurs or when the movement of the web through the saturator is

2

slowed or stopped, the rollers continue to revolve and the web accumulates in a mass on the floor of the looper. The web may thus be damaged and considerable time and effort is required to return it to its proper position in the looper. This is obviously a serious disadvantage in the operation of floating loopers.

It is an object of this invention to overcome this disadvantage by providing a braking device for a floating looper which will automatically check the forward movement of the web in the looper when the progress of the portion of the web which has passed beyond the looper is interrupted.

It is a further object of the invention to provide a braking device of the character indicated which will automatically adjust the speed of the web passing through the looper to the speed of the web outside the looper.

Other objects and advantages of the invention will be apparent from the detailed description which is to follow and from the drawings in which,

Fig. 1 is a diagrammatic side elevation of a floating looper arranged for use with a web saturating machine shown fragmentarily;

Fig. 2 is an enlarged fragmental view of the lower portion of the looper shown in Fig. 1;

Fig. 3 is a plan view of the looper showing the driving mechanism for the floating frame;

Fig. 4 is a fragmental view of the upper portion of the looper;

Fig. 5 is a vertical section along the line 5—5 of Fig. 6, showing the manner in which the tension rolls are mounted;

Fig. 6 is a view partly in section and partly in elevation along the line 6—6 of Fig. 5; and

Fig. 7 is a view along the line 7—7 in Fig. 2.

Referring to the drawings, the numeral 10 designates generally a floating looper having a supporting frame comprising hollow columns 11 and horizontal bracing strips 12. The looper 10 is illustrative of a type of floating looper for which the braking device of the invention is particularly suitable. It will be obvious, however, that the invention is not limited to this particular looper structure.

A series of spaced idle rollers 15 are horizontally mounted in fixed position across the lower portion of the looper, each end of the rollers 15 being journaled in a bearing 16. The bearings 16 shown in Fig. 2 are mounted upon a stationary horizontal beam 18 and the bearings (not shown) supporting the opposite ends of the rollers 15 are similarly mounted. A second set of

idle rollers 20 is journaled in bearings 21 which are mounted upon a floating frame 23.

Frame 23 is supported by chains 25 which are secured to the sides of frame 23 and extend upwardly therefrom, passing over sprocket wheels 26 and then downwardly into columns 11, a counterweight 28 being attached to the end of each chain depending in the columns 11. The sprocket wheels 26, positioned above each of the columns 11, are mounted on two parallel shafts 30 which are supported in bearings 31 along the top of the looper 10. Bevel gears 35 are mounted on shafts 30 centrally thereof and mesh with bevel gears 36 secured at each end of a shaft 38, extending between the shafts 30.

The shaft 38 may be driven by a motor 40 mounted on a platform 41, power being transmitted from motor 40 through endless chain 42 which passes over a sprocket wheel 43. Sprocket wheel 43 is freely mounted on shaft 38 and is secured to a friction clutch 44 in such a manner that when clutch 44 is engaged, shaft 38 is mechanically connected with motor 40. A hydraulic stabilizer 45, which prevents too rapid rotation of shaft 38, is mounted on platform 41 and is mechanically connected to shaft 38 by chain 46 which passes over a sprocket wheel 47 mounted on the shaft 38.

A relatively constant tension is maintained on the web as it leaves the looper by a pair of vertically-movable horizontal tension rolls 48 and 49, the ends of which are mounted in vertical frames 52 and 53, respectively, as shown in Fig. 1. Referring particularly to Fig. 5 and Fig. 6, one end of tension roll 48 is provided with a spur gear 55 mounted on the stub shaft 56 of roll 48, between guide flanges 57 and 58. The spur gear 55 engages a vertical rack 59 provided in one side of frame 52. A limit stop 61 positioned on the side of frame 52 near the top of rack 59 prevents roll 48 from overriding rack 59. One end of tension roll 49 also has a stub shaft 60 upon which is mounted a spur gear 62 engaging the rack 63 in frame 53. The ends of the tension rolls 48 and 49 not shown are also provided with spur gears and the ends of frames 52 and 53 not shown have appropriate racks which engage these spur gears as described in connection with spur gears 55 and 61. The gear and rack arrangement described maintains the tension rolls 48 and 49 horizontally disposed at all times, while at the same time permitting free vertical movement, whereby jamming of the rolls due to uneven lateral tension on the web is prevented. A pair of horizontal idler rolls 64 and 65 are journaled in bearings 66 and 67, respectively, mounted on a frame 68 positioned above frames 52 and 53.

Referring particularly to Fig. 1, a web 70 is supplied to the looper 10 from a supply roll 71, the web 70 passing over a guide roll 72, mounted adjacent a splicing anvil 73, and a guide roll 74 mounted in a bracket 75 secured to the frame of the looper 10. A clamp roll 77, having a lever arm 78, is eccentrically mounted in bracket 75 in such manner that it can be pressed against a plate 79 to hold web 70 therebetween when it is desired to stop the web, as when a splice is to be made. The web is threaded through the looper by being passed alternately over idle rollers 15 and 20, then alternately over tension rolls 48 and 49 and idler rolls 64 and 65. After leaving the tension rolls, the web enters the forward part of the saturating unit 80 where it passes over a series of upper rolls 82 and lower rolls 84 while the web is subjected to sprays of molten asphalt before being passed into the saturator bath (not shown) in the usual manner. The tension rolls 48 and 49 are supported in an elevated position by the web 70 and when the tension on the web 70 slackens, the rolls move downwardly in frames 52 and 53.

The brake mechanism of the invention comprises a brake-actuating lever 85 and, secured thereto, a braking member which, in the embodiment illustrated, is a brake band 86 adapted frictionally to engage idle rollers 15 to retard the rotation thereof. The lever 85 is mounted in a pivot bearing 88 and comprises an upwardly-extending L-shaped portion 89 to which one end of the brake band 86 is attached and an arm portion 90 which extends somewhat obliquely beneath tension rolls 48 and 49. The arm 90 is so positioned that it will be pressed downwardly by the stub shafts 56 and 60 when the tension rolls descend to the lower portion of frames 52 and 53.

A spring 92 suspended from a bar 93 is secured to arm portion 90 and exerts an upward pull thereon, thereby maintaining the brake band 86 out of operative engagement with idle rollers 15 when the tension rolls are in elevated position. The other end of the brake band 86 is firmly held in a take-up device which, in the embodiment shown, comprises a vertical threaded member 95, which extends through a suitable opening in the band 86, and an adjustable nut 96 which may be raised or lowered on member 95 to maintain proper braking action by slackening or tightening the brake band 86. A helical spring 97 is positioned on threaded member 95 between band 86 and nut 96. In order to make the nut 96 effective in adjusting the tension on the band 86, the band is passed over a support plate 98 mounted on a pivot 99 adjacent the member 95.

As will be observed in Fig. 1, the brake band 86 is threaded across the ends of the rollers 15, passing over and under adjacent rollers at either end of the looper and passing under the centrally positioned rollers. The particular arrangement of the brake band with respect to the rollers may, of course, be varied to fit the particular requirements of the looper with which the brake is used. As will be apparent from Fig. 7, the brake band 86 is relatively narrow in comparison with the length of the rollers 15 in order that it may engage the surfaces of the rollers 15 near the ends thereof without interfering with the movement of the web 70 over the main portion of the rollers. For example, a brake band 2 inches wide is used with rollers 84 inches wide over which a web of felt 72 inches wide is passed. The brake band 86 may be formed of leather, canvas, rubber, or other suitable material.

When the looper is in operation, the frame 23 is maintained in an elevated position at the maximum distance from the rollers 15. When the supply roll 71 becomes exhausted, the clamp roll 77 is pressed against plate 79 thereby clamping the web 70 and stopping its movement into the looper. At the same time, the clutch 44 is disengaged, which releases the shaft 38 from mechanical connection with motor 40 and frees frame 23, leaving it supported only by the counterweights 28. As the tension on the web 70 increases as it is pulled from the looper, the frame 23 is pulled downwardly. Meanwhile, the leading end of the felt from the new roll is spliced to the end of the felt from the exhausted

roll. The clamp roll 77 is then drawn back and the movement of felt into the looper resumed. The clutch 44 is engaged and the motor 40 started, which by turning shafts 20 and 38 gradually raises the floating frame 23 until it has reached its elevated position, whereupon motor 40 is stopped. During the normal operation of the roofing machine, the tension rolls 48 and 49 are held by the web in the upper portion of frames 52 and 53, respectively, as shown in solid lines in Fig. 1.

When, however, the forward movement of the web 70 is interrupted, as when the web breaks in the saturator or elsewhere along its path, or when the driven rolls (not shown) which pull the web are stopped, the web 70 continues to be supplied from the rollers in the looper thereby allowing the tension rolls 48 and 49 to move downwardly in frames 52 and 53. As the tension rolls approach the bottom of the frames, the shafts 56 and 60 press upon arm 90, moving it downwardly and actuating the brake band 86 to retard the rotation of rollers 15, thus retarding or stopping further movement of the web. When the break is mended and the web set in motion again, the tension rolls 48 and 49 are raised by the web 70 and the brake band 86 slackened, permitting the rollers 15 to rotate.

The braking device of the invention is equally effective in retarding the movement of the web in the looper when the movement of the web in the saturating unit is slowed, as often occurs. As the web is fed from the rollers in the looper at a greater rate than required, the tension rolls 48 and 49 move downwardly and the brake band 86 is actuated in the manner described above. The braking action of band 86 slows the rollers 15 and thereby the movement of web 70. When the web in the looper has been slowed to the desired degree, i. e., to the speed of the web in the saturator, the tension on the web increases and tension rolls 48 and 49 are raised, thereby automatically releasing the brake and permitting the web in the looper to move freely.

Thus, the speed of the web passing through the looper is automatically adjusted to the speed of the web outside the looper. Whenever the speed of the web in the looper exceeds the speed of the web outside the looper, the tension rolls 48, 49 fall and depress lever arm 90 thereby actuating the brake. When, after the brake has been applied, the speed of the web outside the looper becomes greater than the speed of the web in the looper, the web raises the tension rolls 48 and 49 and the brake band 86 is automatically slackened allowing the rollers 15 to rotate freely.

While the braking device of the invention has been described in connection with a looper having a pair of tension rolls, it will be apparent that it is equally applicable to loopers having a single tension roll.

It will also be obvious that various changes and modifications may be made without departing from the scope of the invention as defined by the appended claims, and it is, therefore, intended that the drawings and the foregoing description shall be interpreted in an illustrative and not in a limiting sense.

I claim:

1. A brake mechanism for a floating looper including a plurality of idle rollers and at least one tension roll, said brake mechanism comprising a braking member positioned to frictionally engage simultaneously the surface of at least several of said idle rollers to retard the rotation thereof, and a braking-member actuating element disposed beneath said tension roll and engageable thereby to actuate said braking member, whereby said brake is actuated upon downward movement of said tension roll into engagement with said braking-member actuating element.

2. A brake mechanism for a floating looper including a plurality of idle rollers and at least one tension roll, said brake mechanism comprising a braking member positioned to frictionally engage simultaneously a portion of the surface of at least several of said idle rollers to retard the rotation thereof, said braking member being positioned to be moved in and out of frictional engagement with the surface of the idle rollers, a braking-member actuating element disposed beneath said tension roll and engageable thereby to actuate said braking member, whereby said braking member is urged into frictional engagement with said idle rollers upon downward movement of said tension roll into engagement with said braking-member actuating element.

3. A brake mechanism for a floating looper including a plurality of idle rollers and at least one tension roll, said brake mechanism comprising a brake band positioned to engage simultaneously a portion of the surface of at least several of said idle rollers to retard the rotation thereof, and a lever secured to the said brake band at one end thereof, said lever being positioned beneath said tension roll.

4. In a looper including a plurality of stationarily-mounted idle rollers and at least one vertically-movable tension roll normally supported in elevated position by the web passing through the looper, a brake band positioned to frictionally engage a portion of the surface of at least several of said idle rollers, and a brake-actuating lever secured to said brake band at one end thereof, said lever being positioned beneath said tension roll and being secured in a pivot mounting whereby downward movement of the lever tightens the brake band.

5. In a looper including a plurality of stationarily-mounted idle rollers and at least one vertically-movable tension roll normally supported in elevated position by the web passing through the looper, a brake band positioned to frictionally engage a portion of the surface of at least several of said idle rollers, and a brake-actuating lever secured to sid brake band at one end thereof, said lever being secured in a pivot mounting whereby downward movement of the lever tightens the brake band, and said lever being positioned below said tension roll in such manner that it will be engaged and pressed downwardly when the tension roll is lowered.

LOUIS M. ARCEMENT.

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Certificate of Correction

Patent No. 2,561,165 July 17, 1951

LOUIS M. ARCEMENT

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 6, line 54, for "sid" read *said*;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of September, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.