March 18, 1941. J. W. HELTZEL 2,235,105

ADJUSTABLE SCREED

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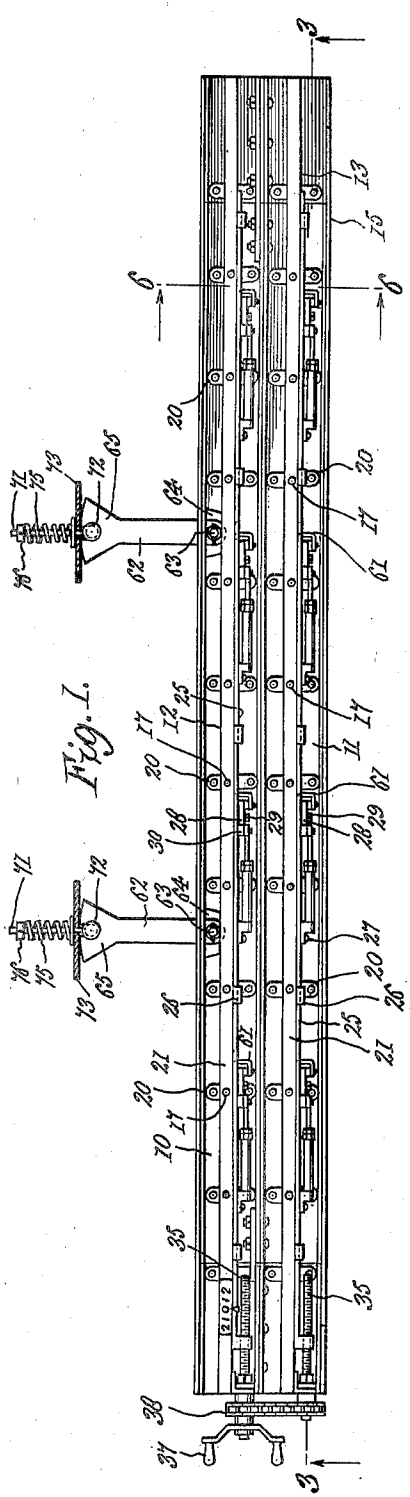


Fig. 1.

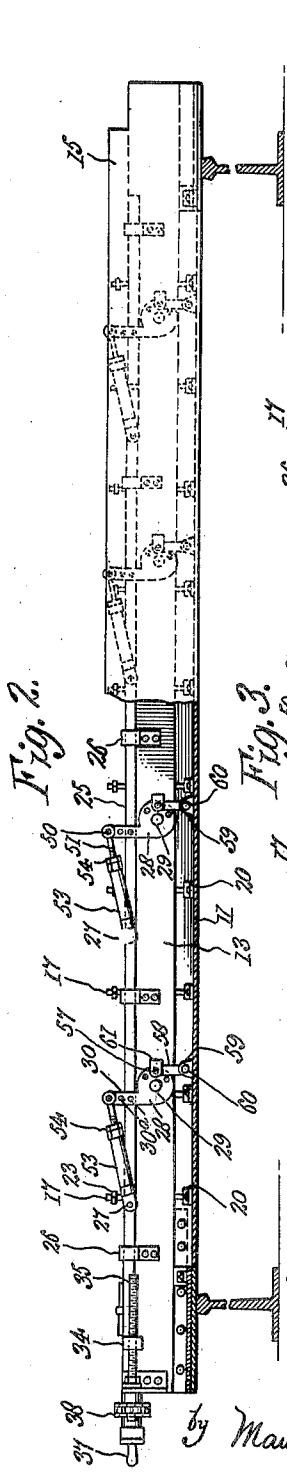


Fig. 2.

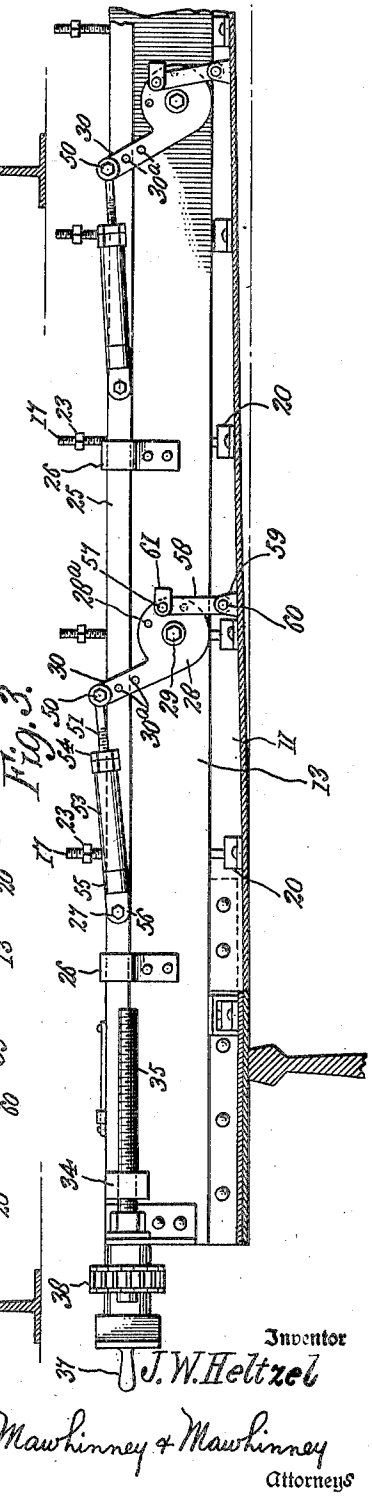


Fig. 3.

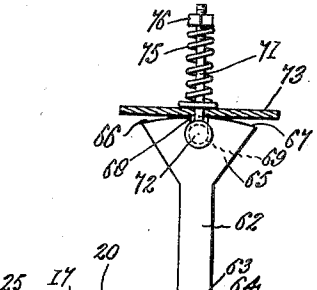
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Fig. 4.



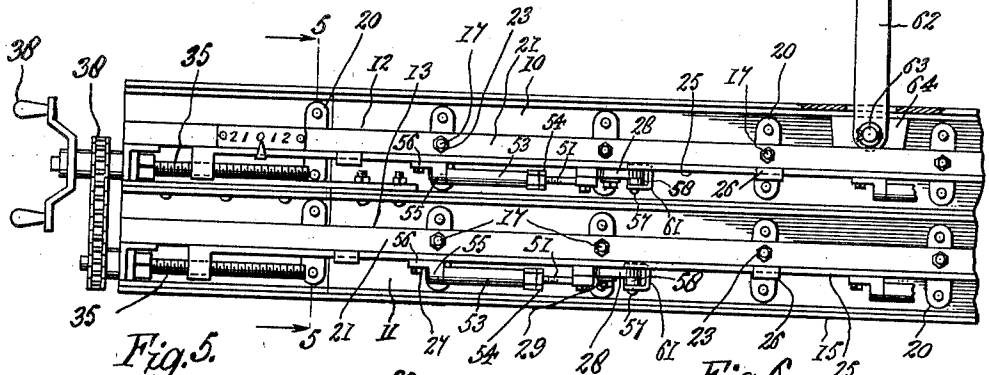


Fig. 5.

Fig. 6.

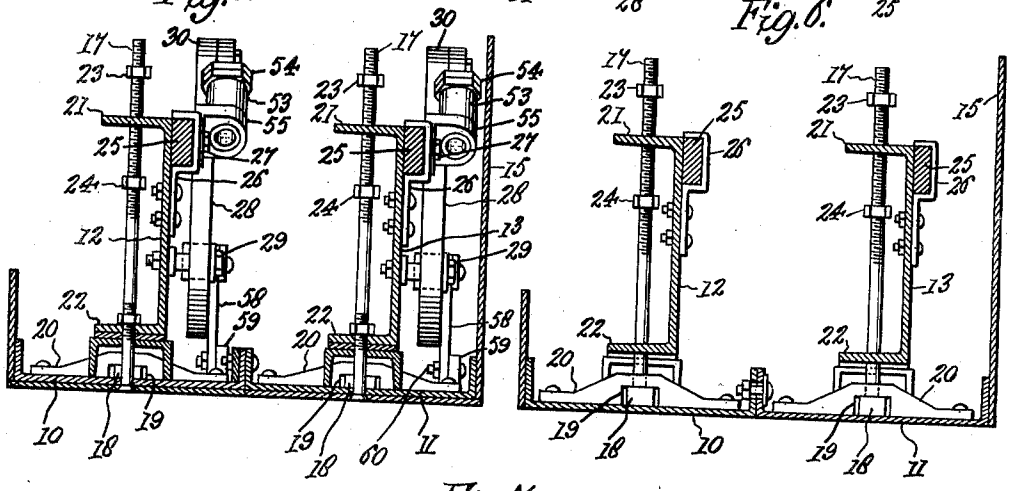


Fig. 7.

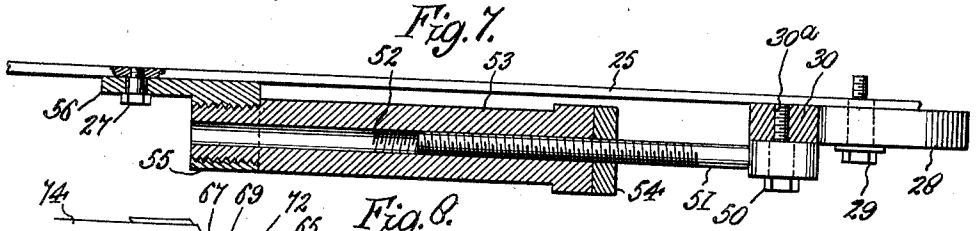
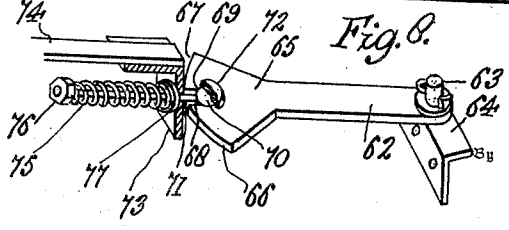


Fig. 8.



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UNITED STATES PATENT OFFICE

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ADJUSTABLE SCREED

Joseph William Heltzel, Warren, Ohio, assignor to Flexible Road Joint Machine Company, Warren, Ohio, a corporation of Ohio

Application May 16, 1939, Serial No. 274,056

11 Claims. (Cl. 94—45)

The present invention relates to improvements in adjustable screeds, and more particularly refers to the adjustment of the bottom of the screed whereby the bottom may be warped or curved to accommodate variations in the crown to be given to the road.

The present invention involves certain improvements over the invention shown, described and claimed in my prior Patent No. 1,741,459, granted December 31, 1929.

It is an object of the invention to provide a number of operating units connected to successive local points along the length of the screed which may be actuated simultaneously by a common operating member from a single point, and in which the various units may be adjusted independently of one another whereby to vary the degree of the raising or the lowering of the screed bottom at each unit in conformity with the angle of curvature to be imparted to the road.

It is an important object of the present invention to provide improved units having a common effect and affording a two-fold adjustment; the one adjustment being for roughly determining the effect of the throw of the cam on the screed bottom and for also effecting the throw of the cam itself with respect to the degree of movement of the operating member; and secondly a finer or more minute adjustment independently of the cam adjustment whereby the pitman length may be varied, the pitman being the cam actuating member and thus having a direct effect upon the angular or rotational throw of the cam.

A further object of the invention is to provide an improved push rod by which the screed is pushed forwardly, by, and in advance of, the finishing machine, to the end that the screed may partake of a true rectilinear reciprocating movement cross-wise of the roadway while it is being pushed forward by the finishing machine and not be required to execute an arc-like or swinging movement across the roadway which has always been attended by a mutilating action of the screed on the concrete and resulted in the formation of ridges in the road.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views.

Figure 1 is a top plan view of an improved adjustable screed constructed in accordance with the present invention.

Figure 2 is a front elevation of the same with parts broken away and parts shown in section.

Figure 3 is an enlarged fragmentary section taken on the line 3—3 in Figure 1.

Figure 4 is an enlarged fragmentary top plan view with parts broken away and parts shown in section.

Figure 5 is a vertical cross-section taken on the line 5—5 in Figure 4.

Figure 6 is a similar view taken on the line 6—6 in Figure 1.

Figure 7 is an enlarged horizontal section taken through one of the operating units, and

Figure 8 is a fragmentary perspective view of the improved push rod employed with its connections to the screed and finishing machine shown partly broken away and partly in section.

Referring more particularly to the drawings, which show only a single embodiment of the present invention, 10 designates a rear screed and 11 a front screed, the device being illustrated as applied to a double screed; although it will be apparent to those skilled in the art that such invention is equally applicable to a single screed.

The rear screed truss beam 12 may be of the channel shape shown. The front screed truss beam is shown at 13 and is preferably of the channel form as shown. A dash board 15 is carried at the front of the screed to buck the mass of concrete.

In accordance with prevailing practice, the bottom of the screed is warped or curved by the use of the adjusting bolts 17. A set of these bolts is provided for each screed. Such bolts 17 are disposed substantially vertically through the flanges of the beams 12 and 13. The bolts extend in a series longitudinally of the screed and are spaced apart at relatively short intervals. The heads 18 of these bolts 17, as shown in Figure 6, are disposed in sockets 19 in the socket pieces 20 which are bolted or otherwise secured to the base members of the screeds 10 and 11. The adjusting bolts 17 play freely through openings in the horizontal flanges 21 and 22 of the beams 12 and 13.

The adjustment is secured by means of upper nuts 23 and lower nuts 24. The upper nuts 23 may be screwed down against the upper sides of the flanges 21, while the lower nuts 24 may be screwed up on the bolts 17 against the lower sides of said flanges 21. This produces a locked condition of the bolt whereby such bolt is restrained against vertical movement. By rotating

the upper nut 23 so that it rises along the threaded portion of the bolt 17 and moves upwardly away from the flange 21 the lower nut 24 may be accordingly turned upwardly against the lower side of said flange 21 to force the bolt 17 vertically downward and thus push down upon the bottom members of the screeds 10 or 11, or both, thus diminishing or eliminating the crown.

By reversing the process, the nut 24 may be run down on the bolt away from flange 21 and upper nut 23 may be screwed down on the bolt 17 in a direction to tighten the same against the flange 21 which will have the effect to lift the shaft 17. The lifting of the shaft head 18 in the socket piece 20 will tend to draw up the bottom of the screed at the local point at which such bolt 17 is placed; thus having a tendency to increase the crown at this point.

According to present practice, to secure the local adjustment of the screed bottom along its entire length it is necessary to adjust by hand the various nuts 23 and 24 on all of the bolts 17. Thus when curves are encountered these bolts 17 must be adjusted to substantially eliminate the crown and to cause the bottom of the screed to lie in the same flat plane from side to side of the road. After the curve is negotiated and formed, the screed bottoms must be again adjusted through the bolts 17 and their nuts 23 and 24 to restore the same crown conditions as previously prevailed before the curve was reached. This individual adjustment of the various bolts 17 often requires quite a number of hours on the part of the operators of the machines.

The object of the present invention is to eliminate this lengthy and tedious adjustment of the bolt 17 and to provide a practically instantaneous and uniform adjusting device which enables the operator to change the degree of the crown of the screed while the machine is actually in operation and while the screed is being reciprocated across the roadway.

In the use of this new device the nuts 23 and 24 may be backed away from the flanges 21, the nuts 23 being backed upwardly and the nuts 24 downwardly as in the position indicated in Figures 5 and 6. Thus the bolts 17 are rendered inoperative except to act as guides in moving up and down through the openings of the flanges 21 and 22.

In accordance with the invention a bar 25 is slidably mounted on each screed. The bar 25 slides in supports 26. The supports 26 sustain bar 25 and require it to move horizontally in a substantially rectilinear path back and forth longitudinally of the screed.

One sliding bar 25 is provided for each screed, the bar lying at the forward portion of the beam 12 or 13 and on the side of the beam opposite to that on which project the flanges 21 and 22 as seen in Figures 5 and 6. The brackets or supports 26 are secured to the webs of the beams 12 and 13.

The bar carries pins 27 at suitable intervals between the supports 26. These pins are provided whenever it is desirable to have one of the local adjusting devices or units. Such local adjusting devices consist generally of cams 28 fulcrumed at 29 upon pins or bolts which project from the webs of the channel beams 12 and 13. The cams 28 also extend forwardly of the beams and at the sides thereof opposite the flanges. The cams 28 have cam arms 30 extending in a direction generally upward from the cams and being in general tangential to the cams, the cams being preferably of a substantially circular form. In the arms 30 are a series of perforations 30^a. These perforations are spaced apart rather small distances in order to secure nice and minute adjustments. Such perforations are in a row extending lengthwise of the arm 30 or being in a row in alignment with a tangent to the cam 28.

These perforations 30^a are adapted to receive a pin 50. As shown to advantage in Figure 7, the pins or bolts 50 are threaded in order to screw into and out of the threaded walls of the perforations 30^a. The pins are also received through eyes on rods 51, the pins having heads to retain the rods 51 in pivotal connection with the arms 30.

The rods 51 are threaded and screw into and out of threaded sockets 52 formed in tubes 53. Each rod 51 and its tube 53 constitutes a link or pitman; the rod being held in adjusted position in the tube by means of a lock nut 54 threaded on the threaded shank of the rod 51, and being adapted to be run up tightly against the end of the tube 53 as shown in Figure 7. When the length of the pitman is to be changed, that is when the pitman is to be made longer or shorter, the nut 54 is first backed off from the end of the tube, and the pin or bolt 50 screwed out of the perforation 30^a in the cam arm 30. Using the eye of the rod 51 as a head, the rod may then be rotated in either direction to cause it to move further into or out of tube 53. When the predetermined length of pitman desired is secured, the lock nut 54 is again rotated home against the end of the tube 53, and the pin 50 again inserted through the eye and rotated to cause its threads to engage with the threads of the opening 30^a.

The tube 53 on the end opposite that engaged by lock nut 54 is threaded to receive an internally threaded collar 55 having a lug 56 perforated to receive the pin 27 of the actuating bar 25. The arrangement of the lock nut 54 in connection with the tube and the engagement of the pin 50 with the eye of the rod 51 will also cooperate so that conjointly these parts will prevent the tube 53 from casually or accidentally backing out of the threads of the collar 55. This collar is held itself against rotation by the engagement of its lug with pin 27. Therefore if the tube 53 cannot rotate, then no separation of the tube and collar is possible.

Reverting to Figure 3, the cam 28 is provided with a circular series of perforations 28^a extending around a rim or arc of the cam in order to selectively receive a pin 57, the function of which is to pivotally unite to the active part of the cam 28 the upper end of a link 58. The lower end of this link is articulated with, or pivoted in, an upstanding ear 59 affixed to the bottom of the screed. The pins connecting the ears 59 with link 58 are represented at 60. Clips 61 of metal made in a substantially U-shape may extend about the connection between the upper end of the links 58 and cam 28.

Referring more particularly to Figures 1 and 8, the push bars consist of bar members 62 pivoted at their front ends upon pivot pins 63 upstanding from angle irons or other parts 64 affixed to the screed.

At their rear ends the push bars fan out and are in the form of segments 65 having curvilinear faces 66 and 67 at opposite sides of a substantial central slot 68. This slot opens out on the curvilinear rear surfaces of the segment 65. Inwardly the slot 68 leads into a circular socket 69 in which is rotatably fitted the universal head 70

carried upon the forward end of a bolt 71. Cover plates 72 may be carried by the segment on both upper and lower faces thereof for closing the socket 69 and for confining the universal head 70 therein.

The bolt 71 extends slidably through an opening in the vertical web 73 of an angle iron or other part which is affixed to the finishing machine designated generally at 74. This web 73 forms thrust surfaces or a fixed abutment on which the curvilinear surfaces 66 and 67 of the segment 65 may roll or rotate. The bolt 71 has a coil spring 75 extending about the same and held to its free end by one or more adjusting nuts 76 whereby to vary the tension of the spring. The other end of the coil spring abuts against a ring 77, which ring engages the inner wall of the abutment 73. The spring tends to retain the bolt 71 in a backwardly withdrawn position. At such times as the push rod may draw the bolt 71 forwardly, the spring 75 will be compressed and react on the universal head and on the push rod to draw the same back; and the function of the spring 75 is to normally maintain the curvilinear surfaces 66 and 67 in contact against the front wall of the abutment 73. It will be noted from Figure 8 that the slot 68 is considerably wider than the diameter of the shank of the bolt 71 to permit the rocking of the segment 65 on the abutment while the bolt 71 remains unaltered by this movement. The surfaces 66 and 67 will preferably not be circular, that is not precisely concentric with the center of pin 63. It will be understood that the screed is reciprocated transversely of the roadway as the finishing machine pushes forward upon the screed through the push bars 62. Therefore the center 63 shifts with respect to the curvilinear surfaces 66 and 67 and it will be necessary for these surfaces to be elliptical.

The slide bar 25 carries a threaded collar 34 at or near one end. This collar is internally threaded to engage with the threads upon a screw adjusting shaft 35. This adjusting shaft is carried by one end of the screed and is affixed against axial travel but permitted to rotate. Appropriate means for causing the rotation of the shaft is provided. Where there is a double screed two shafts 35 are provided. On one of these shafts an operating handle or crank 37 is mounted and a chain drive 38 is provided from this shaft to the companion shaft 35.

In the use of the device, the finishing machine thrusts forward upon the push bars 62, and in turn the push bars compel the screed to advance in front of the finishing machine. The screed is reciprocated laterally of the roadway as it advances so that the push bars 62 must not only push forward but they must at the same time partake of a laterally oscillating motion which is permitted upon the circular heads 70 and upon the elliptical curvilinear surfaces 66 and 67.

As shown in Figure 3, by shifting the operating bar 25 toward the right all of the cams 28 will be rotated so as to push down upon the links 58 and thus cause the screed bottoms to be depressed or flattened out, as when rounding a curve. By drawing the push bar 25 in the opposite direction or to the left, as seen in Figure 3, all of the arms 30 of the cams will be rocked causing the links 58 to be lifted and the screed bottom flexed upwardly.

As seen in Figure 3 the bottom of the screed at the left operating unit is raised only slightly as compared with the degree of raising of the screed bottom at the operating unit on the right. This is desirable as the screed bottom must progress in elevation from both sides of the road toward the center where the crown is highest. This differential in operation is roughly secured by changing the throw of the cams 28. This is done by changing the radius of movement, as by selectively fitting pin 50 in a perforation 30^a. The closer to the center 29 the effective connection of the pitman is made, the greater will be the rotational or angular movement of the cam in a predetermined rectilinear movement of the operating bar 25. The farther away pin 50 is from cam center 29, the smaller will be the angular movement of the cam 28 on the same rectilinear movement of the bar 25. Therefore in the units at the end of the device the pin connections 50 will be farther from the cam centers 29. Progressively toward the center of the screed the pin connections 50 may be set closer to the cam centers 29. Also this effective throw of the cams on the screed bottom may be controlled to a considerable extent by the selective placing of pin 57 in one of the series of apertures 28^a on the eccentric rim of the cam 28.

Also after the rough adjustment is made by the placement of the pins 50 and 57 in selected holes 30^a and 28^a respectively, then the finer adjustment may be secured by changing the length of the pitman as previously described or it may be necessary or desirable to change pitman length conformably to the adjustment of pin 50 in a selected aperture 30^a.

By rotating the crank or handle 37 in one or the other direction all of the cams may be simultaneously operated, or groups of cams may be simultaneously operated; or if preferred each cam may be individually operated and then held in the adjusted position by any suitable means as by a pin or by a ratchet arrangement.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. In a screed having a flexible bottom, means for flexing said bottom comprising a cam secured for angular movement to said screed and having a marginal operative portion eccentric to the axis of rotation of the cam and having along said margin a plurality of perforations spaced at variable distances from the center of rotation of the cam, a connection between the flexible screed bottom and said marginal portion of the cam with means to selectively connect said connection to any one of said perforations, and means whereby the cam may be rotated in both directions selectively.

2. In a screed having a flexible bottom, means for flexing said bottom comprising a cam angularly carried by said screed, a connection between the operative part of said cam and said screed bottom, a substantially tangential arm projecting from said cam and having a number of perforations therein spaced at different points from the cam center of movement, a pitman, a pin for connecting one end of said pitman selectively in any one of said perforations, and means pivotally connected to the other end portion of the pitman for operating the same.

3. In a screed having a flexible bottom, means for flexing said bottom comprising a cam carried by said screed, a connection between the operative part of said cam and the screed bottom, a sub-

stantially tangential arm on said cam having a series of spaced threaded perforations therein, a pitman having an eye, a threaded and headed pin engaging through the eye and having screw threads to selectively engage any of said perforations, and means pivotally connected with the other end portion of the pitman for operating the same.

4. In a screed having a flexible bottom, means for flexing said bottom comprising a cam carried by said screed, a connection between the operative part of said cam and the screed bottom, a pitman for operating said cam, means for driving said pitman in opposite directions, said pitman comprising two adjustable parts for varying the length of said pitman.

5. In a screed having a flexible bottom, means for flexing said bottom comprising a cam movably carried by the screed, a connection between the operative part of the cam and said screed bottom, a perforated arm on said cam, a pitman composed of threadedly telescoping parts, means for pivotally connecting one said part with said arm, and an operating member pivotally connected to the other said part of said pitman.

6. In combination with a transversely reciprocating screed and a finishing machine, an abutment on said finishing machine, a headed bolt movable through said abutment, resilient means for holding said bolt in retired position, a push bar pivoted to the screed and having curvilinear surfaces riding against said abutment, said push bar also having a socket for rotating on the head of said bolt.

7. In a screed having a flexible bottom, a reciprocating bar, a cam rotatable on the screed and having an eccentric edge, a connection to the flexible bottom, coupling means for detachably and selectively coupling said connection to variable points on said eccentric edge at different distances from the center of rotation of the cam adapted to cause predetermined angular movement of the cam to result in differential amplitude of movement in the connection and flexible screed bottom, and means to rotate the cam back and forth on reciprocating movement of the bar.

8. In a screed having a flexible bottom, a cam rotatably mounted on the screed, a connection on the cam to the bottom, a reciprocating bar, and a variable length pitman pivoted to the bar and to the cam, the point of pivotal connection of the pitman to the cam being selectively variable with respect to the distances from the center of rotation of the cam to change the throw of the cam in its effect on the flexible bottom without changing the degree of movement of said bar.

9. In combination, a movable machine having a thrust surface, a finishing member having a reciprocating movement crosswise of the path of movement of said movable machine, a push bar pivoted to said finishing member and having a wide rear end with transversely elongated curved surfaces engaging directly against said thrust surfaces of the machine, and yieldable means between said machine and bar for yieldably retaining the curved surfaces of the wide rear end of the bar against the thrust surfaces of said machine.

10. In combination, a machine having a thrust surface, a laterally reciprocating member moving across the advancing path of movement of said machine, a bar pivoted to said reciprocating member and having an enlarged rear end with convexly curved rear surfaces constructed and positioned relatively to the machine to rock laterally upon said thrust surface incident to the lateral traverse of the finishing member, a connection pivotally carried by the rear wide end of said bar and having a longitudinally slidable engagement with said machine, and yieldable means between said machine and connection for reacting on said bar to cause the convex curved surfaces thereof to be maintained against said thrust surfaces of the machine.

11. In a screed having a flexible bottom, means for flexing said bottom comprising cams pivoted upon said screed and having connection to said flexible bottom, a reciprocating bar, means on the screed for wholly supporting said reciprocating bar and causing the same to travel back and forth in a substantially rectilinear path, a pitman between each cam and said bar, said pitman being pivoted to the bar and to the cam whereby to relieve the cams and their pivots of the weight of the bar, and control means for shifting said bar back and forth to simultaneously operate said cams.

JOSEPH WILLIAM HELTZEL.