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(54) Machine for grading road surfaces.

(57) The grader has a hopper (1) which is mounted on the tracked base truck (2) by means of a fifth wheel (3) ; the post (6) on which the operator climbs is absolutely independent, and the grader blade (5) is arranged below it ; the entire assembly is connected to the truck supporting the hopper (1) by means of levers (4) that can move so as to form a parallelogram, thus allowing grading work to be performed in a fully automatic manner, with perfect working results and great economy in construction costs.

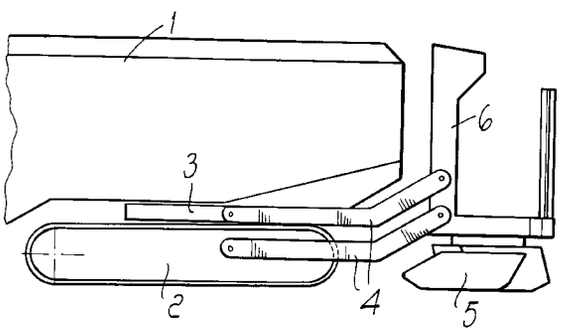

Fig.1

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The aim of the present invention is to provide a machine to lay asphalt, especially on sidewalks or in any case on road sections of limited width, almost fully eliminating the use of manual work but nonetheless providing a finished road surface of extremely commendable characteristics and with a significant reduction in construction costs.

In the field of roadwork machines and particularly of finishing machines for laying asphalt there are in fact no commercially available machines for repairing and laying sidewalks.

It is evident that this fact entails an almost total use of manual work in this kind of activity, with imperfect results as to the quality of the structure thus produced and with considerable management costs.

The need to obviate all this is accordingly strongly felt, and the search for suitable solutions is beginning to gain ground in this sector.

Some first attempts have been made, but so far the solutions that have been tried have not proved risolutive.

The grader according to the invention enters this field with innovative technical solutions that make it unique in its kind.

Indeed it has:

1) a loading hopper which is mounted on a central fifth wheel, has a system with an internal screw feeder, and is suitable to receive the material and unload it where it is most useful;

2) a hopper opening system with hinged panels for loading by trucks of any size, thus avoiding unwanted losses of material;

3) parallelogram-like means for lifting the grader blade to prevent tractor movements from affecting the laying of the asphalt (ripple effect);

4) mutually rigidly coupled control panel and operator platform to facilitate handling in any type of operation and make work safer;

5) the possibility to move the grader blade laterally to allow bitumen to be laid outside of the machine's bulk while maintaining easy hopper loading;

6) a grader blade that is mounted on a plane which is inclined with respect to the advancement direction in order to allow constant loading of the material without the aid of fluid-actuated screw feeders, furthermore allowing any obstacles to be passed over more easily.

The invention is now described hereinafter in greater detail with the aid of the accompanying drawings, wherein:

figure 1 (drawing I) is a general side view of the machine according to the invention;

figure 2 is a plan view of the machine, with the hopper rotated through 90°;

figure 3 (drawing II) is a view of the machine taken from the opposite side, with the hopper rotated through 90°;

figure 4 is a top view of said machine with the screw feeder clearly visible from the outside;

figure 5 (drawing III) is a side view of the machine with the hopper in an open position;

figure 6 is a plan view of the machine;

figure 7 (drawing IV) is a view of the machine with the grader blade lowered to the ground;

figure 8 is a plan view of the machine in the same condition;

figures 9, 10 and 11 (drawing V) are views of three different positions of the grader blade and of the control post;

figures 12, 13 and 14 (drawing VI) are plan views of the grader according to the invention in three different possible operating conditions.

The machine according to the invention comprises a hopper 1 (figure 1) which is connected to the tracked truck 2 by means of a fifth wheel 3 that allows the hopper to rotate about its vertical axis.

Levers 4 extend from the tracked truck 2 and support, by means of a so-called parallelogram-like system, the grader blade 5 on which the control post 6 is mounted; the operator that controls the machine climbs onto said control post.

The screw feeder 7 is arranged inside the guiding hopper 1 (figure 4) and, by rotating in both directions, moves the material deposited by the hopper in order to make it descend through the outlet 8.

The hopper can be loaded by means of a conventional power loader or with a dumper truck.

The tow hook 9 allows the machine to be towed with a tractor or a similar towing vehicle.

The front wall 10 (figures 5 and 6) of the hopper 1 can swing down completely by virtue of the presence of the jacks 11 that move it, thus facilitating the loading of said hopper by means of a truck of any size.

The shape given to the hopper 1 allows the engine and component parts to be accommodated on the side that lies opposite to the opening in the wall 10.

An essential characteristic of the machine is that the grader blade 5 (figures 7 and 8) is connected to the truck that supports the hopper 1 by means of the levers 4, which form a so-called "parallelogram" system.

In this manner, the vertical movements of the grader blade 5 are independent of the forces applied by the tractor that tows the machine.

Accordingly, during work the obstacles encountered by the tractor and the jolts caused thereby are not transmitted to the grader blade 5, thus avoiding the typical ripples in bitumen laying that occur with machines in use to date.

Both in the transfer position, i.e. with the grader blade 5 lifted (figure 11), and in the working position, with the grader blade in contact with the ground (figure 9), or even in the presence of bumps or depressions on the ground (figure 10), the operator is safer

and more comfortable since he can always work in a vertical position with the base of the post perfectly horizontal in any situation.

As can be seen from figures 12, 13 and 14, the machine according to the invention allows the asphalt to be laid in various ways depending on the particular requirements.

The above figures show that the grader blade 5 is mounted on preferably chromium-plated rods 12 arranged in an inclined position with respect to the advancement axis of the machine, thus allowing the material to be distributed uniformly and any obstacles on the roadbed to be passed over more easily.

Figure 12 illustrates the laying of asphalt along a strip 13 which is arranged symmetrically along the advancement axis of the machine, and figure 13 illustrates the laying of asphalt on a strip 14 which lies entirely outside the advancement axis of the machine, with the hopper 1 orientated so that its axis is approximately at 45° with respect to the machine advancement axis; figure 14 illustrates the laying of asphalt on a strip 15 which lies partially outside and partially inside the machine, with the hopper 1 orientated at an angle of less than 45° with respect to the axis of the machine.

In any case, the post 6, together with the associated control panel, remains in a central position with respect to the advancement tracks of the truck that supports the machine.

The advantages of the machine according to the invention with respect to conventional finishing machines are evident, since conventional finishing machines never have a central fifth wheel and therefore cannot rotate in any way.

In the machine according to the invention it is instead possible to discharge the material exactly and in the appropriate amount to provide the best result for the work in progress.

No currently commercially available finishing machine has screw feeders arranged directly inside the hoppers.

When said screw feeders are present, they are mounted in the rear part of the machine, between the tractor and the grader blade, and this makes it absolutely impossible to discharge the material in a single position, and therefore the material must be first discharged and then conveyed by the screw feeders, which distribute it and leave traces of asphalt even where they are not necessary, thus requiring an additional and expensive road-cleaning operation.

The front opening of the side wall 10 allows the hopper 1 to be loaded without entailing losses onto the ground; this is not at all ensured by currently used loading hoppers, which have openings on their side walls to allow this loading.

The particular arrangement of the post so that the controls are available to the operator, in which the post is not mounted directly on the truck that supports the hopper but is coupled thereto by means of levers arranged so as to form a parallelogram, ensures that the position of the post with the related movement unit is fully independent of the truck supporting the hopper.

The position of the operator is such that he is ensured of great visibility in any working condition, both onto the loading hopper and onto the strip of ground to be covered with asphalt.

Accordingly, the advantages of the grader according to the invention are evident; said machine allows substantially perfect and uniform laying of the asphalt along the required strip without needing subsequent manual laying operations or cleaning operations, with a significant reduction in the onerous labor costs and a considerable improvement in the laying characteristics of the material.

Naturally, the constructive details of the machine according to the invention have been described and illustrated so far in a particular embodiment which has been given merely by way of non-limitative example, such details being able to assume different shapes and appearances without altering the general characteristics of said machine and without thereby abandoning the scope of the patent.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Machine for grading road surfaces, characterized in that it comprises a loading hopper (1) which is mounted on a tracked device (2), with the interposition of a central fifth wheel (3), rods (4) being arranged so as to form a parallelogram-like system and support the post (6) with a platform for the operator and with control panels, the grader blade (5) being mounted below said post, thus making the movement of the grader blade (5) independent of the position of the hopper (1), the material whereof can be discharged along a central or lateral strip as desired by the operator.

2. Machine for grading road surfaces, according to claim 1, characterized in that a screw feeder (7), with a discharge opening (8), is arranged inside the hopper (1) to move the material inside the hopper and to allow its discharge in the desired position without losses of material.

3. Machine for grading road surfaces, according to claims 1 and 2, characterized in that the hopper

(1) can swing open by swinging down the side wall (10), thus allowing trucks or buckets to load said hopper without unwanted losses of material.

4. Machine for grading road surfaces, according to claims 1 to 3, characterized in that the operator is located on a control post (6) with a control panel and an underlying grader blade (5), the entire assembly being connected to the tracked truck (2) that supports the hopper (1) by means of rods (4) which are preferably arranged so as to form a parallelogram, thus making the position of the operator independent and keeping the platform on which the operator rests always horizontal in any condition even if the terrain over which the machine advances is uneven.

5. Machine for grading road surfaces, according to claims 1 to 4, characterized in that an entire side wall (10) of the loading hopper (1) can swing down, by means of a piston-operated actuation system (11), thus allowing the material to be easily loaded inside the hopper (1).

6. Machine for grading road surfaces, according to claims 1 to 5, characterized in that said grader blade (5) can move laterally and lay the material inside or outside the machine according to particular requirements.

7. Machine for grading road surfaces according to claims 1 to 6, characterized in that said grader blade (5) is mounted on rods which are inclined with respect to the advancement axis of the machine.

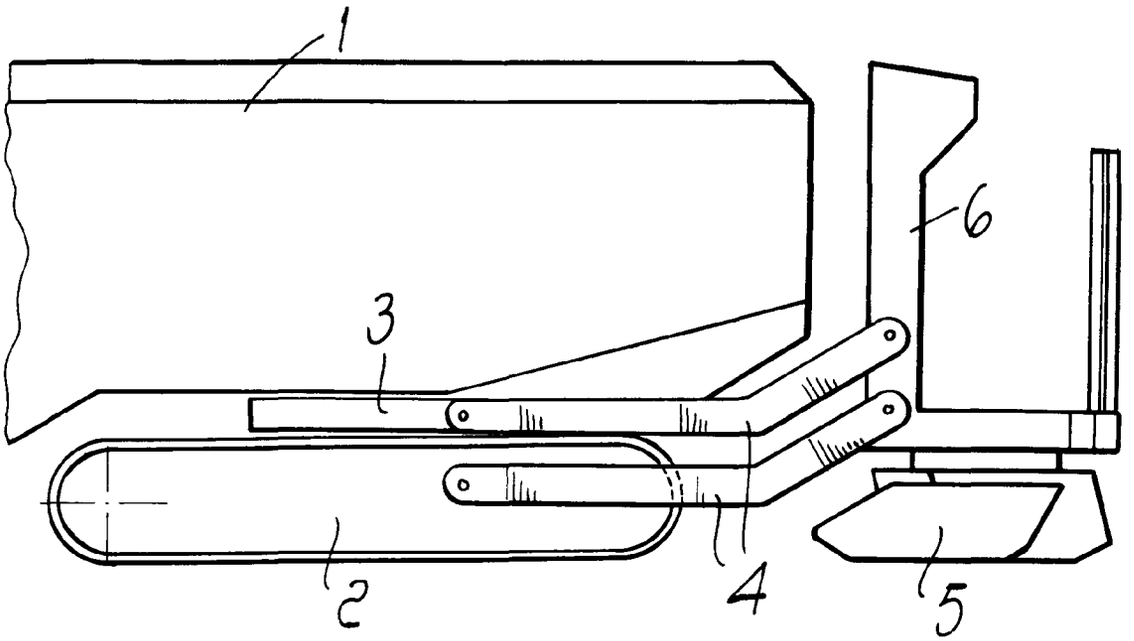

FIG. 1

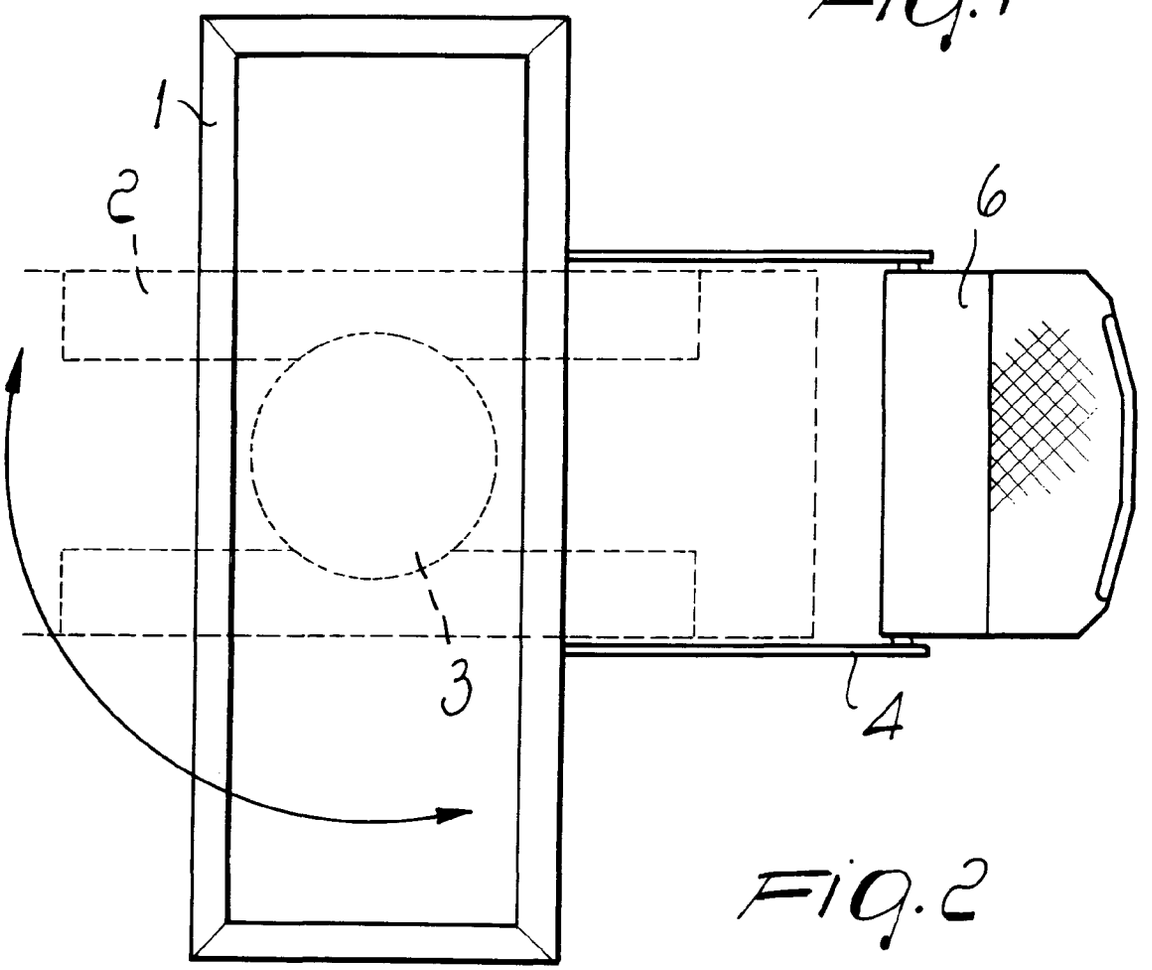

FIG. 2

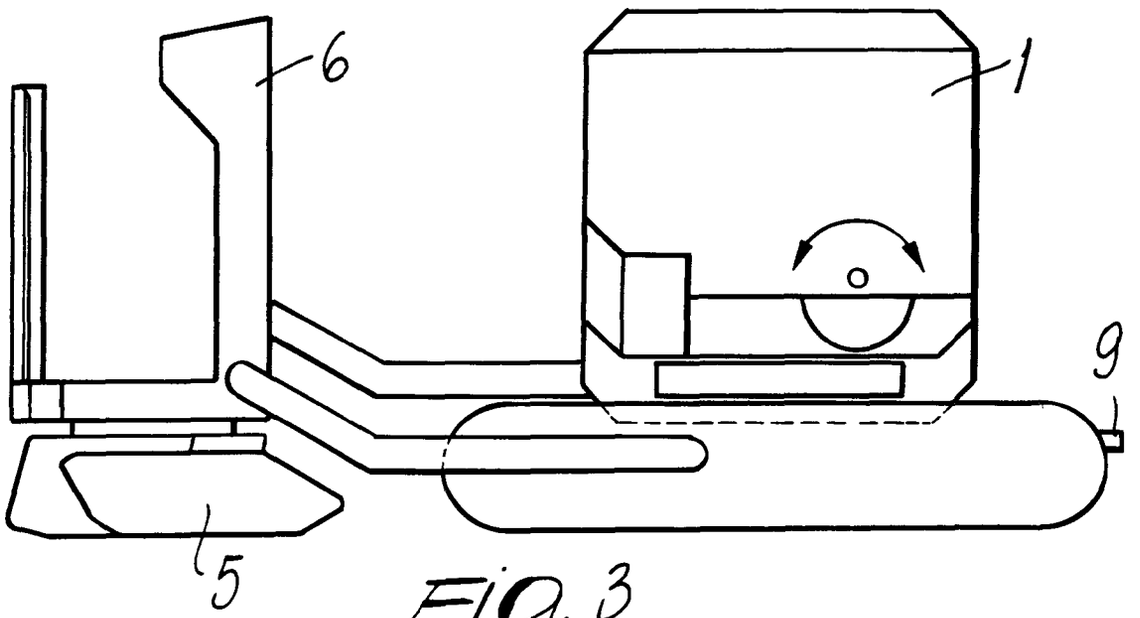

FIG. 3

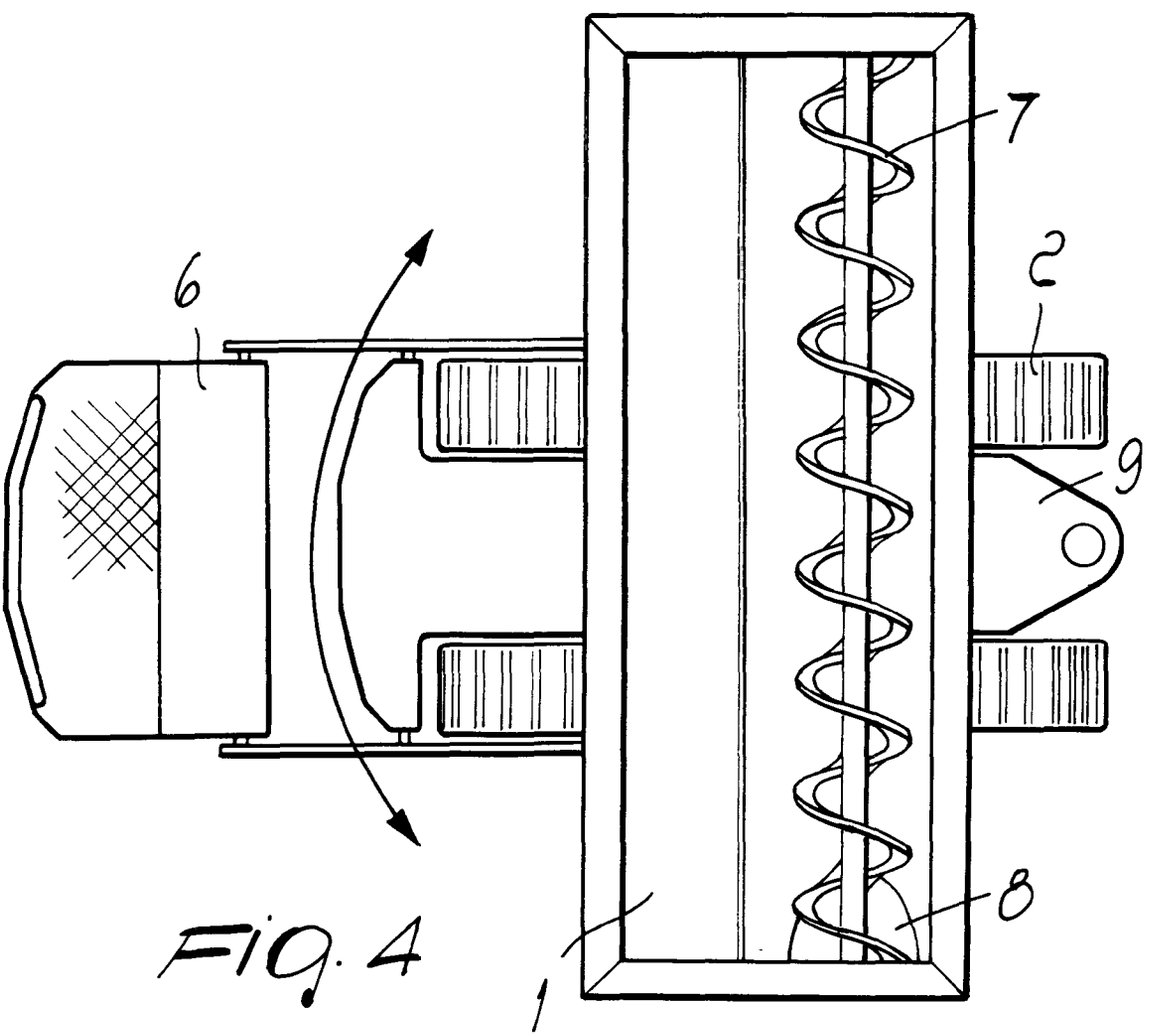

FIG. 4

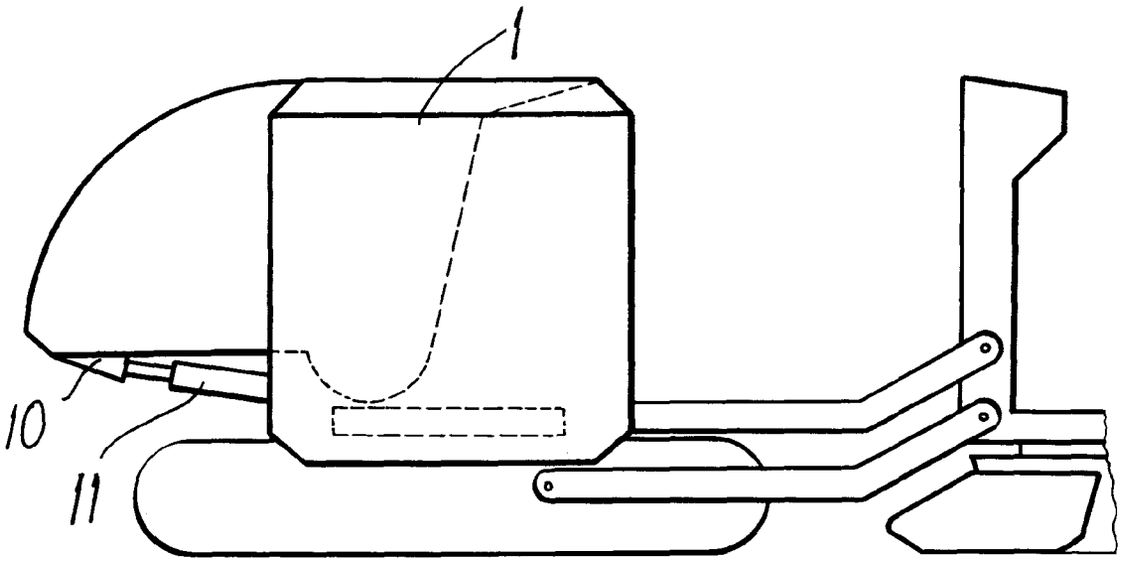

Fig. 5

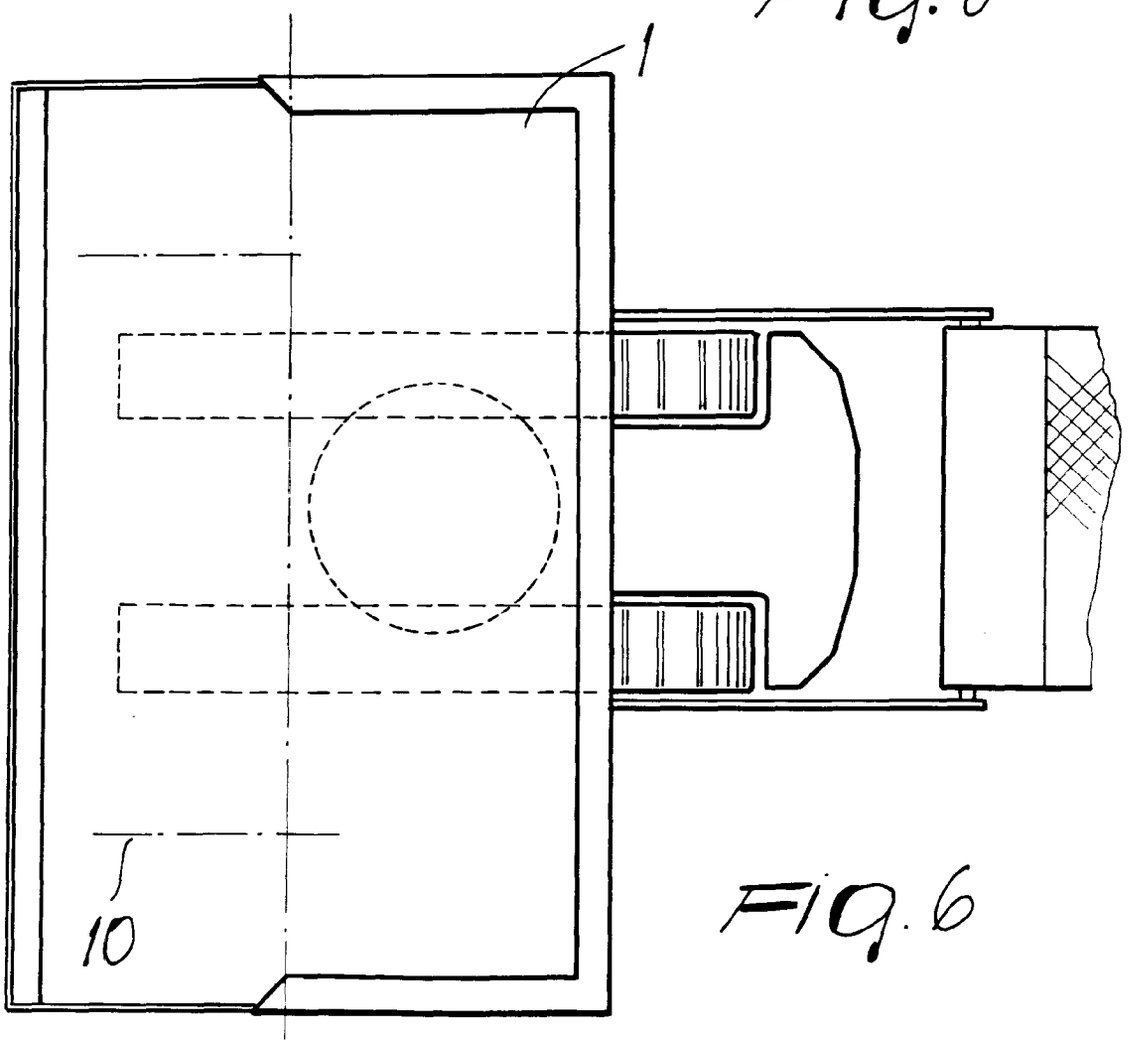

Fig. 6

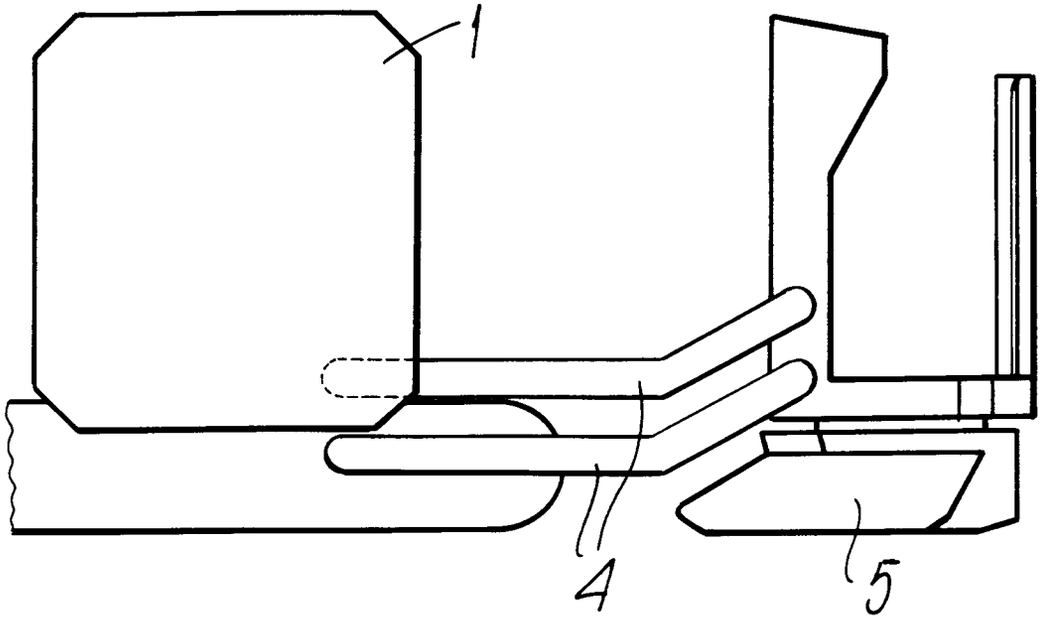

FIG. 7

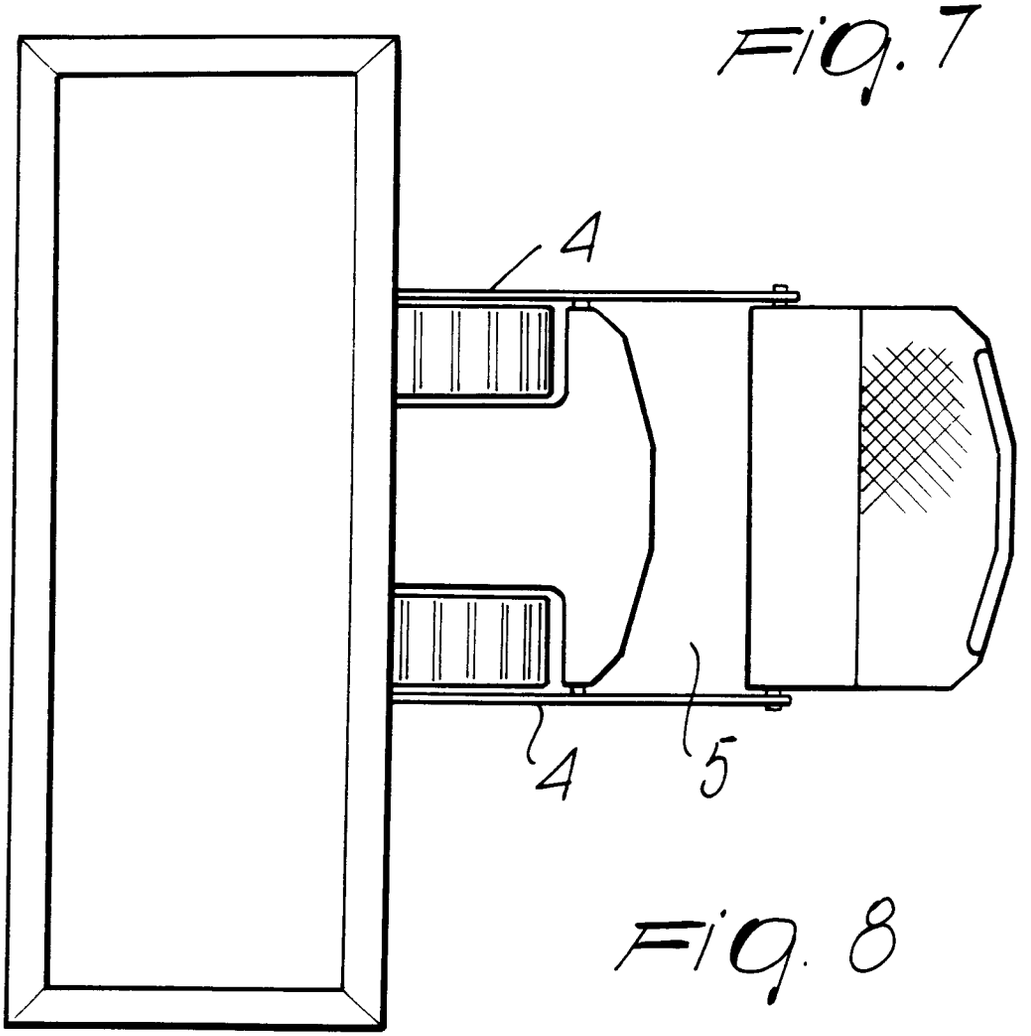

FIG. 8

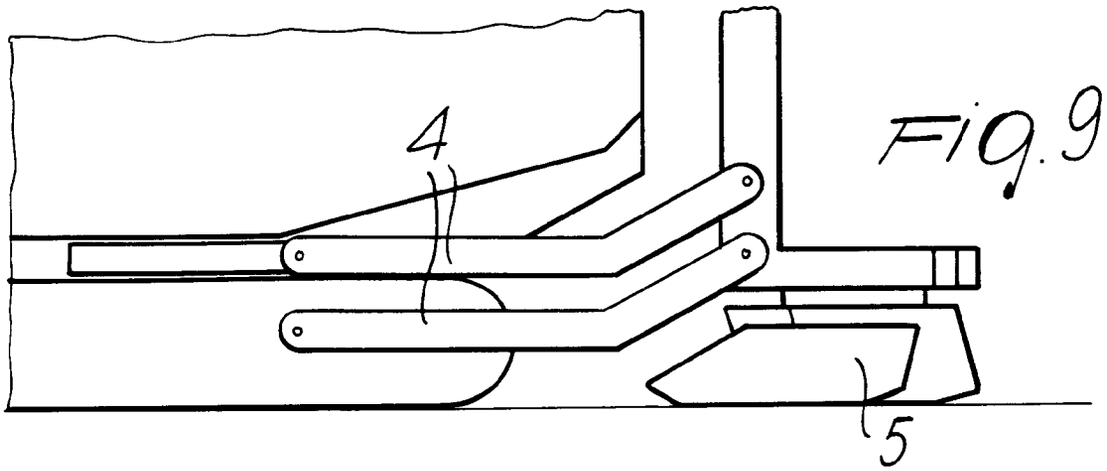

Fig. 9

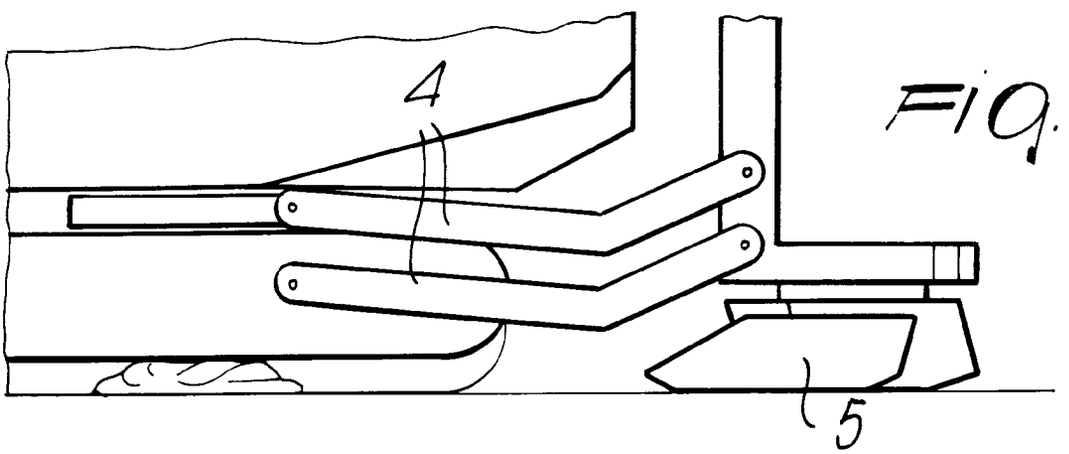

Fig. 10

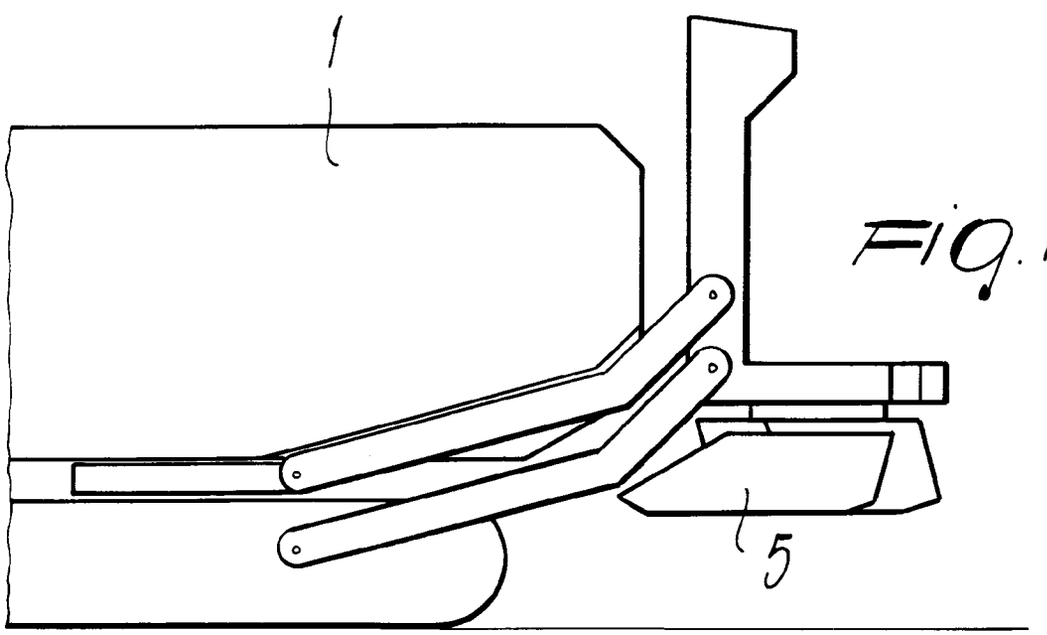

Fig. 11

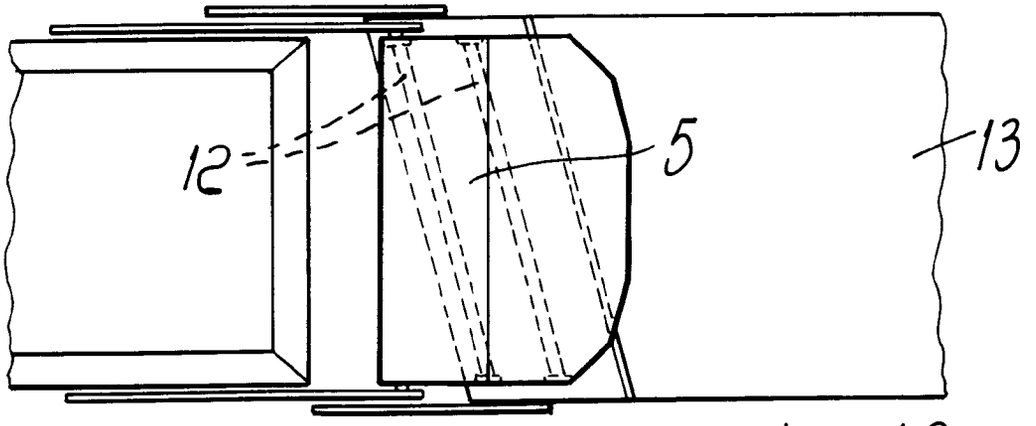

FIG. 12

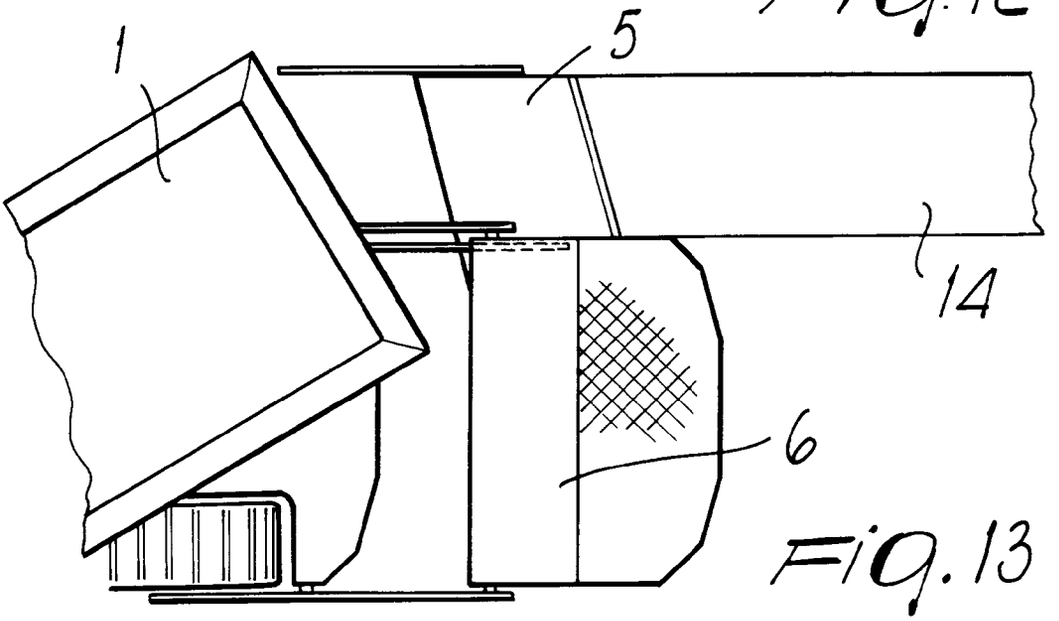

FIG. 13

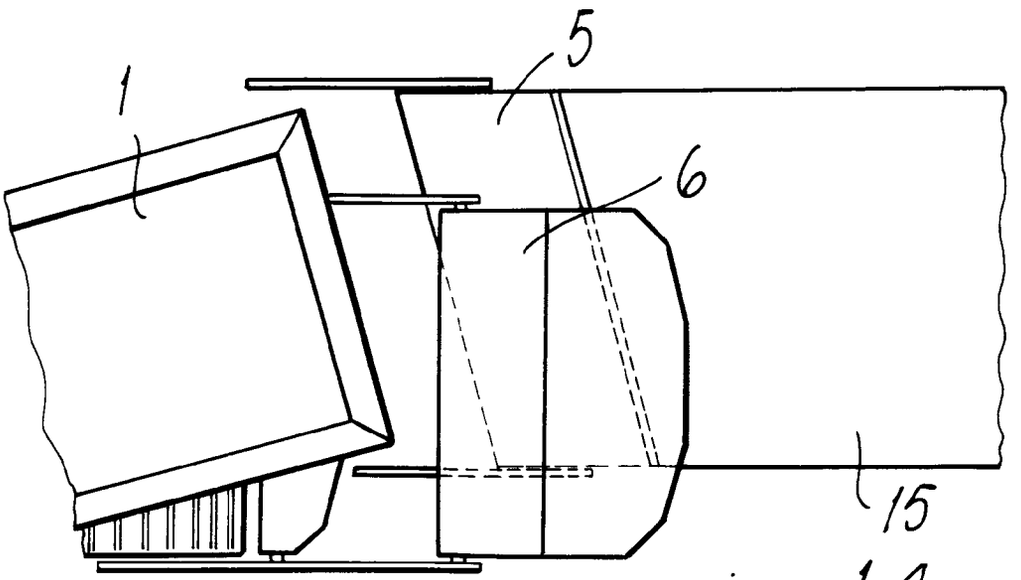

FIG. 14