Oct. 31, 1933. H. E. PRICE 1,932,601

ROAD MACHINE

Filed March 11, 1929 2 Sheets-Sheet 1

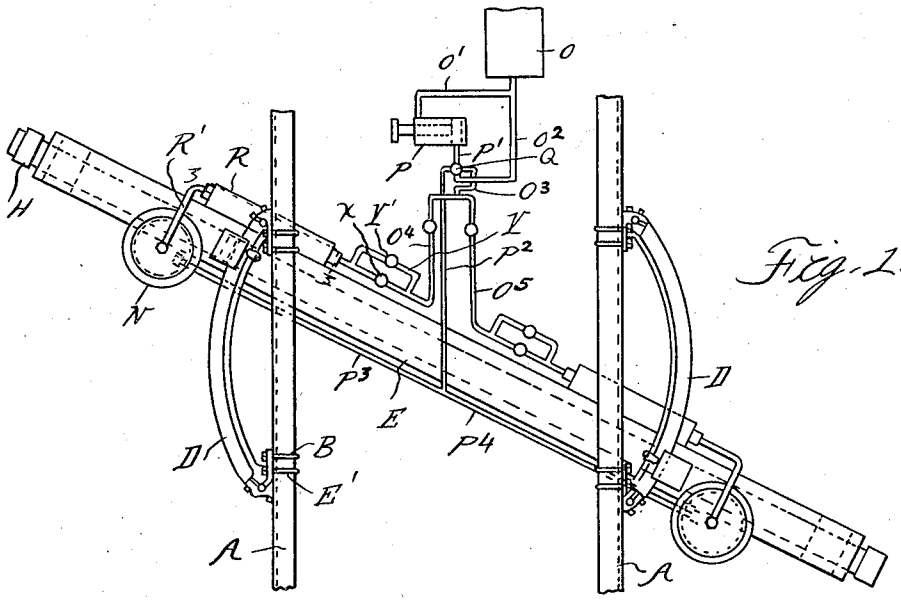


Fig. 1.

Fig. 2

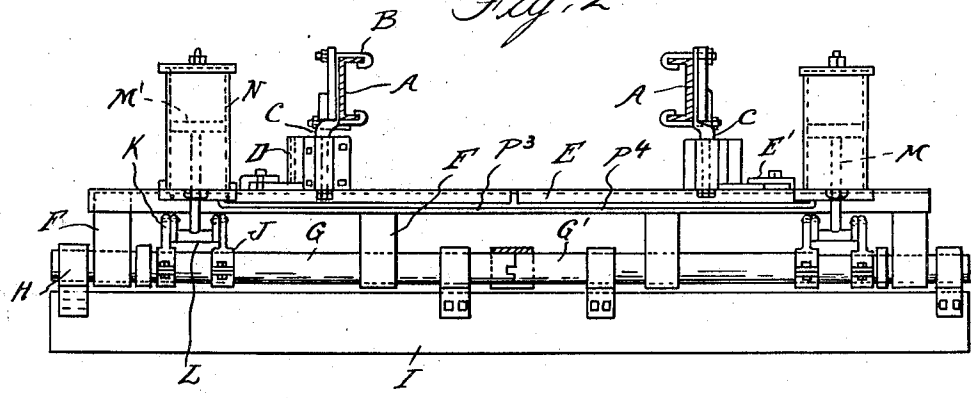
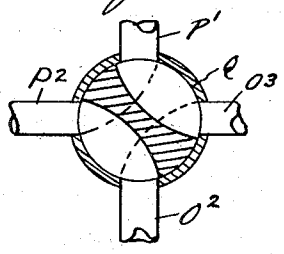


Fig. 1a



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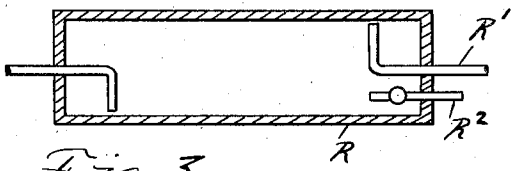


Fig. 3.

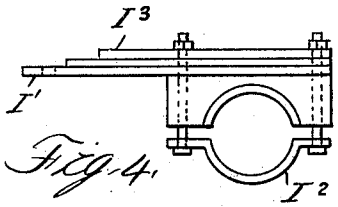


Fig. 4.

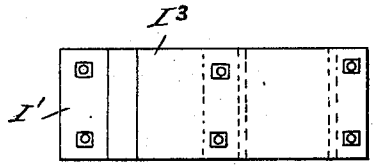
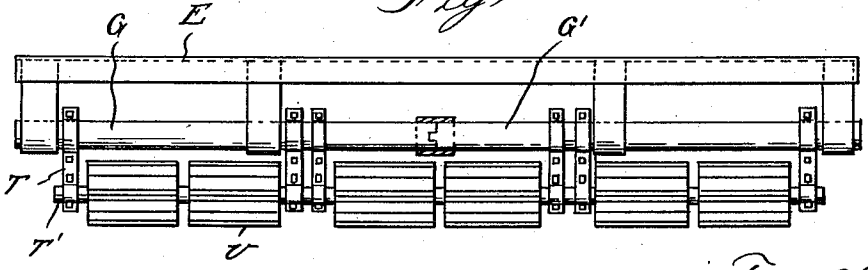


Fig. 5.



Fig. 6.

Fig. 7



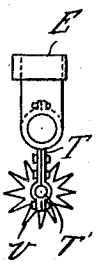


Fig. 7a

Fig. 8

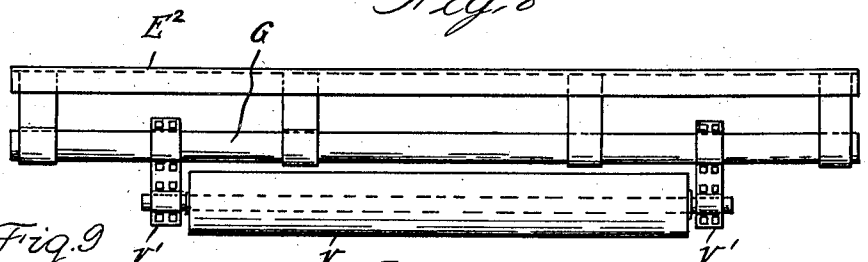


Fig. 9

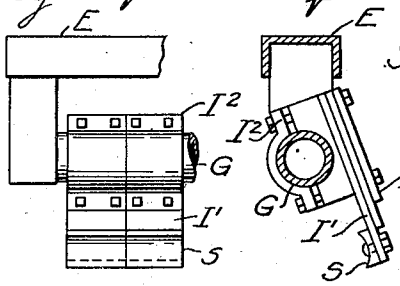


Fig. 10

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Patented Oct. 31, 1933 1,932,601

UNITED STATES PATENT OFFICE

1,932,601

ROAD MACHINE

Harvey Eugene Price, Cadillac, Mich., assignor to Pneu-Hydro Road Machinery Company, Cadillac, Mich., a corporation of Michigan

Application March 11, 1929. Serial No. 346,222

1 Claim. (Cl. 37—143)

The invention relates to road machines more particularly designed to be used for scraping and grading roads. It is the object of the present invention to obtain a construction which is adapted first to perform the usual functions of a scraper or grader, second, having the capacity for removing or roughening ice on roads or pavements to lessen danger of skidding, and third, to smooth or level patches in roads or pavements. With these objects in view, the invention consists in the various features of construction as hereinafter set forth.

In the drawings:

Figure 1 is a plan view of my improved machine illustrating diagrammatically the hydro-pneumatic operating mechanism;

Figure 1A is a section through the control valve of Figure 1;

Figure 2 is a cross section through the frame of a machine showing the scraper and its operating mechanism in elevation;

Figure 3 is a section on line 3—3 of Figure 1;

Figure 4 is a side elevation of one of the blade arms;

Figure 5 is a rear elevation thereof;

Figure 6 is an end elevation of an attachment member for imparting a curved surface to the scraper blade;

Figure 7 is a view similar to Figure 2 showing an attachment for removing or roughening ice;

Figure 7A is an end elevation thereof;

Figure 8 is a similar view showing an attachment for smoothing down or levelling patched pavements;

Figure 9 is a view similar to a portion of Figure 2 showing the modification illustrated in Figures 4, 5 and 6;

Figure 10 is a cross section thereof.

My improvements are adapted to be attached to a vehicle of any suitable construction and which is provided with longitudinally extending sill members A. To these sill members I attach preferably by hook bolts B vertically and downwardly extending posts C. D are segments provided at opposite ends with clamping bearings D for attachment of the same to the posts C, the arrangement being one which permits of vertical adjustment of said segments on said posts.

Where the machine is used as a road scraper I employ the construction illustrated in Figure 2 in which E is a cross beam adjustably secured to the segments D by means of clamps E'. This beam is preferably an inverted channel member and has secured thereto the depending bearing arms F forming journals for aligned rock shafts G and G'. The adjacent ends of these rock shafts are coupled but with a lost motion connection permitting of a limited independent rotative movement. The shafts G have attached thereto the depending arms H which in turn are attached to the scraper blade I.

To move the scraper blade I into or out of working position I provide means for rocking the shafts G and G' comprising the arms J secured to and projecting outward from said shaft and connected at their outer ends through links K to a cross-head L upon the rod M of a piston M' engaging a cylinder N. This cylinder is mounted upon the beam E and the arrangement is such that a movement of the piston in the cylinder will cause a rocking of the shafts G and G' which in turn will rock the arms H and scraper blade attached thereto. Movement of the pistons M' in the cylinders N is effected by hydro-pneumatic pressure developed as follows: O is a storage tank for a liquid such as oil and which is connected by a conduit O' with a pump P either manually or automatically operated. The discharge conduit P' on this pump is controlled by a valve Q which in one position of adjustment will couple the pump with a conduit P^2 having branches P^3 and P^4 leading respectively to the lower ends of the cylinders N beneath the pistons therein. In this same position of adjustment of the valve Q connection is established between a return conduit O^2 for the tank O and a conduit O^3 having branches O^4 and O^5 leading to tanks R on the beam E. The tanks R in turn are connected by conduits R' with the upper ends of the cylinders N above the pistons M'. The conduits O^4 and O^5 communicate with the bottom portions of the tanks R while the conduits R' communicate with the top of said tanks. This permits of having liquid in the lower portions of the tanks R and air in the upper portions thereof and without danger of forcing any of the liquid through the conduits R' into the upper ends of the cylinders.

With the arrangement just described, assuming that there is liquid such as oil in the tank O, when the pump P is operated either manually or by motor it will pump this oil through the conduits P', P^2, P^3 and P^4 into the lower portions of the cylinders N forcing the pistons N' upward and thereby lifting the scraper blade I out of engagement with the road. If on the other hand the valve Q is in the position shown in dotted lines liquid may be forced by the pump P into the bottom portions of the tanks R and by displacing air therefrom and forcing it into the upper ends of the cylinders placing a resilient downward pres-

sure on the pistons N'. This same adjustment of the valve Q will open communication between the conduit P^2 and the conduit O^2 so as to permit of displacement of the liquid in the cylinder below the piston so that the piston will be moved downward. This will force the scraper blade downward into working position but will permit it to yield if any obstacle is met which must be ridden over by the blade. Preferably the tanks R are initially filled with air at more than atmospheric pressure so that the pressure operating on the piston is not merely that which would be produced by the compression of air in the tanks R by the liquid entering said tank. The compressed air may be introduced into the tank through the fittings R^2 from any convenient air line and as no air is permitted to escape in the operation of the device it will remain in operative condition for a considerable period of time. With this arrangement it is not necessary that the pump P should be operated to force any liquid into the tanks R but only to force the liquid into the bottoms of the cylinders when it is desired to lift the scraper. Thus a resilient compressible medium is used for yieldably holding the blade in working position and an incompressible fluid is used for positively withdrawing the blade from working position. Also the fact that liquid is on one side of the piston produces an effective seal for said piston and prevents escape of air. To avoid danger of pumping too great pressure into the tank R, I preferably place pressure relief valves in the conduits O^4 and O^5. As shown, each of these conduits is provided with a check valve X and around this valve is a by pass Y in which is located the pressure relief valve Y'. This may be of any suitable construction adapted to open when the pressure exceeds a predetermined limit so as to permit return of the liquid to the tank O. Thus where the tank R is filled from an air line it may entirely displace the liquid.

For some conditions of road it is desirable to substitute for a continuous scraper blade such as shown at I in Figure 2 a blade formed of a series of comparatively short sections as illustrated in Figures 4 and 5. These blades I' may be secured to the rock shafts G and G' or to a single shaft in place thereof by means of clamps I^2. If desired, the blades I' may be reinforced by a plurality of progressively shorter leaves I^3 which permit of yielding with an ever increasing resistance. It is also sometimes desirable to substitute for a flat blade a curved or concave blade and this I accomplish by attachment blocks S which may be bolted or riveted to the end portion of the blades I'.

In winter roads and pavements frequently become encrusted with ice which renders the travel of vehicles thereover very dangerous. I have therefore provided an attachment for my road machine which will break up or roughen this ice coating to avoid or lessen the danger of skidding. Such a construction is shown in Figure 7 in which there is used a substitute beam E carrying substitute rock shafts G and G'. To these shafts are clamped rock arms T which at their outer ends are provided with journals for a shaft T'. On this shaft are mounted toothed or ribbed rolls U having sharpened ends for digging into the ice. Thus when the attachment shown in Figure 7 is substituted for the scraper attachment of Figure 2 the machine may be used for clearing the roads or pavements from ice as above described.

Another use of my machine is for smoothing down patches that have been placed in roads or pavements. Usually these patches are filled to a greater height than the surrounding surface and where a steam roller is not available for rolling them down, I can accomplish the same purpose by my machine. Thus as shown in Figure 8, a substitute beam E having a substitute shaft G is provided with a roller V which is journalled in rock arms V' clamped to said shafts. It will be understood that both the constructions shown in Figure 7 and Figure 8 are provided with the same hydro-pneumatic attachment which permits of raising and lowering the same in relation to the road or pavement and holds them in working position by resilient yieldable pressure. Thus my machine is capable of performing various functions in the maintenance of roads and pavements in good condition and avoids the necessity of having separate machines for each function.

What I claim as my invention is:

In a road machine a rock shaft, a scraper formed of a series of short flat blades individually clamped to said rock shaft and a block having a curved face attachable to said flat blades and presenting an acute angle cutting edge.

H. EUGENE PRICE.