This invention relates to an improved method of stripping surface layers from paved streets and the like, and to apparatus for practicing the same. More particularly, it provides a method and apparatus for stripping one or more paving layers from a street or road without disruption of the base or bed and at a speed greatly exceeding what has been possible according to prior methods and with heretofore available apparatus.

The re-surfacing of a paved street or road involves the removal of the old surface layer or layers whether it is of sheet paving material such as asphalt or bituminous macadam, or is a block pavement of which vitrified brick, wood block and granite block are examples. However, the base or bed on which the wearing surface layer or layers are supported ordinarily is in good condition and entirely suitable for receiving the new wearing surface provided the old wearing surface can be stripped away without disturbing the base or bed.

Heretofore, it has been customary to break up the surface layer which is to be removed by any of various power devices, after which the broken surface material is removed by any suitable means. It has not been practicable to employ power shovels for removing the broken surface. In fact it has been customary in road re-surfacing specifications to exclude the use of power shovels because experience has taught that their use necessarily disrupts and disturbs the base or bed. In consequence, the stripping away of a worn surface layer has been time consuming, expensive and laborious.

It is an object of my present invention to simplify the procedure of stripping the worn surface layer or layers from a paved street or road and to greatly speed up the conditioning of the base or bed for reception of the new paving surface. I provide an improved stripper boom which may be substituted for the usual dipper stick of the conventional power pull shovel, and which may be sensitively manipulated to strip a surface layer from its base in sizeable sheets without any preliminary breaking of the surface and without disturbing the base or bed. The stripper boom is relatively light in weight and is rake-like in design and in action, it having a series of prongs for taking a bite between the surface layer and the base or bed, after which the stripper boom is elevated to lift the surface layer in sizeable sheet form away from the base. Then a combined upward movement and movement toward the sheet increases the bite and the sheet ultimately breaks as the movement toward the sheet continues and finally topsles the sheet over upon the adjacent surface. If the sheet is in the way, it may be kicked by the heel of the stripper onto the stripped base or bed, to be removed to a truck or the like.

A feature is to provide a stripper means on the stripper boom which is relatively short from the tips of the prongs to its heel thereby to minimize any tendency for the heel to dig into the base during a stripping operation.

A further feature is to provide the stripper means with a clear space through which a stripped sheet may swing as it is lifted and swung preparatory to its ultimate topping over onto the adjacent surface.

It is, moreover, my purpose and object generally to improve upon prior methods and apparatus for stripping surface layers from paved streets and the like.

In the accompanying drawings:

Figure 1 is a more or less diagrammatic view in side elevation of a conventional power pull shovel rig having my stripper boom substituted therein for the regular shovel-carrying dipper stick;

Figure 2 is a fragmentary elevation of the stripper means, on a larger scale, shown taking a bite between an exposed edge of the surface layer to be stripped from the supporting base;

Figure 3 is a view similar to Figure 2 but showing the stripper means after it has been initially elevated and showing the engaged edge of the surface layer pulled away from the base;

Figures 4 and 5 are views similar to Figures 2 and 3 but showing the stripper means in successively later positions during its travel for stripping a sheet section from the base;

Figure 6 is a view similar to Figures 2–5 showing the stripper means beyond the folded over sheet section in position to kick the sheet section onto the base or sub-grade;

Figure 7 is a plan view of the stripper means, with the stripper boom shown in cross-section;

and Figures 8, 9 and 10 are fragmentary views of the stripper means of Figure 7, showing it respectively in side, rear and front elevations.

Referring to the drawings, a conventional power pull shovel rig is represented diagrammatically in Fig. 1 equipped with my improved stripper boom 10 in place of the usual dipper stick which ordinarily carries the relatively large and heavy
shovel. The rig as shown comprises a caterpillar type of vehicle 12 on which is mounted the operator's cabin 14 from which the main boom 16 and the stripper boom 10 may be controlled and manipulated by means of the control cables 18 and 20. The cabin 14 is suitably mounted in the usual manner so that it and the booms 16 and 10 may be elevated on the vehicle 12.

My improved stripper boom 10 will be generally the same for any of the various makes of power pull shovel rigs. However, since each make of pull shovel has specific features different from others, including differences in the manner of attachment and control of its dipper stick, my stripper boom 10 for any particular make of power pull shovel rig will be designed with the specific attachment and control connections adapting it for taking the place of a particular make of dipper stick. Hence, in Fig. 1, the stripper boom 10 is designed for embodiment in one commercial make of power pull shovel rig in which the stripper boom 10 is pivotally mounted at 22 at the outer end of the main boom 16 and projects above boom 18. A yoke 24 is pivotally provided at 26 at the upper end of stripper boom 10, the yoke having a sheave 28 rotatable therein at its end toward the cabin 14. Another sheave 30 is mounted at the upper end of an upright 32 rigid on the cabin platform, and the control cable 18 has one end secured at 34 to yoke 24 and extending around sheave 30, thence back to and around sheave 28 and back again to sheave 30 whence it goes to a suitable winding drum or winch in the control cabin. The other control cable 20 has its end connected at 36 to the stripper boom 10 toward the free end of that boom and extends thence over sheave 33 to a winding drum or winch indicated generally at 40.

The operator, by drawing in or letting out on the respective cables 18, 20 can control the position of the booms 16 and 10.

The stripper boom 10 preferably comprises a rectangular core of wood 42 which is substantially encased by the two channel irons 44, with suitable bolts securing the core and channel irons together. At the free end of the stripper boom 10, I provide a strong and durable but relatively light-weight stripper means which in general is rake-like in structure. As herein illustrated, it comprises a rectangular plate 46 rigidly secured to the free end of stripper boom 10 as by the angle irons 48 on opposite sides of the boom 10, and the bracing ribs 50, acting through plate 52 on that side of the boom 10 which is toward the teeth or prongs 54.

While I show three teeth or prongs 54, only two may suffice for some work, and more than three may be desirable under particular conditions. In the drawings, the teeth 54 have suitable ears 56 by which they may be bolted, as at 55, to the under side of plate 46, projecting a substantial distance beyond the plate in spaced parallelism with each other. The end of each tooth 54 preferably is bevelled on its upper side as at 50, and the end of each, on the under side, may have a slight bevel as at 52.

It will be observed that the plate 46 has little or no projection beyond the stripper boom on that side of the boom opposite the side where teeth 54 project, and this region of non-projection of the plate 46 conveniently may be termed the "heel" of the boom 10. Also, the under sides of the teeth 54 are in a lower plane than the under side of plate 46 which, in conjunction with the heel location facilitates manipulation of the stripper boom without the heel digging into the base or sub-grade from which the surface layer has been stripped.

It is an important feature of the invention that the stripper foot, comprising plate 45 and prongs or teeth 54 with their appurtenances, is relatively light in weight so that the operator can handle them with a sensitive control and feel the manipulations thereof, in contrast to the degree of control the operator has over the usual extremely heavy shovel on the end of the usual dipper stick. It is essential, according to my present invention, that the stripper means be always in each instance under the operator's control so that the stripping may be accomplished without disturbing the sub-grade or base.

Referring to Fig. 3, the sub-grade or base is indicated at 64 and the surface layer to be stripped is represented at 66, although it should be understood that the surface to be removed may consist of a plurality of paving layers, or may be a block pavement, in which latter case the blocks will be stripped off in sizeable sheets of blocks. Preferably an edge of the layer to be stripped will be exposed by any suitable means so that the stripper prongs or teeth 54 may be directed by the operator into a bite between the exposed edge and the sub-grade or base 64. After a suitable bite is effected, the operator elevates the stripper boom 10 approximately in a vertical direction, as in Fig. 3, which causes the engaged edge of layer 65 to be lifted away from the base. The operator then pulls the stripper boom toward him while continuing to elevate it, as suggested in Fig. 4, thereby to increase the bite of teeth 65 under the lifted sheet section and to initiate a folding of the lifted sheet along a transverse fold line at 70 in Fig. 3, where the sheet will start to break. Continued movement of the stripper toward the operator and also upward, swings the sheet section, now broken at fold line 70, substantially as represented in Fig. 5, after which further movement toward the operator causes the sheet section to topple over upon the adjacent paved surface, as in Fig. 6. If the section is in the way, it may be kicked by the heel of the stripper, moved in the direction of the arrow in Fig. 6, over onto the already stripped sub-grade 64.

It is important to note that the vehicle 12 stands on the paved street and the surface stripping is toward the vehicle which backs along the paved street as the stripping proceeds, so that the stripped sub-grade can be undisturbed. The sizeable sheet sections thus quickly and efficiently stripped free of the base can be broken into smaller pieces, if desired, by the heel of the stripper, and the sections removed in any convenient manner.

Because no preliminary breaking of the surface is required, and because the surface strips away from the subgrade in relatively large sheet sections, my invention enables the stripping of a given area of paved surface in a fraction of the time heretofore required and with less disturbance of the sub-grade or base than has been customary with prior methods and apparatus.

I claim:

1. In a paving stripper rig, a stripper boom having rigidly secured to its lower end a stripper plate having area several times greater than the cross-sectional area of the stripper boom and disposed flatwise directly against the end of the boom appproximately in right angular relation to the axis of said boom, said plate having relatively large
projection outward from the boom on three sides including the side toward said rig and there being spaced projections on the plate at its edge which is toward said rig, whereby said projections and plate can engage deeply under a section of pavement which is to be stripped from a road bed, and a said section of pavement lifted by said plate can have relatively large integral lateral extent at opposite sides of the plate.

2. In a paving stripper rig, a stripper boom having rigidly secured to its lower end a lightweight stripper means comprising a plate disposed flatwise of and approximately in the plane of the end of said boom and with the end of the boom entirely within the confines of the plate, generally plane stripper elements disposed in spaced parallelism on and projecting from the plate in generally right angular relation to the axis of said boom, said stripper elements having plane upper and lower surfaces and having their free ends projecting outward beyond said boom a distance at least twice the cross-sectional dimension of the boom in the corresponding direction, and distributed laterally through a distance at least three times the cross-sectional dimension of the boom in the corresponding direction.

3. In a paving stripper rig, a stripper boom having rigidly secured to its lower end a lightweight stripper means comprising a stiff relatively light plate having area several times the cross-sectional area of the boom and disposed generally in right angular relation to the axis of the boom and projecting appreciably beyond the boom at only three sides, and stripper elements projecting beyond said plate in parallelism with the plane of the plate on that side which is toward the rig, the free ends of said elements being outward beyond the boom a distance at least twice the cross-sectional dimension of the boom in the corresponding direction.

4. In a paving stripper rig, a stripper boom having rigidly secured to its lower end a lightweight stripper means comprising a plane plate having area several times greater than the cross-sectional area of the boom and disposed approximately in the plane of the end of the boom and approximately in right angular relation to the axis of the boom, said plate having relatively large projection outward from the boom on three sides including the side toward the said rig, and being free from appreciable projection on the side remote from the rig, there being spaced projections on the plate at its edge which is toward the rig, and a broad vertically and laterally extending element at said remote side of said plate constituting a pusher and, in conjunction with the adjacent edge of the plate constituting a heel for breaking stripped sections of pavement and kicking sections and fragments to clear the way for a fresh stripping bite of the plate.

5. A paving stripper for paved streets and the like comprising a vehicle having a main boom pivotally mounted thereon for movement about its pivot in a vertical plane, a stripper boom pivotally mounted on the main boom and swingable in a vertical plane, said stripper boom having directly secured thereon at its lower end a plate exceeding in area by several times the cross-sectional area of the stripper boom and rigidly fixed in approximately right angular relation to the axis of the stripper boom, said plate being positioned with relatively large projecting extent at three sides of the stripper boom including the side which is toward the vehicle, and having a plurality of spaced stripper elements projecting a substantial distance outward from said plate on the said side which is toward the vehicle.

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