Jan. 19, 1932. F. GETTELMAN 1,841,802

PICKING AND TAMPING DEVICE

Filed Nov. 22, 1929 3 Sheets-Sheet 1

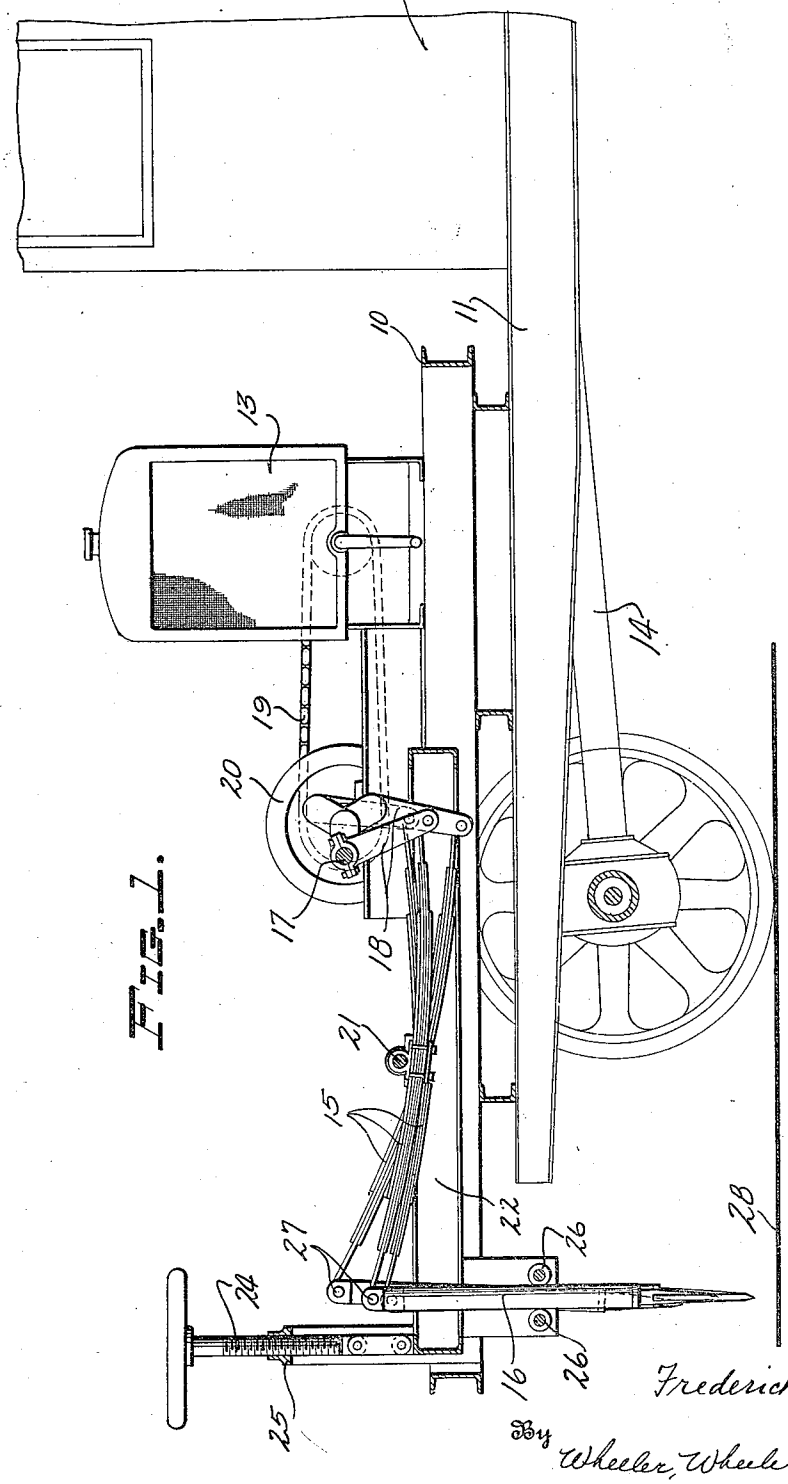

Fig. 1.

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Filed Nov. 22, 1929 3 Sheets-Sheet 2

Fig. 2.

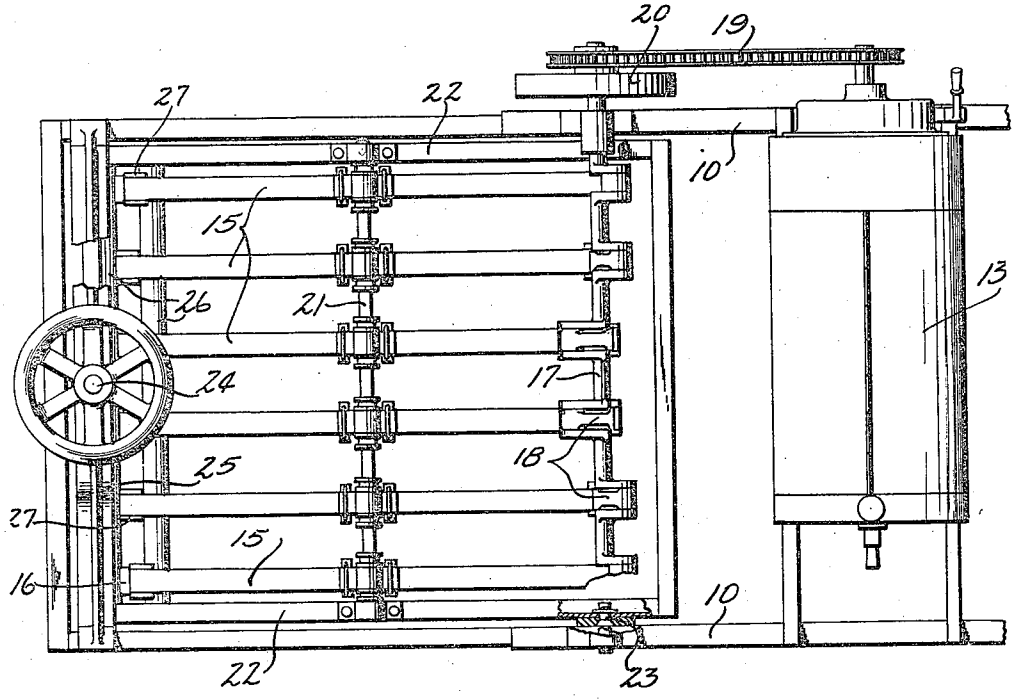
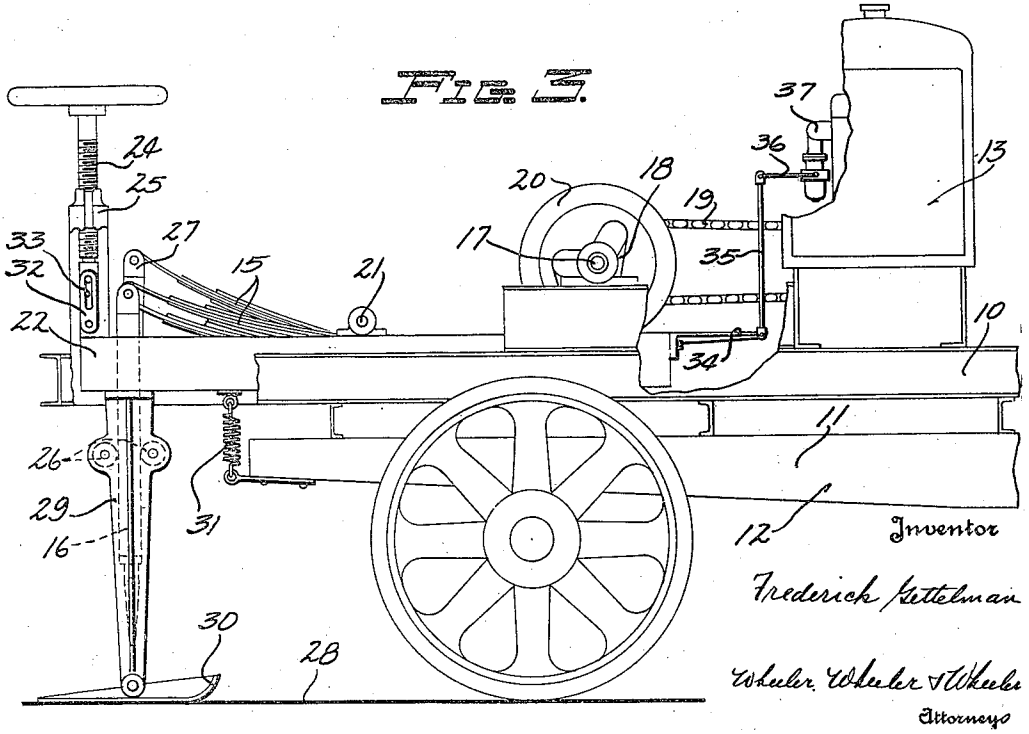


Fig. 3.



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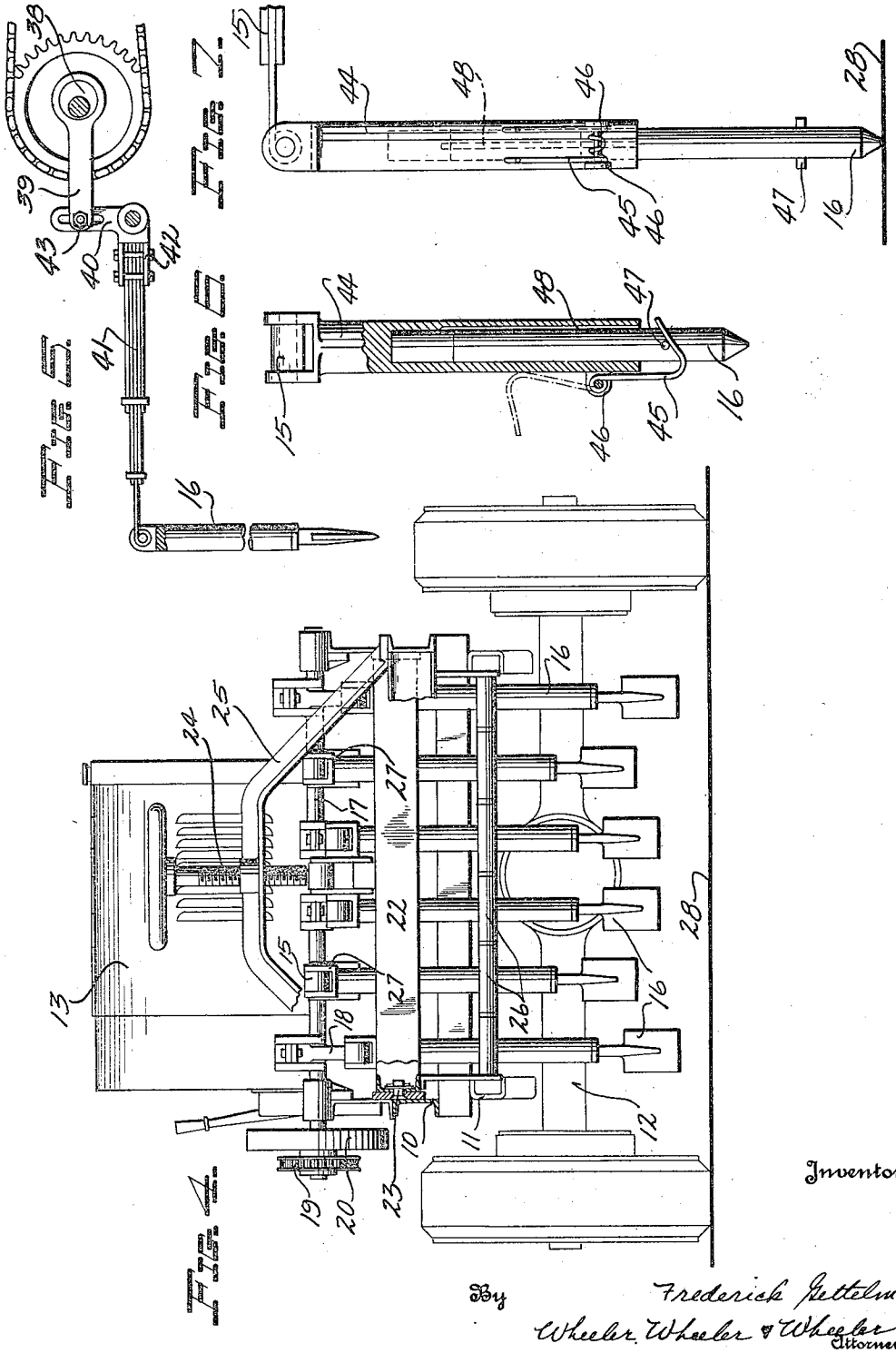

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UNITED STATES PATENT OFFICE

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PICKING AND TAMPING DEVICE

Application filed November 22, 1929. Serial No. 408,949.

My invention relates to improvements in picking and tamping devices.

The objects of my invention are; to provide a mechanically operated picking or tamping device; to provide a resiliently mounted picking or tamping tool so coupled to a motive power that an automatic tamping or picking operation can be efficiently accomplished and to couple a motive power to a resiliently mounted tool so that the maximum efficiency of the resilient mounting for the tool may be attained and utilized. In carrying out these objects it is more particularly my object to provide a picking or tamping tool mounted upon a resilient support and to impart motion to such resilient support at varying speeds subject to the control of an operator so that the vibration period of the tool and its resilient support or mounting may be used to the greatest advantage and may be controlled so as to strike with maximum force or with extreme delicacy.

Another object of my invention is to so mount a device of this kind as to make it useful for railroad ballast tamping, ice picking or road breaking alternatively and subject to adjustments which will permit the most efficient operation of the actual working tool.

A further object of my invention is to provide a tool for the purpose described which will be automatically self-cleaning.

In the drawings:

Figure 1 is a vertical section through a portion of my device, showing its adjustable mounting upon a motor truck.

Figure 2 is a plan view of the rearward portion of the structure shown in Figure 1.

Figure 3 is a side elevation of the structure shown in Figure 1 and showing in addition a special mounting and adjustable foot in conjunction with an automatic speed control.

Figure 4 is a rear elevation of a motor truck equipped with my improved device provided with tamping tools.

Figure 5 is a detail view of an alternative structure for supporting and operating my tamping tool.

Figure 6 is a detail view of a chisel holder, part of the holder being shown in vertical section.

Figure 7 is a side elevation of the tool shown in Figure 6 with the chisel in extended position for operation.

Like parts are identified by the same reference characters throughout the several views.

My tamping or picking device is mounted upon a frame 10 which is supported in turn by and in hinged relation to the regular main frame 11 of a truck 12, and, as indicated in the drawings, I prefer to operate my tamping device by means of motive power comprising a motor 13 supported by the frame 10, although power may obviously be derived from an external source or from a drive shaft 14 of the motor truck 12 as may be found most convenient.

Fundamentally my improved picking and tamping device includes a spring 15 or other resilient support to which at one point is secured a picking or tamping tool 16 which will vibrate or oscillate under the direction and impulse of the spring 15 which is primarily motivated by means such as the crank 17 and the link 18, which in turn are motivated by a chain or belt 19 from the motor 13 under the steadying control of a balance wheel 20.

It will be noted that the motor 13 and the crank shaft 17 are secured to the frame 10, that the springs 15 are supported upon a shaft 21 secured to an adjustable frame 22, which is hingedly supported at 23 as best shown in Figure 2 and provided with means comprising a virtual screw jack 24 carried by a bridge member 25 at the rear of the frame 10, the hinge support 23 being in a vertical plane substantially identical with that of the crank shaft 17 which actuates the springs. The tool 16 is guided in part in its oscillation by rollers 26 and hinge 27 but the shackle at the rear of the spring guides as well as motivates the tool.

Broadly speaking therefore, it will be seen from the above description that the crank shaft 17 actuated by the motor 13 causes the springs 15 to oscillate rapidly, thereby imparting an oscillatory movement to the picking or tamping tool 16, the relation of the

tool to the surface to be worked being adjusted to or from a surface 28 by means of the screw jack 24 which will lower or raise the rear portion of the adjustable frame 22.

Attention is now directed to the disclosure as set forth most clearly in Figure 3, of an automatic device for controlling the force and extent of the blows to be struck by the the tool 16, need for such control being most clearly illustrated by the problem confronting the operator of my device over an icy surface which is to be chipped and removed; for instance, over a roadway or sidewalk.

In this construction the frame 22 is supported at its rearward portion by a strut 29 which is provided at its lower extremity with a shoe 30 adapted to slide upon the material over which the truck 12 is traversing. A contractile spring 31 extending between the frame 22 and the truck frame 11 assists in holding the adjustable frame 22 downward despite the vibration and reactionary thrust of the working tool 16.

In this form of my device a link 32 between the screw jack 24 and the adjustable frame 22 is provided with a slot 33 which will permit of automatic adjustment within limits under the control of the shoe 30 with the result that as the truck 12 progresses over an uneven surface to be picked or tamped, the shoe 30 will force the strut upwardly and raise the rearward portion of the frame 22, thus withdrawing the tools 16 from the surface upon which they are working, or placing the tools in working position upon material of increased thickness which must be picked or tamped.

Such a change of conditions under which the tool 16 must work is compensated for by means of linkage including a bracket 34, a rod 35, and a throttle control 36 for the intake manifold 37 of the motor 13, the linkage 34, 35, and 36 being so constructed that as the shoe 30 raises the rearward portion of the frame 22, the throttle of the motor 13 will be opened thereby increasing the speed of the motor, the speed of the crank shaft 17, and the speed of operation of the springs 15 and the tool 16, thereby imparting heavier blows with increased oscillatory displacement of the tools.

One of the most important advantages to be gained by the construction shown in my drawings, is the versatility and range of movement and the ease of control inherent therein. In the construction shown in Figure 1, the links 18 are non-adjustable as to length and it will be apparent therefore, that there is provided only one path and extent of oscillation of the spring 15 between the shaft 21 and the point at the forward end of the spring 15 where the link 18 is pivotally secured thereto. The range of movement, however, of the tool 16 is dependent entirely upon the resiliency of the rearward extension of the spring 15, the weight of the tool, and the speed of operation at which my device is driven. It is well known that resiliently supported articles have periods of vibration analogous to the periods of vibration of a tuning fork, including the overtones, and I have found that by changing the speed of the motor 13 it is possible to cause the tool 16 to oscillate so slightly as to impinge delicately upon the surface 28 or to strike increasingly powerful blows up to a point where the rearward portion of the spring 15 would cause the tool 16 to have an extreme oscillatory movement of sixteen inches in a device provided with a spring 48 inches long.

Adjustment, therefore, of my picking and tamping device includes selection of materials and parts whereby to provide within the easy range of operation of a motor 13 a period of vibration of the springs 15 and the tool 16 to accomplish the range of strength and sharpness of impact desired in the operation of my device.

In Figure 5 I have disclosed an alternative structure for the resilient mounting of a tool where adjustment is found to be necessary in addition to the adjustments described above. In order to provide a range of oscillation for the tool 16 without overtaxing the motor 13, this construction includes the use of an eccentric 38 upon which an arm 39 adjustably secured to a bell crank 40 provides means for oscillating a spring 41 clampingly engaged at 42 by the bell crank 40. It is possible by means of this construction to foreshorten the device for the purpose described, and also to provide by means of an adjustment 43 a complete range of operation and oscillation of the spring 41 without materially changing the speed of the motor.

In Figures 6 and 7, I have shown in detail a special tool holder 44 which comprises a cylindrical socketed member to be secured at the rearward end of a spring 15 or 41. The tool, comprising a pick or chisel 16, is loosely receivable in the socketed member 44 so that the tool as shown in Figure 7 will normally be supported by the surface to be picked or tamped, and the oscillation of the member 44 by the spring 15 is relied upon to deliver hammer blows to the tool as the tool reaches the upper or inner end of the socket. A clip 45 pivotally secured to a boss 46 adjacent the extended end of the socket member 44 may be used to engage a pin 47 to hold the tool in inoperative position. At one side of the socket in the member 44 I provided a bypass 48. It will be apparent upon examination of the construction shown in Figures 6 and 7, that as the tool 16 passes into and partially out of the socket a compression of air in the head of the socket is unavoidable and might possibly be a serious interference with

the operation of my tool. The provision of the by-pass 48, however, permits the escape of the compressed air from the socket downward along the tool with the result that the dust and débris chipped by the tool 16 will be blown from the surface 28 upon which the tool is working and will assist greatly in permitting the operator of the machine to ascertain accurately the type and extent of work accomplished by my device.

In operation my device will be found to be easily adaptable to the various picking and tamping operations where hand operated tools are now used, for the frame 10 may be transported upon any convenient means of transportation directly over the surface to be worked, and the automatic means for controlling speed of operation as shown in Figure 3 or a hand control throttle, may be used to cause my device to exert the hardest of hammer blows, or the most delicate chisel blows to be delivered, for instance, where ice upon a road surface is desired to be chipped without damage to the roadway, experience with my device having shown that the downward extent of the blows to be struck by my tools may be controlled within the smallest fraction of an inch.

I claim:

1. In a picking and tamping device, the combination with a movable supporting member, of a spring mounted upon the supporting member and extending in either direction therefrom, a tool secured to the spring at a point spaced from the support means opposite the tool for vibrating the spring to impart movement to the tool, and control means operable by said support for controlling the first mentioned means.

2. In a picking and tamping device, the combination with a movable support, of a spring secured to the support and having spring arms extending in either direction therefrom, a tool mounted upon one arm of the spring at a point spaced from the support a motivating connection to an arm of the spring to give a back and forth motion to the spring and to the tool, and control means operable by said support for controlling said connection.

3. In a picking and tamping device, the combination with a movable support, of a resilient member mounted upon the support and extending in either direction therefrom, a tool carried by the resilient member and spaced from the support, a motivating connection applied to the resilient member opposite the tool with reference to the support, and control means operable by said support for controlling said connection.

4. In a picking and tamping device, the combination with a movable support, of a resilient member mounted upon the support and extending in either direction therefrom, a tool carried by the resilient member and spaced from the support, a motivating connection applied to the resilient member opposite the tool with reference to the support, said motivating connection being secured to power means for controllably imparting variable speed movement to the resilient member, and control means operable by said support for controlling said connection.

5. In a picking and tamping device, the combination with a tool mounted directly upon a resilient member for movement at varying speeds between a plurality of periods of vibration, of motive power connections for causing vibration of the tool with its resilient mounting, and controlling means automatically changeable with change in said vibration for altering the synchronism between the operation of the tool said periods of vibration.

6. In a picking and tamping device, the combination with a tool, of a movable supporting element for the tool including resilient means, a power unit for moving the operating element synchronously with the vibration period of said tool and said operating element, and control means for the power unit operable by said element.

7. In a picking and tamping device, the combination with a resiliently mounted tool for operation vertically relative to a surface to be worked through substance covering said surface, of a support for the tool adjustable vertically relative to said surface and adapted to ride upon said substance, motivating connections to the tool for alternatively driving the tool at faster and slower speeds, and control connections between the support and the motivating connections whereby to change the speed of the tool in accordance with the displacement of the support.

8. In a picking and tamping device, the combination with a tool for operation vertically relative to a surface to be worked through material covering said surface, of a support for the tool adjustable vertically relative to said surface and adapted to ride upon said substance, a resilient member interposed between the tool and said support, and a motivating connection for the resilient member, said motivating connection being controllable for varying the rapidity of movement of the resilient member in proportion to the displacement of the supporting member.

9. In a picking and tamping device, the combination with a main frame, of an auxiliary frame mounted on and for relative movement with respect to the main frame, supporting members for the main frame adapted to permit movement of the main frame over a surface to be worked, a shoe for supporting the auxiliary frame upon material covering the surface to be worked, and a tool mounted upon the auxiliary frame for movement proportionate to the displace-

ment between the main frame and the auxiliary frame.

10. In a picking and tamping device, the combination with a main frame, of an auxiliary frame mounted on and for relative movement with respect to the main frame, supporting members for the main frame adapted to permit movement of the main frame over a surface to be worked, a shoe for supporting the auxiliary frame upon material covering the surface to be worked, and a tool resiliently supported by the auxiliary frame for oscillatory movement vertically relative to the surface to be worked in a range of oscillation proportionate to the displacement of the auxiliary frame from the main frame.

11. In a picking and tamping device, the combination with a main frame mounted to traverse a surface to be worked, an auxiliary frame mounted on and for relative movement with respect to the main frame and provided with a supporting shoe adapted to ride upon material covering the surface to be worked and to move the auxiliary frame with reference to the main frame in proportion to the thickness of material covering the surface to be worked, a tool resiliently mounted upon the auxiliary frame, power means for imparting vibration to the resiliently mounted tool, and a link interconnected between the main frame and the auxiliary frame and said power means whereby to control the speed of the power means in proportion to the displacement of the auxiliary frame with respect to the main frame.

12. In a picking and tamping device, the combination with a supporting frame, of an auxiliary frame pivotally supported at one end by said supporting frame, adjustable means for supporting the other end of said auxiliary frame in any one of a plurality of positions relative to the supporting frame, a spring pivotally mounted intermediate its ends on said auxiliary frame, a tool carried by one end of said spring, and power means carried by the supporting frame and connected with the other end of said spring.

13. In a picking and tamping device, the combination with a supporting frame, of an auxiliary frame pivotally supported at one end by said supporting frame, adjustable means for supporting the other end of said auxiliary frame in any one of a plurality of positions relative to the supporting frame, a spring pivotally mounted intermediate its ends on said auxiliary frame, a tool carried by one end of said spring, power means carried by the supporting frame and connected with the other end of said spring, and control means connected with the auxiliary frame and power means, whereby variable speed of said power means may be secured relative to the position of said auxiliary frame.

14. In a picking and tamping device, the combination with a supporting frame, of an auxiliary support mounted on said frame for movement relative thereto, a tool resiliently supported by said auxiliary support, power means for moving said tool, and control means connected with said auxiliary support and said power means for varying the speed of said power means in relation to the movement of said auxiliary support.

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