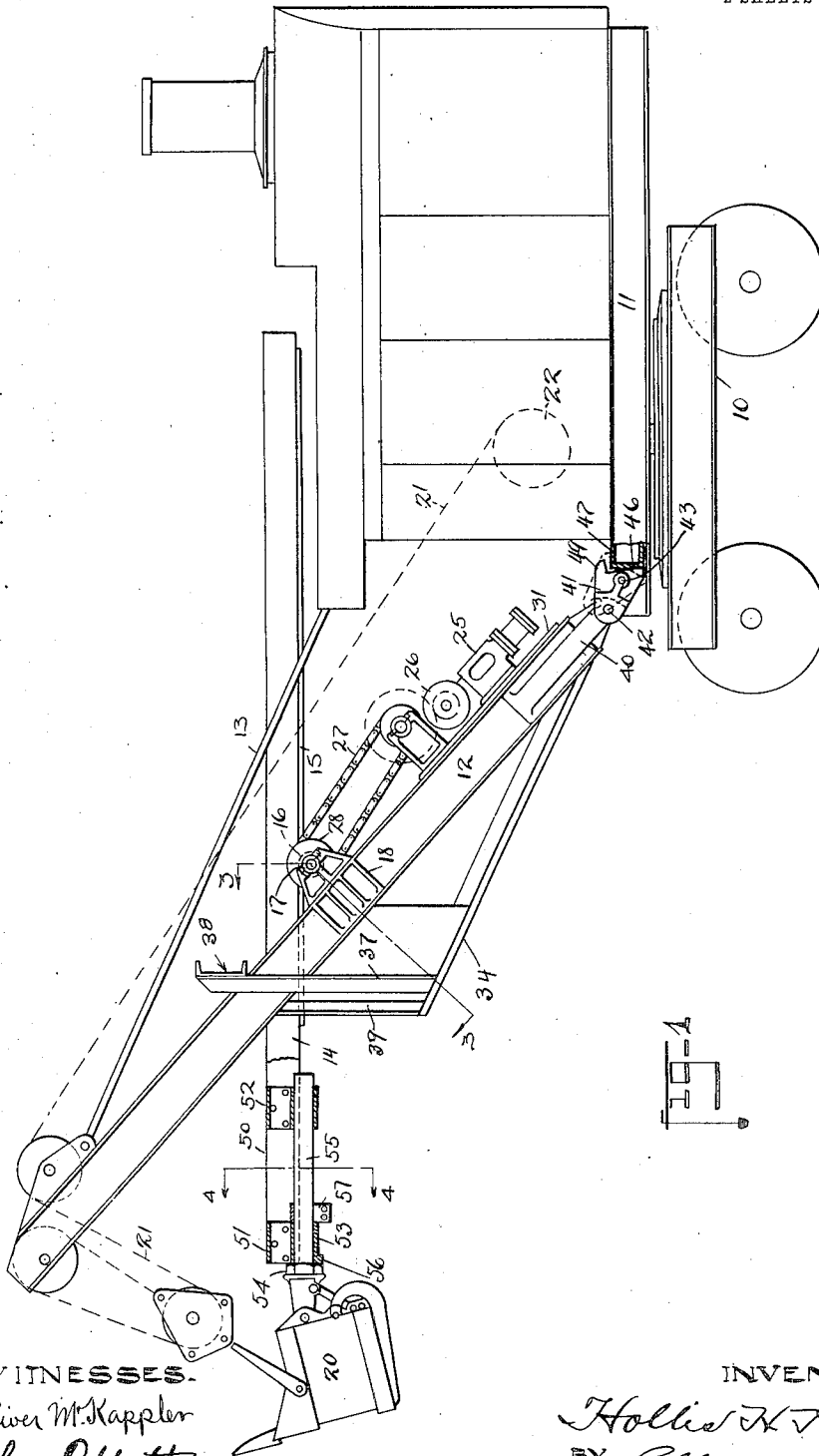


H. H. HARRIS.
EXCAVATING MECHANISM.
APPLICATION FILED FEB. 16, 1912.

1,126,203.

Patented Jan. 26, 1915.

2 SHEETS—SHEET 1.



WITNESSES.
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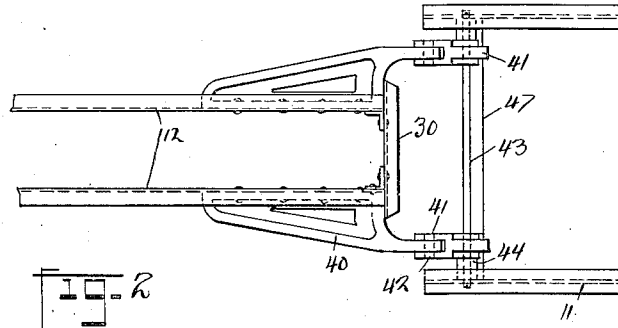
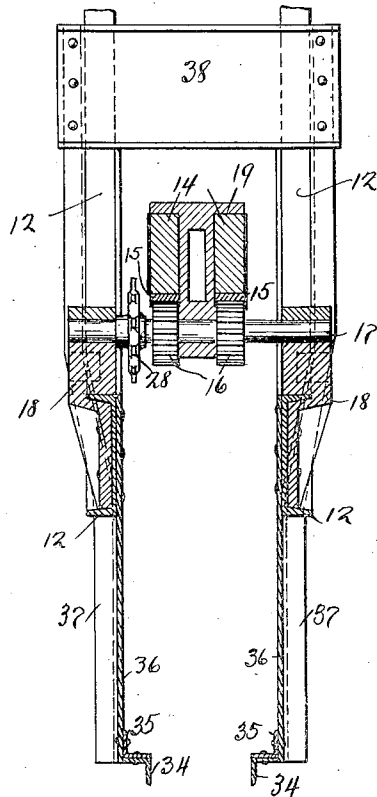
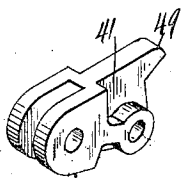
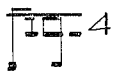
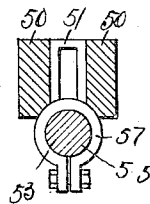


FIG. 5



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EXCAVATING MECHANISM.

1,126,203.

Specification of Letters Patent.

Patented Jan. 26, 1915.

Application filed February 16, 1912. Serial No. 678,052.

To all whom it may concern:

Be it known that I. HOLLIS H. HARRIS, a citizen of the United States, residing at Lorain, in the county of Lorain and State of Ohio, have invented a certain new and useful Improvement in Excavating Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to excavators, steam shovels, dredges and the like, wherein there is a scoop or bucket operated by a swinging arm or handle.

The primary object of the invention is to relieve the mechanism from shock in case the bucket strikes an obstruction.

Another object is to enable the bucket to automatically adjust itself for the most effective digging.

The invention is particularly well adapted for that class of excavators where there is a swiveled platform carrying a boom on which the dipper handle is supported and operated. In such embodiment I accomplish the desired relief from shock and the automatic adjustment of the dipper by means of a yielding connection between the boom and platform enabling it to tip when the bucket, in the lateral swinging of the boom, strikes an obstruction, and by swiveling the bucket on the handle so that it may adjust itself to the obstruction. This automatic adjustment of the bucket also produces more effective digging.

In the drawings, which illustrate my invention embodied in a machine having a swiveled platform and boom, Figure 1 is a side elevation, partly in section, of such structure; Fig. 2 is a fragmentary plan showing the support of the boom by the platform; Fig. 3 is an enlarged cross section through the boom and dipper stick substantially on the line 3—3 of Fig. 1; Fig. 4 is a transverse section across the dipper stick and shank of the bucket swivel, as indicated by the line 4—4 of Fig. 1; and Fig. 5 is a perspective view of one of the blocks by which the boom is supported at its rear end.

As shown in Fig. 1, 10 indicates a suitable wheeled truck carrying a turn table on which is mounted a platform 11. Carried at the forward end of the platform, in a manner hereinafter to be described, is the lower end of the diagonal boom 12. The

upper end of this boom is connected by a tie rod 13 to the rear portion of the platform. The boom has a central longitudinal opening in which swings the dipper stick 14. This stick is shown as having a rack 15 meshing with a pinion 16 on a shaft 17 carried in bearings 18 mounted on the boom. As shown in Fig. 2, the dipper handle 14 is made by two members or bars spaced apart, and the rack and pinion 15 and 16 are correspondingly separated into two members. The handle is held in place by the T-shaped yoke 19 which overhangs the upper side of the bars 14 and passes through the space between them and surrounds the shaft 17.

Carried by the dipper stick, in a manner to be hereinafter described, is the dipper 20. A suitable cable 21 connected with this dipper leads over suitable pulleys to winding mechanism 22 carried by the platform 11. Suitable means are employed for rotating the pinion 16, that shown being an engine 25 on the boom geared by means of gears 26 and a sprocket chain 27 with a sprocket wheel 28 on the shaft 17. The drawing shows the two main members of the boom as consisting of outwardly facing channel beams. These beams are suitably connected at their upper ends, by means not shown, and at their lower ends by a cross bar 30, Fig. 2. They are also connected by a cross plate 31, Fig. 1, on which the engine is mounted. It is to be understood that the parts so far described may be of any suitable or usual construction.

In my invention, embodied in the type of machine just described, there is a suitable guide for the swinging dipper stick carried by the boom to receive the lateral strain thereof. As shown, this consists of the angle bars 34 supported by other angle bars 35 secured at their lower ends to the boom near its lower end and near their upper ends to stiffening plates 36, which are riveted at their upper ends to the channel beams 12 and are braced by the upright angle bars 37 extending across the outer sides of the boom and connected above by the cross channel 38. Upright angle bars 39 are provided to brace the plates 36 and the members 34. By this means a stiff and effective guide is provided for the swinging dipper handle and any of its positions. It will be seen that, with such a structure as above described, when the

dipper is lowered and the platform is turned on its swivel, the dipper is liable to strike an obstruction before the turning of the platform is stopped, and the continued turning of the platform, under these circumstances, by inertia, or otherwise, throws a strain on the dipper, the dipper handle and the guide therefor, as well as the boom itself. To overcome this I provide the yielding connection referred to between the boom and platform and the swivel connection between the dipper and the stick. I will now describe each of these features.

From Figs. 1 and 2 it will be seen that the channel beams 12 of the boom have secured to them, near their lower ends, outwardly and rearwardly extending brackets 40 which have hinged to them blocks 41 (see also Fig. 5) which are hinged to the platform. As shown, the rear end of the bracket 40 is in the form of an eye and the forward portion of the block 41 is bifurcated to straddle such eye and is hinged to it by a pin 42. The hinging of the blocks 41 to the platform is accomplished, as shown, by journaling these blocks on a rod 43 which extends across the platform and is secured to the side members thereof. As shown, there are distance sleeves 44 between the blocks 41 and such side members to properly position the blocks. At the rear of the rod 43 the blocks 41 have substantially upright edges 46 which normally abut the front vertical edge of a casting 47 which forms a rigid portion of the platform. The blocks are also provided with overhanging rearwardly extending ears 49 which are adapted, when the block is swung upwardly, to engage the top surface of the casting 47.

Fig. 1 shows the normal position of the parts just described, in which the diagonal plane along the center of the boom passes through the pins 42 and below the rod 43. The weight normally holds the parts in this position and the structure may operate as though the boom were hinged directly to the platform. When, however, in the lateral swinging of the platform, the dipper strikes an obstruction, it tips upwardly the boom on the opposite side, relieving the jar and preventing distortion of the parts. The weight of the elevated side of the tipped boom restores the parts to normal position as soon as the machine is swung slightly in the opposite direction away from the obstruction. It is to be understood that the amount of elevation of the boom end 42 is limited by the ear 49 engaging the top of the platform. While enough to relieve the shock and prevent distortion, it does not allow the boom to rise sufficiently so that it will not drop back by gravity when released. While the tipping is sufficient to relieve the shock, it is to be understood that the angle of displacement of the pivotal axis 42 is small (due to

the wide separation of the blocks 41) and is easily provided for by slight looseness at the pivot bearings 42 and 43.

To further relieve the parts, in case the bucket 20 meets an obstruction, I swivel this bucket to the stick 14. As shown, the stick consists of two parallel wooden members 50 spaced by intermediate castings. Near the lower end of this stick two of these castings 51 and 52 are provided with eyes 53 in which is journaled the shank or bar 55 secured to the bucket. A suitable head 54 on this bar abuts the under or outer face of the casting 51, the casting being enlarged at this face at 56 to provide an effective bearing. Clamped on the shank between the castings 51 and 52 is a suitable split collar 57 which forms a stop against outward movement of the shank 55.

The construction just described provides a simple and at the same time effective swiveling of the bucket to the stick. This swiveling enables the bucket to automatically adjust itself if either its toe or heel engages a side obstruction. This, in addition to the yielding boom connection heretofore described, relieves against jarring in the lateral swinging of the machine. This swiveling of the bucket also enables it, in digging, to tip back and forth about the axis of the swivel to adjust itself to the character of the material being done, and, so to speak, to worm its way through the material, whereby the digging is more effective and accomplished with less power.

Having thus described my invention, what I claim is:

1. In a mechanism of the class described, the combination of a platform, a boom yieldingly supported at two separated points on opposite sides of the boom by the platform in a manner enabling it to tip axially, a dipper, and a dipper stick connected therewith and supported by the boom.

2. The combination of a swiveled platform, a boom, two independent laterally spaced yielding supports for the boom in a substantially horizontal plane on the forward portion of the platform, and a dipper and dipper stick carried by the boom.

3. The combination of a swiveled platform, a boom, two independently movable blocks a considerable distance apart each hinged at one point to the boom near its rear end, said blocks being hinged at other points to the platform, and a dipper and dipper handle carried by the boom.

4. The combination of a swiveled platform, a boom independently supported thereon at two separated points side by side by yielding connections, a dipper stick carried by the boom, guides for the dipper stick on its opposite sides carried by the boom beneath the boom, and a dipper carried by the dipper stick.

5. The combination, with a suitable platform, a diagonal boom, a pair of blocks separated from each other and independently pivoted to the rear end of the boom on opposite sides of a vertical central plane thereof, said blocks being pivoted to the platform, each block having the axes of its two pivots normally out of the plane of the boom, and a dipper stick carried by the boom.

6. The combination, with a suitable platform, a diagonal boom, a pair of blocks separated from each other and hinged to the rear end of the boom on opposite sides of a vertical central plane thereof, said blocks being hinged to the platform and having faces coacting with the platform to limit the movement of the block in either direction about its hinging axis, and a dipper stick carried by the boom.

7. In a device of the character described, the combination of a platform, a rod carried thereby, a pair of blocks journaled on said rod, said blocks having shoulders adapted to engage the front of a stationary member carried by the platform, said blocks having other shoulders adapted to engage the top of the stationary member carried by the platform, a boom hinged to said blocks in front of said rod, and a dipper stick carried by the boom.

8. In a device of the character described, the combination of a platform, a rod carried thereby, a pair of blocks journaled on said rod, said blocks having shoulders adapted to engage a stationary member carried by the platform, a boom having at its rear end a pair of outwardly and rearwardly extending brackets, each bracket being hinged to the corresponding one of said blocks, and a dipper stick carried by the boom.

9. The combination of a platform, a pair of blocks a considerable distance apart hinged thereto, a diagonal boom hinged at its opposite sides to the blocks, a dipper stick carried by the boom, and means for limiting the turning of the blocks about the pivot thereof in either direction, the plane

through the two pivots of the blocks forming on its upper side an obtuse angle with the plane of the boom.

10. In a mechanism of the class described, the combination of a platform, a boom carried thereby by means of two laterally spaced yielding connections between the lower end of the boom and the front of the platform, a dipper stick carried by and operated from the boom, and a bucket carried by the lower end of the dipper stick.

11. In a mechanism of the class described, the combination of a dipper stick having two parallel members, a pair of castings secured between said members and providing two eyes in alinement, a dipper having a shank swiveled in said eyes, and a collar on said shank adapted to abut one of the eyes to prevent longitudinal movement of the shank.

12. The combination of a swiveled platform, a boom comprising parallel beams with outwardly extending brackets at their rear ends and spaced a considerable distance apart, means for hinging said brackets independently of each other to the platform by means of two blocks each hinged to the platform and to one of the brackets, a dipper handle carried by the boom and extending between the beams thereof, and a dipper on said dipper handle.

13. The combination of a swiveled platform, a boom comprising a pair of beams parallel with each other and a pair of brackets secured to the outer side of the beams adjacent to their rear ends and spreading outwardly and rearwardly, a pair of blocks hinged at their rear ends to the platform and at their forward ends to said brackets respectively and independently, a dipper stick extending between the boom and beams, and a dipper on the stick.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

H. H. HARRIS.

Witnesses:

D. D. DEEDS,
A. P. KELLY.