June 17, 1930. H. MARKS 1,764,518

EXCAVATOR

Filed Feb. 20, 1928 2 Sheets-Sheet 1

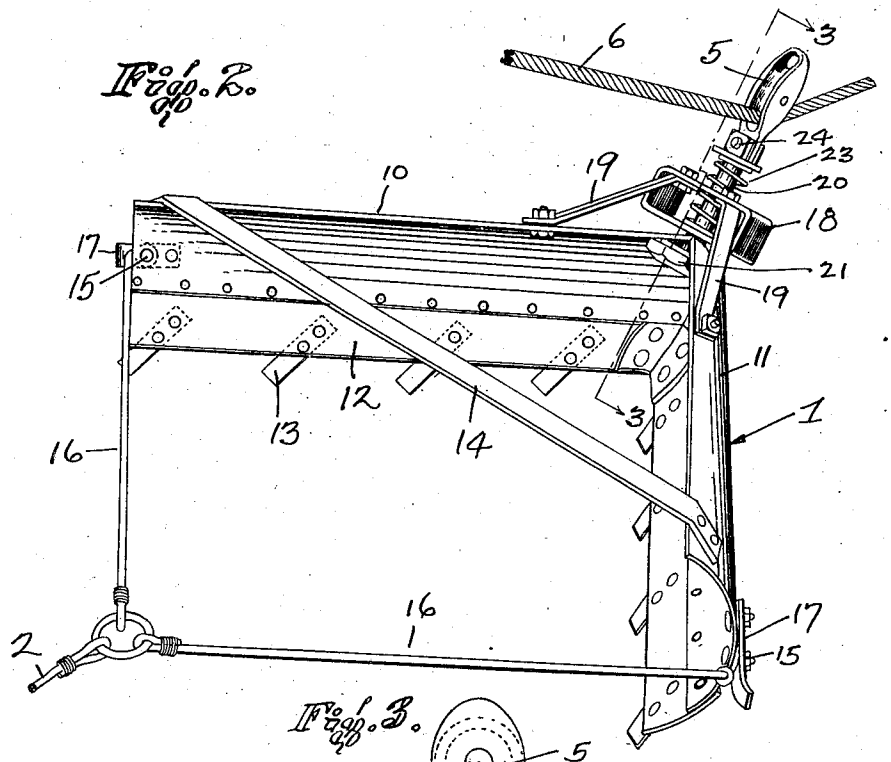


Fig. 2.

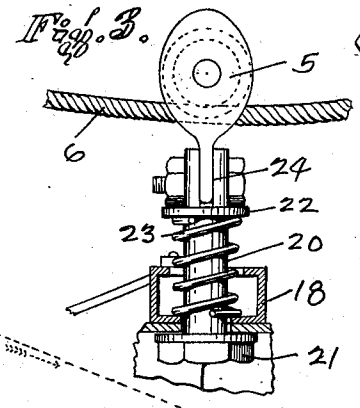


Fig. 3.

Fig. 1.

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June 17, 1930. H. MARKS 1,764,518

EXCAVATOR

Filed Feb. 20 1928 2 Sheets-Sheet 2

Fig. A.

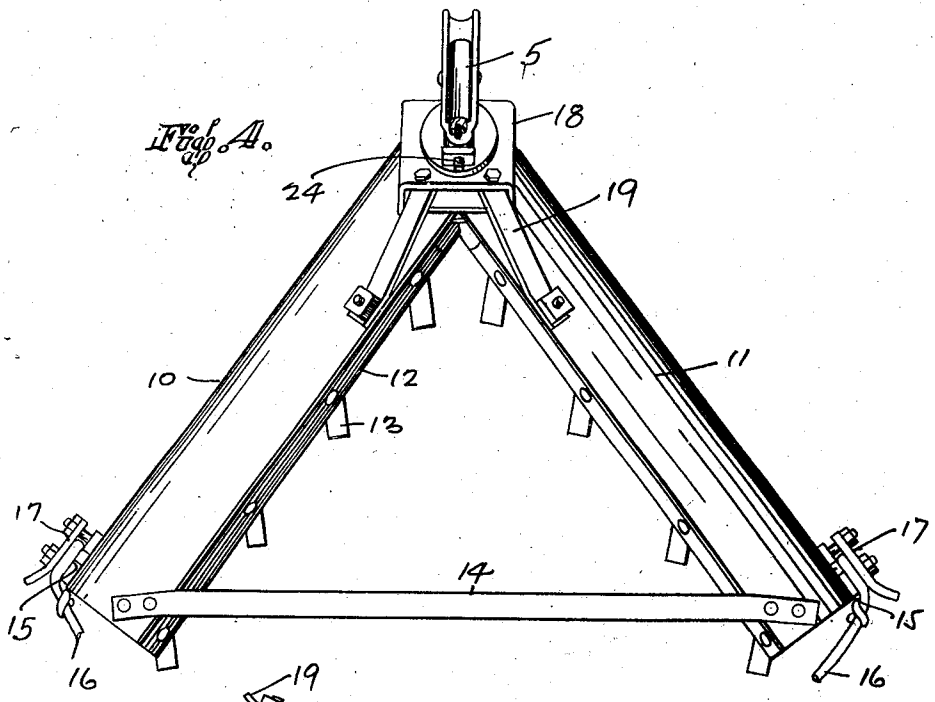


Fig. C.

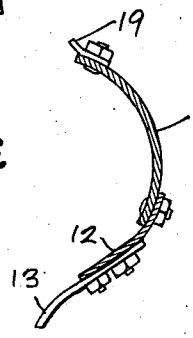


Fig. D.

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Patented June 17, 1930 1,764,518

UNITED STATES PATENT OFFICE

HOWARD MARKS, OF NEWMAN, CALIFORNIA

EXCAVATOR

Application filed February 20, 1928. Serial No. 255,511.

This invention relates particularly to an excavating apparatus.

An object of the invention is to provide an excavating apparatus employing a scraper that is substantially V shaped, and which is adapted to have the open end thereof pulled in the direction of the material to be excavated, and which has, at its rear end, a yieldably supported pulley block through which a cable passes to lift the scraper into a suspended position and return it to the point of commencement of the work to be performed.

A further object of the invention is to provide in an excavating apparatus a scraper comprised of two similarly curved halves secured together at an end and extended divergently forward, the diverging ends being connected to a common pulling apparatus to move the scraper connected thereto, and a pulley block yieldably supported on one side of the apex of the connected ends through which a cable is adapted to pass to raise and lower the scraper relative to the surface over which it moves, and to move said scraper rearwardly.

Other objects of the invention are to provide an excavating apparatus that will be superior in point of simplicity, inexpensiveness of construction, positiveness of operation, and facility and convenience in use and general efficiency.

In this specification and the annexed drawings, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form, because it may be embodied in other forms; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

In the accompanying two sheets of drawings:

Fig. 1 represents a diagrammatic view of an excavating apparatus and scraper, constructed in accordance with my invention, arranged thereon.

Fig. 2 is a perspective view of a scraper and operating mechanism therefor constructed in accordance with my invention.

Fig. 3 is a sectional view taken through Fig. 2, on the line 3—3.

Fig. 4 is a plan view of my scraper.

Fig. 5 is a side view of the scraper shown in Fig. 1.

Fig. 6 is a section taken through Fig. 5 on the line 6—6.

The scraper 1, of the type to be hereinafter described, is connected at its front end to a cable 2 that passes around a winch 3 to drag or pull the scraper along the ground to scrape up and move material to a discharge point, from which the accumulated material can drop onto a car or vehicle, or be otherwise suitably disposed of. The rear end of the scraper, on one side thereof, is provided with an upstanding and yieldably supported pulley block 5 thereon, through which cable 6 passes. The cable 6, at its outer end, is adjustably anchored, at 7, in the field of operations in which the scraper is to work. An intermediate portion of the cable passes around a sheave or pulley 8, that is mounted on a mast at a considerable distance above the point of delivery of the material accumulated by the scraper, and the end of the cable 6 passes around a winch or drum 9, whereby the cable may be moved into that taut position, indicated by dotted lines in Fig. 1, to raise the scrapper 1 into a suspended position, with sufficient angular inclination on the cable to permit the scraper to move by gravity to the commencement point of its scraping operation, after which the cable is slacked into the full line position shown in Fig. 1. The scraper is pulled over the ground by the cable 2 to the point of delivery of the accumulated material.

The scraper 1 is substantially V shaped and comprises two complementary halves 10 and 11 secured together at their apex by rivets, bolts, or by welding. Each of the plates 10 and 11 has a curved or arcuate cross section and in my experiments, I have found that a curved cross section for each scraper half is to be preferred to any other cross section, as the curved section has no apparent point

of weakness that might break down or rupture under usage. A wear plate 12 is secured along the entire length of the bottom of each of the halves 10 and 11, and each plate 12 forms a substantial continuation of the curved cross section of the half to which it is secured. The plates 12 are bolted, or otherwise suitably secured along their entire length, to each of the scraper halves, whereby they may be removed or replaced, and said plates 12 are also firmly secured together at the apex of the scraper.

A plurality of separate curved ended scraper teeth 13 are secured to the rear side of each plate 12 and are projected beyond the lower edge thereof, to rip up or tear the ground over which the scraper is pulled, and to automatically dig up material that can be accumulated between the divergent halves of the scraper. A bar 14 extends across and is connected to the upper sides of the extended divergent scraper halves 10 and 11, to hold said scraper halves in a predetermined spaced relation. A bolt 15 is connected to the middle of the forward edge of the outer ends of the divergent halves 10 and 11, and a short length of cable 16 extends from the pulling line 2 to each of the bolts 15. A protective plate 17 is mounted on the outside of each of the scraper halves 10 and 11 to protect each of the cable ends 16 that are secured to the scraper, from being worn down by coming into contact with the material or obstructions within which the scraper is operating. The scraper teeth 13 when worn down, are detached and used as the protective plates 17. The cables 16 are of substantially the same length in order that the pulling line 2 may pull the scraper 1 evenly over the ground.

At the connected ends of the scraper halves 10 and 11, or at the apex thereof, and on the upper side of said scraper, I have mounted a bearing 18. The bearing 18 is attached rigidly to the upper side of the scraper halves and reinforcing struts 19 extend from said bearing outwardly into engagement with each of the halves of the scraper. A shaft 20 is rotatably confined within the bearing 18 and extends upward in substantially a vertical direction above the plane of the scraper. The lower end of the shaft 20 extends through the meeting joint of the scraper halves 10 and 11 into the interior thereof, and a nut or collar 21 is attached to the shaft end to prevent upward movement of the shaft 20 out of the bearing. A washer is interposed between the nut 21 and the inner body of the scraper. One face of the washer is flat to provide a flat bearing surface for the nut and the opposite face of the washer is curved to conform to the inner contour of the scraper. The upper end of the shaft 20 is provided with a collar 22 thereon and an expansion spring 23 is coiled around the shaft 20 between the collar 22 and the bearing 18. The pulley block 5 has a pulley or sheave rotatably journaled thereon and is pivoted at 24 to the upper end of the shaft 20. The expansion spring 23 is adapted to maintain the pulley block and bearing in a predetermined spaced relation and to resist within the limits of its expansive force, reciprocative movement of the shaft 20.

As heretofore described, the scraper 1 is pulled in an operative direction by the cable 2, with the divergent ends of the scraper 1 foremost, into the direction of dirt or material to be scraped. During the scraping operation, the entire pulling is effected by the line 2, the cable 6 being slacked off into a non-operative position. After the scraper has delivered its load of material to the point of delivery, the slack in the cable 6 is taken up to raise the scraper above the surface over which it has scraped. The inclination of the taut cable, together with the weight of the scraper 1, is sufficient to cause the scraper 1 to run by gravity rearwardly into the field of operation and to the point of commencement of its work. While the rearward speed of the scraper 1 may be checked by the "pulling-in" cable 2, this, as a matter of fact, is rarely done as the operators of the apparatus usually have very little consideration for the injury or damage which they may be causing to the scraper mechanism and its parts. I have found that by allowing the scraper to run by gravity back to the point of commencement of its work, it will reach that point much faster than by dragging the said scraper rearwardly over the ground. Likewise, the life of the scraper is longer and the wear and tear on the same is less by traveling the scraper back to its field of operation by the aerial route than by dragging it over the ground. However, when the scraper travels by suspended cable back to the field of operation, it usually runs into the ground at a high rate of speed and if it were not for the rugged construction of the scraper, considerable injury would be caused to the parts thereof. I have found that the resilient mounting between the scraper and the pulley block will absorb all of the shock and jar that results from the scraper dropping back into contact with the ground and that the life of the scraper is prolonged thereby. In view of the fact that the spring 23 acts as a bumper for all shocks transmitted to the apparatus, it may be quickly and easily replaced at a very nominal cost. The mounting of the scraper on the pulley block is substantially universal, to permit of either rotative, reciprocative or pivotal movement in practically all directions, whereby the scraper when being returned to its work, may oscillate or swing to pass by any obstructions or hindrances, that

might have the effect of retarding its movement, if the said scraper and pulley block were not universally connected.

Having thus described the invention, what I claim and desire to secure by Letters Patent is:

1. An excavator comprised of a V shaped scraper; a bearing mounted on the upper side of the scraper at the apex of the V; a shaft reciprocatingly and rotatably journaled in said bearing; and a pulley block pivoted to the end of the shaft that projects beyond the bearing.

2. An excavator comprised of a scraper; a bearing mounted on the upper side of the scraper at an end thereof; a shaft reciprocatingly and rotatably journaled in said bearing; a pulley block pivoted to the end of the shaft that projects beyond the bearing; and an expansion spring interposed between the pulley block and bearing to maintain the pulley block and bearing in a predetermined spaced relation.

3. An excavator comprised of a V shaped scraper; and a pulley block yieldingly supported on the upper side of the scraper adjacent the apex thereof.

4. An excavator comprised of two like halves secured together at an end and extended divergently forward, each half having a uniformly curved cross section; and a pulley block yieldingly supported on the upper side of the two like halves adjacent the connected ends thereof.

5. An excavator comprised of two like halves secured together at an end and extended divergently forward, each half having a uniformly curved cross section; a plate secured along the length of the bottom edge of each half and forming a substantial continuation of the curved cross section; and a pulley block yieldingly supported on the upper side of the two like halves adjacent the connected ends thereof.

6. An excavator comprised of two like halves secured together at an end and extended divergently forward, each half having a uniformly curved cross section; a bearing mounted on the upper side of the connected like halves at the apex thereof; a shaft yieldingly and rotatably mounted in said bearing; and a pulley block pivoted to the end of said shaft.

7. An excavator comprised of two like halves secured together at an end and extended divergently forward, each half having a uniformly curved cross section; a bearing mounted on the upper side of the connected like halves at the apex thereof; a shaft reciprocatingly and rotatably mounted in said bearing; a spring in said bearing to resist reciprocative movement of said shaft; and a pulley block pivotally connected to said shaft.

8. An excavator comprised of a V shaped scraper; a pulley block yieldingly supported on the upper side of the scraper adjacent the apex thereof; means connected to the forward divergent ends of the scraper to pull it forwardly over the ground; and a cable passed through the pulley block to elevate the excavator and to permit it to travel rearwardly by its own gravity when the pulling force is released from the forward divergent ends of the scraper.

9. An excavator comprised of two like halves secured together at an end and extended divergently forward, each half having a uniformly curved cross section; a bearing mounted on the upper side of the connected like halves at the apex thereof; a shaft yieldingly and rotatably mounted in said bearing; a pulley block pivoted to the end of said shaft; means connected to the forward divergent ends of the scraper to pull it forwardly over the ground; and a cable passed through the pulley block to elevate the excavator and to permit it to travel rearwardly when the pulling force is released from the forward divergent ends of the scraper.

10. An excavator comprised of two like halves secured together at an end and extended divergently forward, each half having a uniformly curved cross section; a bearing mounted on the upper side of the connected like halves at the apex thereof; a shaft reciprocatingly and rotatably mounted in said bearing; a spring in said bearing to resist reciprocative movement of said shaft; a pulley block pivotally connected to said shaft; means connected to the forward divergent ends of the scraper to pull it forwardly over the ground; and a cable passed through the pulley block to elevate the excavator and to permit it to travel rearwardly when the pulling force is released from the forward divergent ends of the scraper.

In testimony whereof, I have hereunto set my hand at Newman, California, this 31st day of January, 1928.

HOWARD MARKS.