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PORTABLE CRUSHER.

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1,331,963. Patented Feb. 24, 1920.

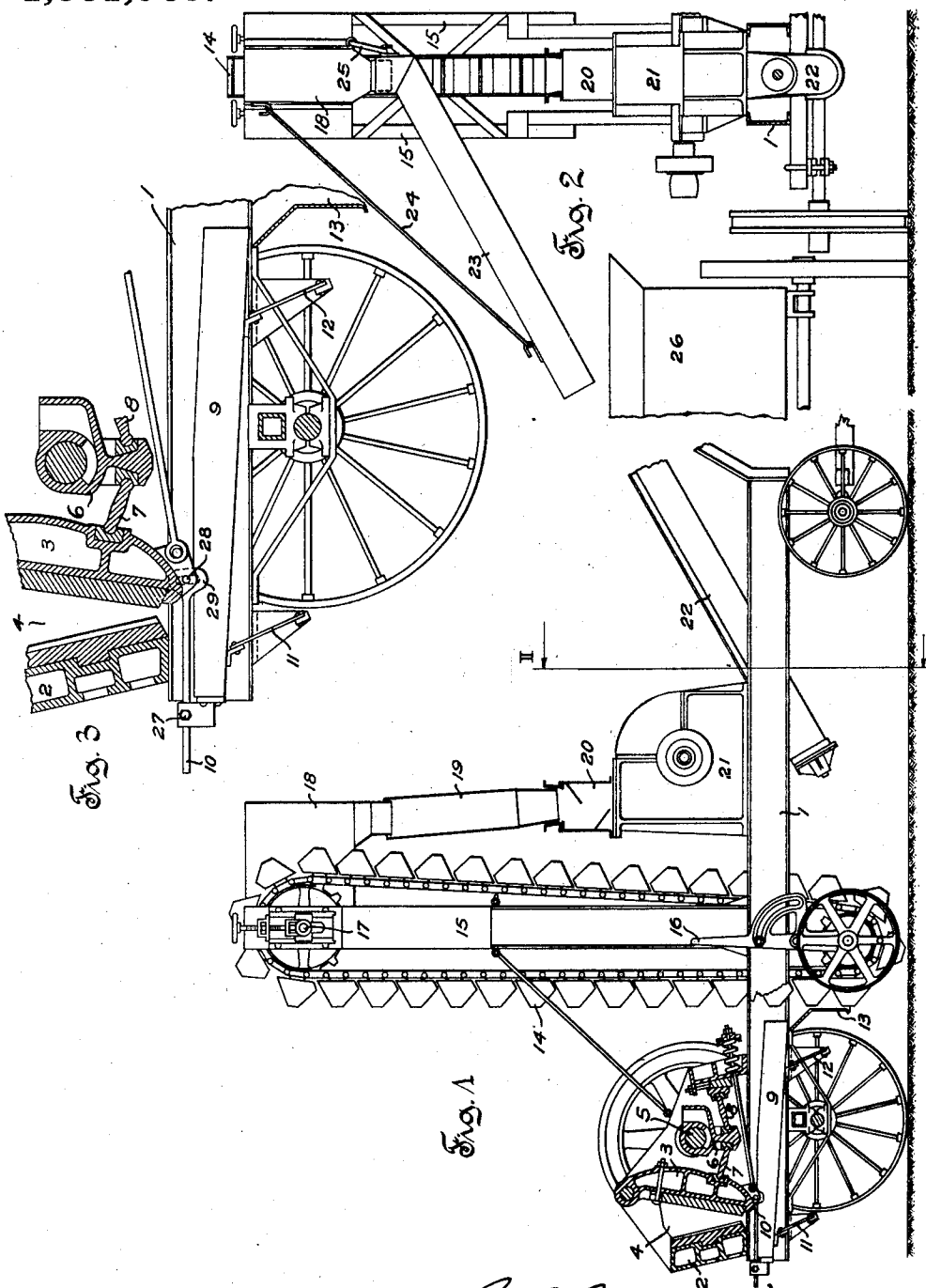

Fig. 2

Fig. 3

Fig. 1

Witnesses
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PORTABLE CRUSHER.

1,331,963. Specification of Letters Patent. Patented Feb. 24, 1920.

Application filed December 31, 1914. Serial No. 309.

To all whom it may concern:

Be it known that I, RAY C. NEWHOUSE, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Portable Crushers, of which the following is a specification.

This invention relates to improvements in the construction of portable crushers and particularly to devices for permitting reduction of the overall height of such crushers to a minimum and for permitting ready feeding and discharge of the material to and from the crushers.

An object of the invention is to provide a portable crusher which is simple in construction, efficient in operation and readily accessible for feeding. One of the more specific objects is to provide a portable crusher in which the crusher feed openings are accessible for feeding directly from the ground and without the use of intermediary elevating devices. Another object is to provide a portable crusher outfit in which the relatively heavy crushing devices are located as near to the ground as possible, thereby securing maximum stability. A further object is to provide efficient and compact means for feeding or conveying the discharge from one of the crushers to an elevating device without undesirably increasing the height of the crusher inlet opening. Still a further object is to provide a feeding device which is simple in its construction and readily accessible for inspection and repairs. A further object is to provide a feeding device which may be readily adjusted to alter the rate of feeding. Still another object is to provide means for permitting, either delivery of the entire coarse crusher discharge to a fine crusher, or for permitting shunting of the coarse crusher discharge to a wagon or other receptacle located at the side of the portable crusher outfit.

Some of the novel features shown and described but not claimed herein, form no part of the present invention and are claimed in co-pending applications Serial Numbers 873,666 and 874,072.

A clear conception of an embodiment of the invention may be had by referring to the drawing accompanying and forming a part of this specification, in which like reference characters designate the same or similar parts in the various views.

Figure 1 is a fragmentary, part sectional, side elevation of a portable crusher outfit.

Fig. 2 is a fragmentary, part sectional end view of a portable crusher outfit, showing the means for shunting the coarse crusher discharge to a wagon, the section being taken on the line II—II of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a fragmentary, part sectional, enlarged side view of the jaw crusher and feeding device for delivering the discharge therefrom to the bucket elevator.

The portable crusher outfit comprises essentially a vehicle or truck 1, a coarse breaker or jaw crusher 2, a bucket elevator 14, a fine crusher or rotary impact pulverizer 21, and a helical screw conveyer 22. The jaw crusher 2 is preferably mounted upon the truck 1 adjacent the extreme rear end thereof. The rotary impact pulverizer 21 is mounted upon the truck 1 near the mid portion thereof and is adapted to deliver its discharge to the screw conveyer 22 which has an overhanging delivery end adapted for discharge into a wagon or other suitable receptacle. The vertical bucket elevator 14 is mounted upon supporting beams 15 which are secured to the truck 1, and is located intermediate the jaw crusher 2 and the rotary impact pulverizer 21.

The jaw crusher 2, which in the present case is used as a coarse crusher, has an inlet opening 4 which is located as near to the ground as possible, in order to permit direct feeding of the material from the ground to the crusher without the use of intermediary elevating devices. The movable or oscillatory jaw 3 of the jaw crusher 2 is reciprocable by means of the rotary shaft 5 having an eccentric or cranked portion adapted to reciprocate the pitman 6 and to alternately flex and straighten the toggle 7, 8.

Below the discharge opening of the jaw crusher 2 is located a substantially horizontal imperforate reciprocable plate 9. The feed plate 9 is mounted upon resilient, substantially parallel, oscillatory members or leaf springs 11, 12, which are fixed to suitable brackets secured to the frame of the truck 1. The plate 9 is reciprocable upon the leaf springs 11, 12, by means of a connection 10 having an elongated transverse opening at

one end thereof which coacts with a projecting pin 28 mounted in the lower extremity of the jaw 3, and having its opposite end slidably, adjustably secured to the plate 9 by means of a suitable bracket and a set screw 27. The set screw 27 is operable in the bracket which is rigidly secured to the end of the plate 9. By releasing the set screw 27 and shifting the connection 10 longitudinally within the bracket and relative to the plate 9, and then retightening the set screw 27, the angularity of the leaf springs 11, 12, relative to a horizontal plane, may be changed. By changing the angularity of the leaf springs 11, 12, the extent of movement of the plate 9 and hence the rate of feeding, may be readily varied.

The discharge end of the plate 9 is located directly over an apron 13 which is secured to the truck 1 and is adapted to deliver the material discharged thereagainst into the advancing buckets of the elevator 14. The elevator 14 comprises a series of buckets carried by a continuous chain which is movable by means of the usual sprockets to advance the buckets. The upper sprocket of the elevator 14 is mounted in adjustable bearings 17 which are supported by the upright beams 15 and permit ready adjustment of the tension of the elevator chain. The upper or discharge portion of the elevator 14 is provided with a discharge chute 18 having its delivery end directed into a removable spout 19, which in turn normally delivers into the feed hopper 20 of the rotary impact pulverizer 21. The lower extremity of the bucket elevator 14 is provided with manually operable devices 16 for permitting retraction of the lower extremity of the elevator 14 from the thread of the truck 1 during transportation.

The spout 19 may be readily removed by lifting the same vertically until its lower extremity is free from coaction with the feed hopper 20, and swinging the spout sidewise to clear the hopper 20, after which the spout may be lowered to clear the lower end of the chute 18 and removed entirely. The shunting spout 23, see Fig. 2, may be suspended from the chute 18 upon removal of the spout 19 by means of supporting links 24, 25, which coact with suitable hooks secured to the chute 18, as shown in the figure.

During the normal operation of the crushers, the jaw crusher 2, bucket elevator 14, rotary impact pulverizer 21 and conveyer 22, are given their proper operating movements by means of suitable mechanism, not shown. The material to be reduced is fed into the inlet opening 4 of the jaw crusher 2; and after being partially reduced in this crusher, is discharged onto the feed plate 9. As the jaw 3 of the crusher 2 is reciprocated for crushing, a reciprocating motion is also imparted to the connection 10, which in turn reciprocates the feed plate 9. The resilient supporting leaf springs 11, 12, during the reciprocation of the plate, cause the plate to simultaneously move both horizontally and vertically, the degree of each motion depending upon the angularity of the elements 11, 12. As the plate 9 is moved vertically, the particles of material deposited thereon by the jaw crusher 2 are given a quick upward and forward motion tending to cause the same to move toward the discharge end of the plate 9. As the plate 9 is quickly retracted after the forward impulse has been given to the particles of material, the particles fall by gravity and assume new positions upon the plate 9, which are somewhat in advance of their previous positions thereon. In this manner the material discharged upon the plate 9 by the crusher 2 is gradually and uniformly fed toward the discharge end of the plate, being eventually delivered to the apron 13 from which it is discharged into the approaching buckets of the elevator 14. The elevator 14 raises the material and eventually delivers the same into the chute 18 from which it is delivered by gravity either directly through the spout 19 to the feed hopper 20 of the impact pulverizer 21, or to the shunting spout 23.

If the portable outfit is arranged for fine crushing, the material is precipitated through the spout 19 into the feed hopper 20 from which it is gradually delivered into the rotary impact pulverizer 21, wherein it is reduced to a fine powder. The material upon being delivered from the rotary impact pulverizer 21 is precipitated into the lower end of the screw conveyer 22, from which it is elevated by means of this conveyer and eventually discharged as desired either into a receptacle or upon the ground.

If it is desired to shunt the jaw crusher discharge, the spout 19 is removed and the shunting spout 23 is applied as shown in Fig. 2. With this spout 23 inserted in the machine, the material delivered to the chute 18 by the bucket elevator 14 is shunted and delivered directly to the side of the machine. The end of the spout 23 is preferably arranged so that the material may be delivered into a wagon 26, as shown, if desired.

It will be noted that the feed plate 9 and the resilient supporting elements 11, 12, provide a simple and compact feeding arrangement for effectively and uniformly feeding the jaw crusher discharge to the bucket elevator 14. The rate of feeding may be readily varied by relative adjustment of the feed plate 9 and connection 10 by manipulation of the set screw 27. As the elements 11, 12, are of substantially the same length and are arranged parallel to each other, it is evident that all portions of the plate 9 have uniform

motion, this feature being of considerable importance in producing uniform feeding of the material along the entire length of the plate. The substantially horizontal arrangement of the plate 9 permits location of the jaw crusher 2, and especially the inlet opening 4 thereof, as near to the ground as possible, thereby permitting both ready feeding of the crusher 2 and producing a machine of maximum stability.

The feature of permitting shunting of the jaw crusher discharge is of considerable importance in machines of this type when used for both agricultural and road making purposes, since it is then desirable to have coarse crushed stone for purposes of road making and to have the pulverized stone for agricultural purposes.

It should be understood that it is not desired to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

It is claimed and desired to secure by Letters Patent,—

1. In combination, a vehicle, a crusher mounted upon the rear end of said vehicle and having its inlet located relative to the tread of said vehicle at a height permitting manual feeding by a single handling of the material, said crusher having stationary parts adjacent the rear end of said vehicle and having movable parts remote from said end, an elevator located upon said vehicle on the side of said crusher adjacent to said movable parts, a substantially horizontal reciprocable feed plate located directly below and in close proximity to the discharge of said crusher and above the tread of said vehicle for delivering to said elevator the material discharged by said crusher, a direct connection between said movable crusher parts and said plate for imparting reciprocating motion to said plate, and means accessible from the rear of said vehicle for varying the length of said connection to alter the extent of said motion.

2. In combination, a vehicle, a jaw crusher mounted upon the rear end of said vehicle, said crusher having a stationary jaw adjacent the rear end of said vehicle and having a movable jaw remote from said end, an elevator mounted upon said vehicle adjacent to said movable crusher jaw, an imperforate reciprocable feed plate located directly below and in close proximity to the discharge of said crusher for delivering to said elevator material discharged by said crusher, a plurality of vibratory supporting elements associated with said plate and with said vehicle and extending at an angle to said plate, a direct connection between said movable crusher jaw and said plate for imparting reciprocating motion to said plate, and means accessible from the rear of said vehicle for effecting adjustment of said connection to vary the relative angularity between said plate and said element whereby the rate of feeding may be altered.

In testimony whereof the signature of the inventor is affixed hereto in the presence of two witnesses.

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Witnesses:
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