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SAND OR GRAVEL TREATING MACHINE

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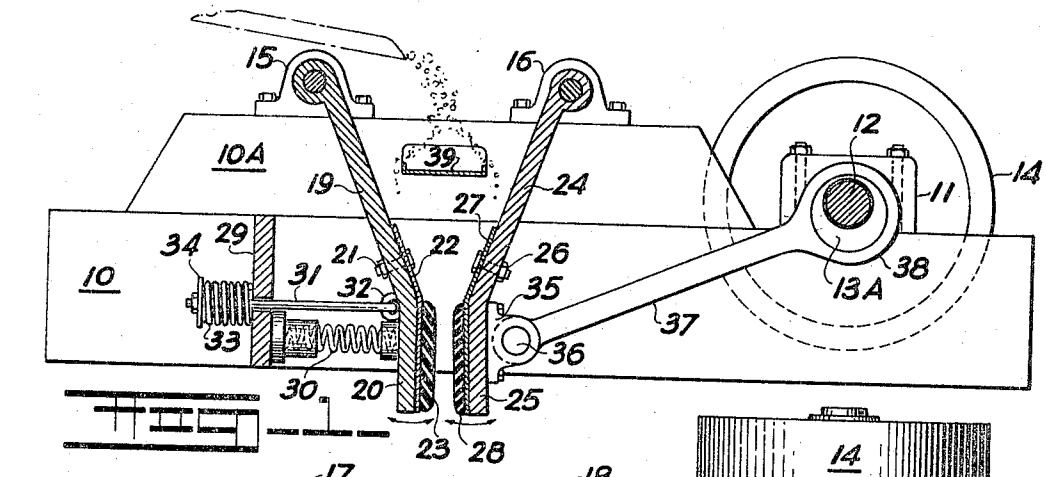


FIG. 1

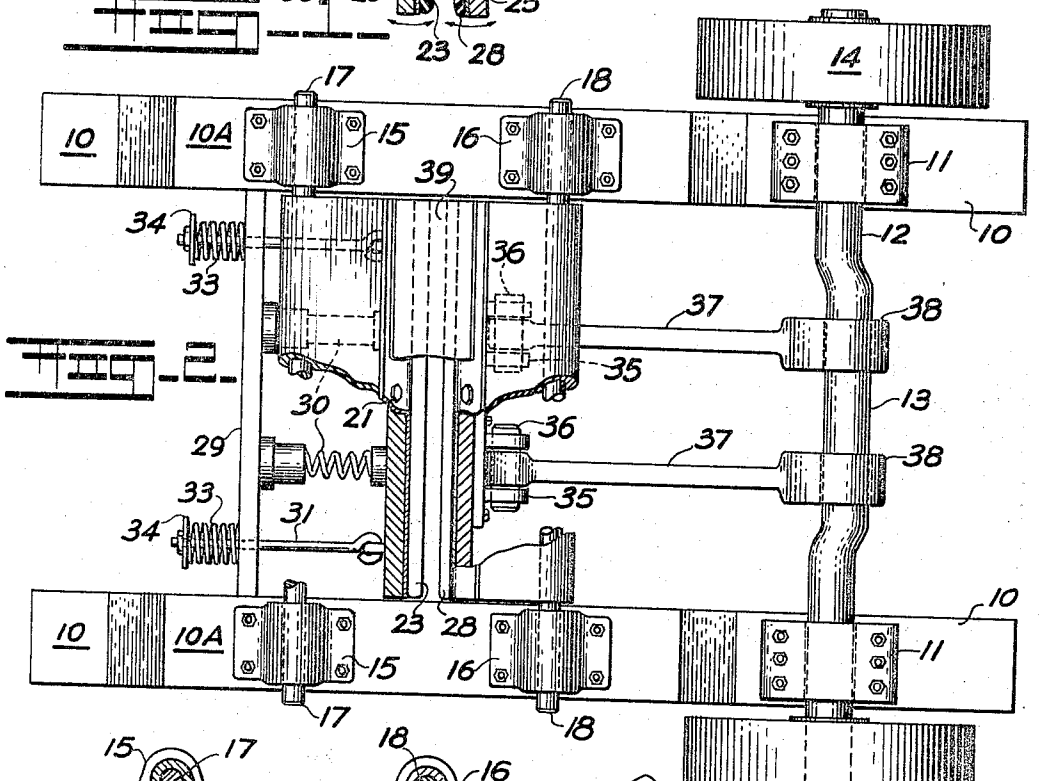


FIG. 2

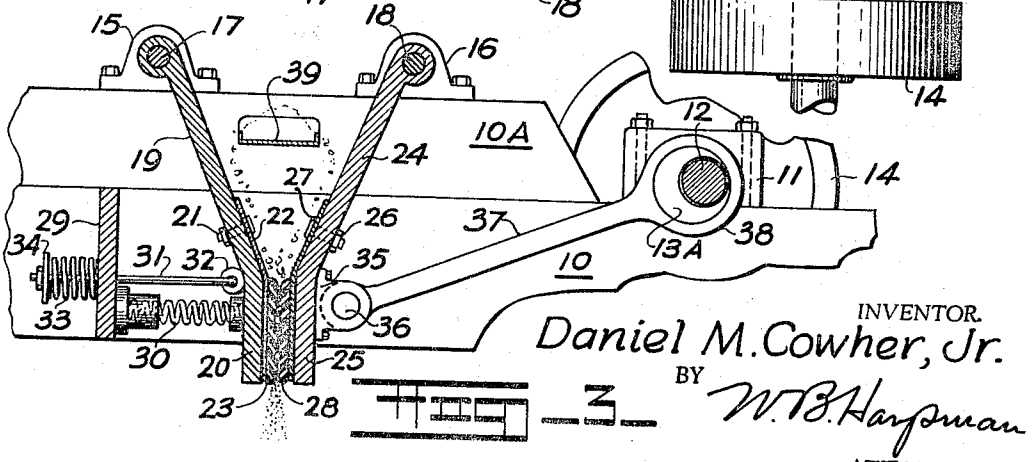


FIG. 3

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SAND OR GRAVEL TREATING MACHINE

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This invention relates to a sand or gravel beneficiating machine and more particularly to a machine which will remove undesirable material from sand or gravel.

The principal object of the invention is the provision of a device for positively removing soft material from sand or gravel.

A further object of the invention is the provision of a machine that will handle sand or gravel, passing the sand or gravel and crushing coal, shale, wood and similar materials that may be mixed therewith.

A still further object of the invention is the provision of a machine which will reduce undesirable elements in sand or gravel to a powder-like consistency by crushing the same.

A still further object of the invention is the provision of a machine that will pass sand or gravel without cracking or crushing the hard particles thereof.

The sand or gravel beneficiating machine disclosed herein is intended for use where sand or gravel deposits are used for aggregate in concrete. It is well known that such sand or gravel deposits usually contain pieces of coal, shale and other soft materials including clay and sometimes pieces of wood, and it is further known that these soft materials must be removed from the sand or gravel before the same will meet the specifications for desirable aggregate in concrete constructions. Many devices have been heretofore proposed for removing such soft materials, and some of such devices have removed the soft materials but have reduced the particle size of the sand or gravel undesirably.

The present invention utilizes a pair of vertically disposed crusher plates having rubber pads on their opposed engaging surfaces, and means for rapidly reciprocating one of the pressure plates relative to the other, which, in turn, is resiliently biased to a desirable position so that the hard particles of sand and gravel passed therethrough by being momentarily embedded in the rubber pads while the softer materials, such as coal, shale, clay, wood and so forth, are crushed.

The combined hard sand and gravel particles and the crushed softer materials are delivered from the machine to a screen and water spray separating system, as known in the art.

The thickness of the rubber pads on the crusher plates and the resiliency of the same, as well as the spacing of the crusher plates with respect to one another, and rapidity of reciprocation of the one crusher plate with respect to the other are responsible for the crushing action of the soft material as the resiliency of the rubber pads is such that the sand or gravel being processed will simply deflect the rubber pads and pass therebetween, while the softer materials will be crushed to a powder-like consistency.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a side elevational view with parts broken away and parts in cross section illustrating a sand and gravel treating device.

FIGURE 2 is a top plan view with parts in cross section and parts broken away.

FIGURE 3 is a view similar to FIGURE 1 showing the crushing pads in engaged relation.

By referring to the drawings and FIGURES 1 and 2 in particular, it will be seen that the sand and gravel treating device disclosed herein comprises a pair of horizontally spaced, longitudinally extending frame members **10, 10** having journals **11, 11** thereon mounting a crankshaft **12** having a crank section **13** intermediate the ends thereof. Eccentric bushings **13A, 13A** are positioned on the crank **13**. The outer ends of the crankshaft **12** extend beyond the frame members **10, 10** and are provided with flywheels **14, 14** one of which may be used to receive a power transmission belt by which the device may be rotated.

The frame members **10, 10** also have two pairs of transversely aligned secondary journals **15, 15** and **16, 16** thereon, and these are in turn longitudinally spaced with respect to one another. The journals **15, 15** journal a transverse shaft **17**, while the journals **16, 16** journal a transverse shaft **18**. The secondary journals **15, 15** and **16, 16** are elevated with respect to the journals **11, 11** by means of a pair of longitudinally extending spacer frames **10A, 10A** respectively. The transverse shaft **17** supports a crusher plate **19** in depending angular relation thereto, the lowermost portion of the plate **19** having section **20** which lies on a substantial vertical axis. Fasteners **21** secure a body member **22** which in turn is provided with a relatively thick resilient rubber crushing pad **23**.

The secondary transverse shaft **18** pivotally supports a secondary crusher plate **24** at an angle from vertical, the lower portion **25** of which lies on a substantial vertical axis. Fasteners **26** support a body member **27** on the crusher plate **24**, which body member **27** has a resilient rubber crusher pad **28** thereon.

Still referring to FIGURES 1 and 2 of the drawings, it will be seen that the crusher plates **19** and **24** are relatively wide and that the upper portions thereof form oppositely disposed hopper walls that will direct material into the lower vertical portions carrying the crusher pads **23** and **28**. The crusher pads **23** and **28** are in face-to-face opposed relation and spaced so that sand or gravel to be treated by the device may move therebetween. Still referring to FIGURES 1 and 2 of the drawings, it will be seen that there is a transverse frame member **29** positioned between the longitudinal frame members **10, 10** and secured thereto, and a pair of coil springs **30, 30** are positioned between the transverse frame member **29** and the back surfaces of the crusher plate **19** so as to normally urge and support the crusher plate **19** into the position illustrated in FIGURE 1 of the drawings wherein the lower angular portion thereof is substantially vertical. Secondary tensioning means are also provided and comprise rods **31, 31** attached by eyelets **32** on the back of the crusher plate **19** and extended through apertures in the transverse frame member **29** and through secondary coil springs **33, 33**. End plates **34** and fasteners in the form of nuts movable on the threaded ends of the rods **31** provide for applying controlled tension to the crusher plate **19** and particularly with respect to partially contracting the coil springs **30** heretofore referred to. Thus, the crusher plate **19** may be positioned in desired relation for the subsequent crushing action that takes place against the resilient rubber crushing pad **23** thereon.

A pair of bifurcated brackets **35, 35** are secured to the back of the secondary crusher plate **24**, and pins **36, 36** are positioned therethrough and through apertures in the

ends of connecting rods **37**, **37** which extend outwardly therefrom and are journalled at their outermost ends **38**, **38** on the crank **39** of the crankshaft **12** heretofore referred to.

It will thus be seen that rotary motion imparted one of the pulley wheels **14** will revolve the crankshaft **12** and cause reciprocal action of the connecting rods **37**, which action is imparted to the secondary crusher plate **24** with the result that the entire area of the resilient rubber crusher pad **28** will move into and out of registry with the entire area of the crusher pad **23** so as to crush soft materials mixed with sand or gravel being treated by the machine while the sand or gravel merely temporarily embeds itself in the crusher pads **23** and **28** and eventually falls free, due to the resiliency of the members when they next separate.

By referring now to FIGURE 3 of the drawings, it will be observed that the crankshaft **12** has been rotated a half turn so as to bring the secondary crusher plate **24** and its resilient rubber crusher pad **28** into forceful engagement with the resilient rubber crusher pad **23** on the crusher plate **19**. The speed of reciprocation of the crusher plate **24** is important, as it must be sufficiently rapid to insure that any particle entering the area of the crusher pads **23** and **28** will be engaged at least once as it falls vertically therethrough.

In FIGURES 1 and 3 of the drawings, a transversely positioned trough or baffle **39** may be seen, and it will be observed that it receives the sand and gravel being treated by the device, together with the soft material therein, and delivers it from either side directly onto the inclined surfaces of the crusher plates **19** and **24**. The material then flows downwardly over the body members **22** and **27** which carry the resilient rubber crusher plates **23** and **28** respectively, and the material then flows between the crusher plates **23** and **28** where it is struck repeatedly with crushing blows which pulverizes the soft materials while the hard materials which are the desirable components of the aggregate simply momentarily embed themselves in the crusher plates **23** and **28** and eventually pass through the machine.

Those skilled in the art will observe that by forming the resilient rubber crusher plates **23** and **28** as sections of suitable rubber or rubber-like resilient material vulcanized to the body members **22** and **27**, the same may be replaced when desired, as, for example, when relatively larger gravel is to be handled by the machine, or relatively small aggregate or sand. Alternately, the crusher plates **23** and **28** may be replaced due to wear and the detachable arrangement provides for ready interchange in either circumstance.

It will thus be seen that a device for treating sand and gravel so as to crush the soft undesirable materials that are normally found therein has been disclosed and that the disclosure meets the several objects of the invention, and having thus described by invention, what I claim is:

1. A sand and gravel treating device comprising a supporting frame, a pair of crusher plates positioned transversely of the frame in spaced relation, each of said crusher plates having an upper angular portion and a lower vertically disposed portion, one of said crusher plates having resilient means normally holding the same in a first position, said crusher plate having a resilient crusher pad on said lower vertical portion thereof in oppositely disposed relation to said resilient supporting means, the other of said crusher plates having a resilient crusher pad on said lower vertical portion thereof in abutting face to face relation to the resilient crusher pad on said first crusher plate, a device on said frame for imparting reciprocal movement to said last-mentioned crusher plate and arranged to move the same from a position spaced with respect to said first crusher plate to a second position with said resilient crusher pads in contacting relation to one another throughout their entire opposed surface areas.

2. The sand and gravel treating device set forth in claim **1** and wherein said supporting frame includes spaced frame members, a pair of shafts positioned transversely of said frame members and journals on said frame members supporting said shafts and wherein said crusher plates are movably secured to said shafts.

3. The sand and gravel treating device set forth in claim **1** and wherein said crusher plates are arranged with the said upper angular portions at an acute angle to one another and wherein the resilient crusher pads are in parallel relation to one another.

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