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COMBINATION OF A CHAIN, SCRAPER, AND CONVEYER

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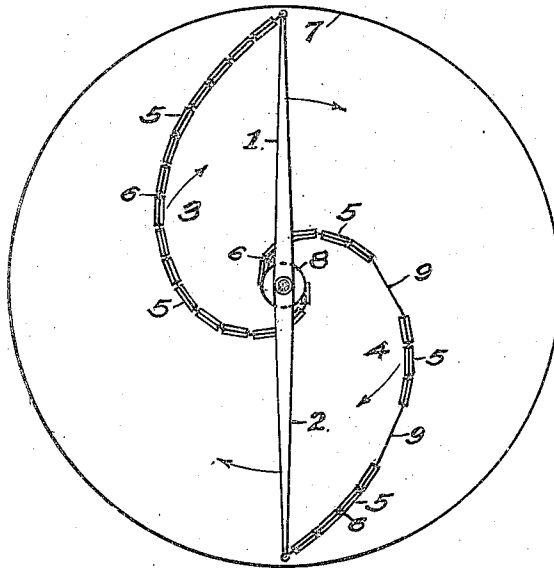


Fig. 1.

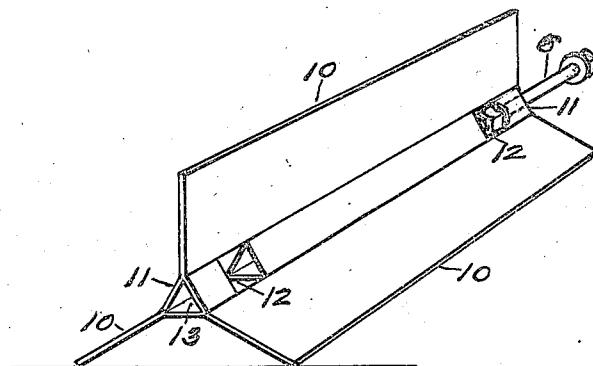


Fig. 2.

Witnesses.

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UNITED STATES PATENT OFFICE

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COMBINATION OF A CHAIN, SCRAPER, AND
CONVEYER

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1 Claim. (Cl. 210—55)

The primary object of this invention is to provide an improved mechanism to release and raise the solids and semi-fluid matter that settles on the bottom of sedimentation basins, as gently as feasible, and promptly convey the dregs to a convenient outlet without needless agitation of the contents of or interrupting the continuous operation of the basin.

The mechanism may also be used to excavate and convey such other wet, dry, granular, or plastic material, or mixtures thereof, as may be commonly handled by shovels, plows or scrapers.

The novel parts and combination of parts used to secure the desired results are shown in the accompanying drawing, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a general plan of a circular basin showing two arms extending radially outward from a vertical shaft, or mast, located at the center of the basin. It also shows two chain scrapers resting on the bottom of the basin, with the leading end of each chain attached to an arm and the remainder of the chain in position for operation when the arms are actuated in the direction indicated by the arrows.

Figure 2 is a perspective view showing a single link of the chains shown in Fig. 1, but at an enlarged scale.

It shows a link in which three scraper blades, radiating from a hollow triangular hub at the center, or axis, of the link, are combined to form a link; also, a common machine bolt and two common cut washers are shown inserted in the farther end of the link to serve as a connector between adjacent links and complete a chain.

The mechanism is described in detail as follows:—

Referring to Fig. 1, the arms 1 and 2 are illustrative only, as only one, or some greater number of chains may be required in some installations; and in some instances it may be more convenient to eliminate the arms, shaft and supporting structure and haul the chain or chains by mechanism located at the periphery of the basin.

Chain 3, attached to arm 1, exhibits a continuous line of scraper links 5, arranged end to end and flexibly attached to each other by connectors 6, to form a complete unit of a chain scraper; which, when operated in the direction indicated by the arrow, is adapted to scrape and clean the entire area of the bottom of the basin between the periphery 7, and the sump 8, at every revolution of the mechanism, and deliver the dregs to the sump in a continuous stream.

Chain 4, attached to arm 2, shows a discontinuous line of scraper links 5, in which one or more links are omitted and a longer connector 9, of the same type as 6, but of suitable length, is substituted for the link or links omitted, to form a complete sectional chain scraper.

By such division of the chain into sections of suitable length, it is adapted to handle mixtures of sludge containing material that will flow, and other granular or fibrous substances that will not flow, but will either roll or slide as the scraper blades are hauled against it in the same manner, and as effectively, as earth can be raised and moved by a common plow. The sectional type of chain may be arranged to completely scrape and clean the entire bottom of a basin by providing one or more additional sectional chains to scrape and clean the unscraped intervals between the sections of chain 4; and, when combined in this manner, they operate in substantially the same manner as a gang-plow.

Referring to Fig. 2, which shows one link 5, consisting of three scraper blades 10, rigidly joined to a hollow hub 11, in which openings 12, are provided near each of its ends for attaching and adjusting the connector 6 or 9, by which the links are assembled to produce a complete chain scraper. As shown, and as commonly used, the scraper blades 10, are rectangular and the links 5, are of equal diameter at each end; but for special conditions the ends of the links may be unequal, the blades may have a trapezoidal border, or the outer edge of blades may be curved to fit the surfaces over which they are to be operated.

The hollow hub 11, may extend entirely through the link as shown, or it may be limited in length and extend inward from each end of the link only such distance as may be required for insertion of the connector 6 or 9. The bore 13, of the hub may be triangular as shown, or square, circular or otherwise as it may be most conveniently fabricated of the material adapted to the conditions of service, provided it is as large as required to freely permit the limited transverse off-setting between two adjacent links to conform to the irregularities of the bottom of the basin and the unequal wear on the blades; also to permit angular variations in alignment of adjacent links as desired for free adjustment of curvature of the chain under variations of its load, and to freely permit one or more links to roll over an abnormal obstacle, in preference to breaking the chain or stalling the mechanism, and automatically resume a normal position, with the edges of two

blades on the bottom of basin, and otherwise adapted for a continuation of regular and efficient service.

I am aware that prior to my invention common
5 coil chains and other devices have been used, with some degree of satisfaction, in removing sludge from the bottom of sedimentation basins; that in operation they fail to contact with and clean the entire area of bottom passed over, that they push
10 the sludge along without shaving under and lifting it up to an elevation from which the semi-fluid parts will flow freely; that they lack the height and capacity required to move all loads accumulated in the vicinity of the trailing ends
15 and overflow on areas just previously cleaned.

I am also aware that in addition to circular basins there are oval, rectangular and irregularly shaped basins that may have level, sloping, curved or irregular bottoms; that they may contain water,
20 sewage, brine, or a great variety of abrasive, corrosive or chemical mixtures, and that all require occasional or continuous cleaning and removal of the accumulated dregs to maintain their efficiency; so I prefer in this application to limit my
25 claim to the chain scraper only, when suitably fabricated from substances, or combinations thereof, adapted to resist the abrasive, corrosive and chemical activity of the material encountered in service.

30 Scraper links made of thin sheet steel blades shaped, punched, bent to form the hub and riveted or welded together at the hub will be satisfactory for most conditions of service and many mixtures of materials; but for some mixtures containing highly abrasive or chemically active substances it will be prudent to use rubber, glass,
35 vitrified clay, or fibrous composition, or combinations thereof, that can only be produced by moulding or casting.

40 Similarly, a common machine bolt and cut

washers as shown inserted in the hollow hub at 12, have served very well as a connector in some mixtures, but they would not serve in a satisfactory manner under all conditions.

In consideration of the wide variations of service to be encountered I prefer to claim broadly the scraper links and connectors, however fabricated from any suitable material, and combined to form a chain suitable for the purpose and provided the essential features of the invention,
10 such as the form of links, flexibility, freedom of transverse and angular movement, rolling and self-adjusting features are substantially as set forth in the description and claim and for the purpose intended. 15

I claim:

In a settling apparatus, a circular tank having an outlet sump located at the center of the bottom of said tank, a vertical shaft extending upward from said sump, a transverse actuating element engaging said shaft and extending to a point adjacent to the periphery of said tank, a chain-scraper-mechanism attached at one end to the outer end of said actuating element and at its other end attached to said vertical shaft to produce a complete chain-like tension resisting structure extending inwardly from the outer end of said actuating element indirectly toward said vertical shaft along a flexible self-adjustable catenary-like curve, said scraper-conveyer-mechanism comprising a plurality of links connected in series by connectors which are rotatably attached to each of said links, each said link comprising a central hub, said hub having three similar scraper blades located substantially parallel
30 with and projecting outwardly therefrom, said scraper blades being rigidly attached along said central hub and spaced equidistantly about said hub. 35

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