

Feb. 11, 1947.

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2,415,592

CONCRETE PUMP

Filed April 5, 1944

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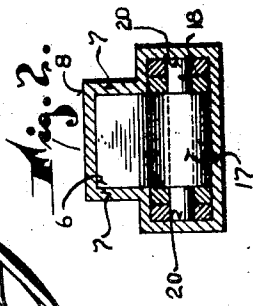
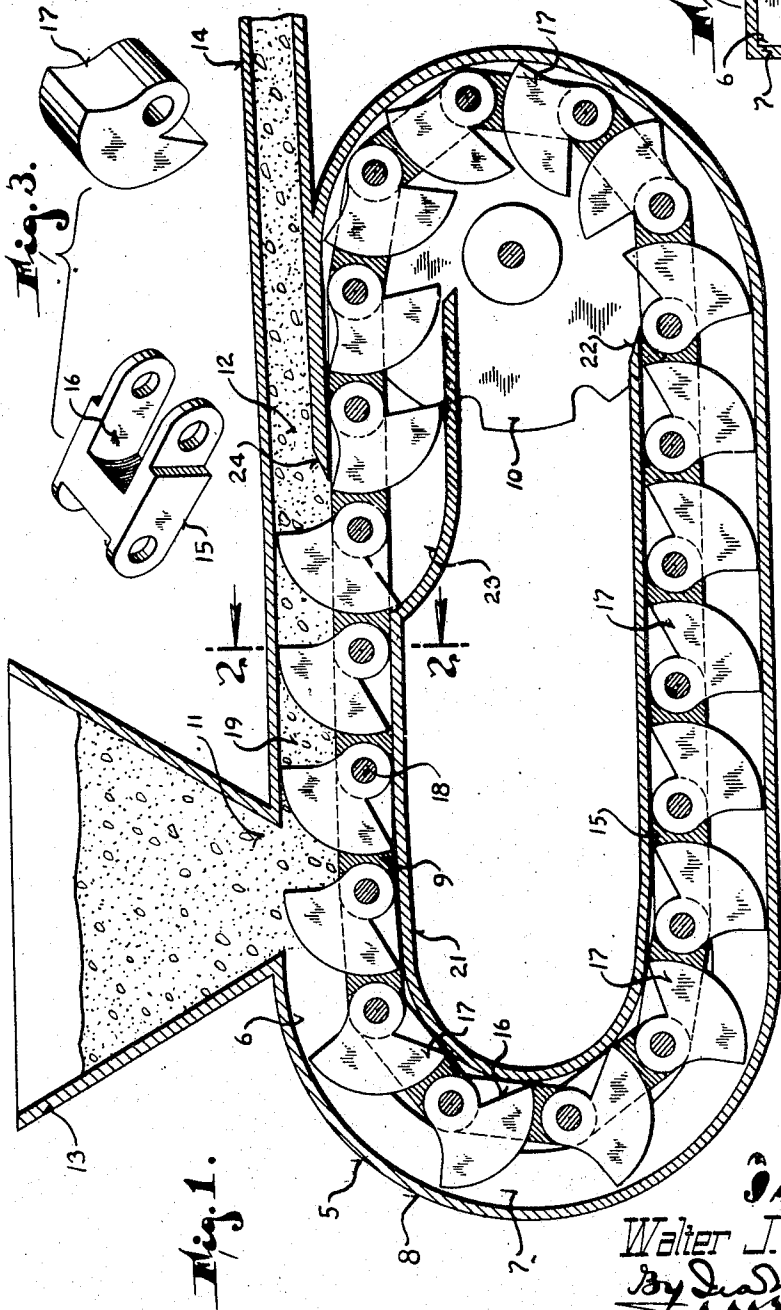


Fig. 1.

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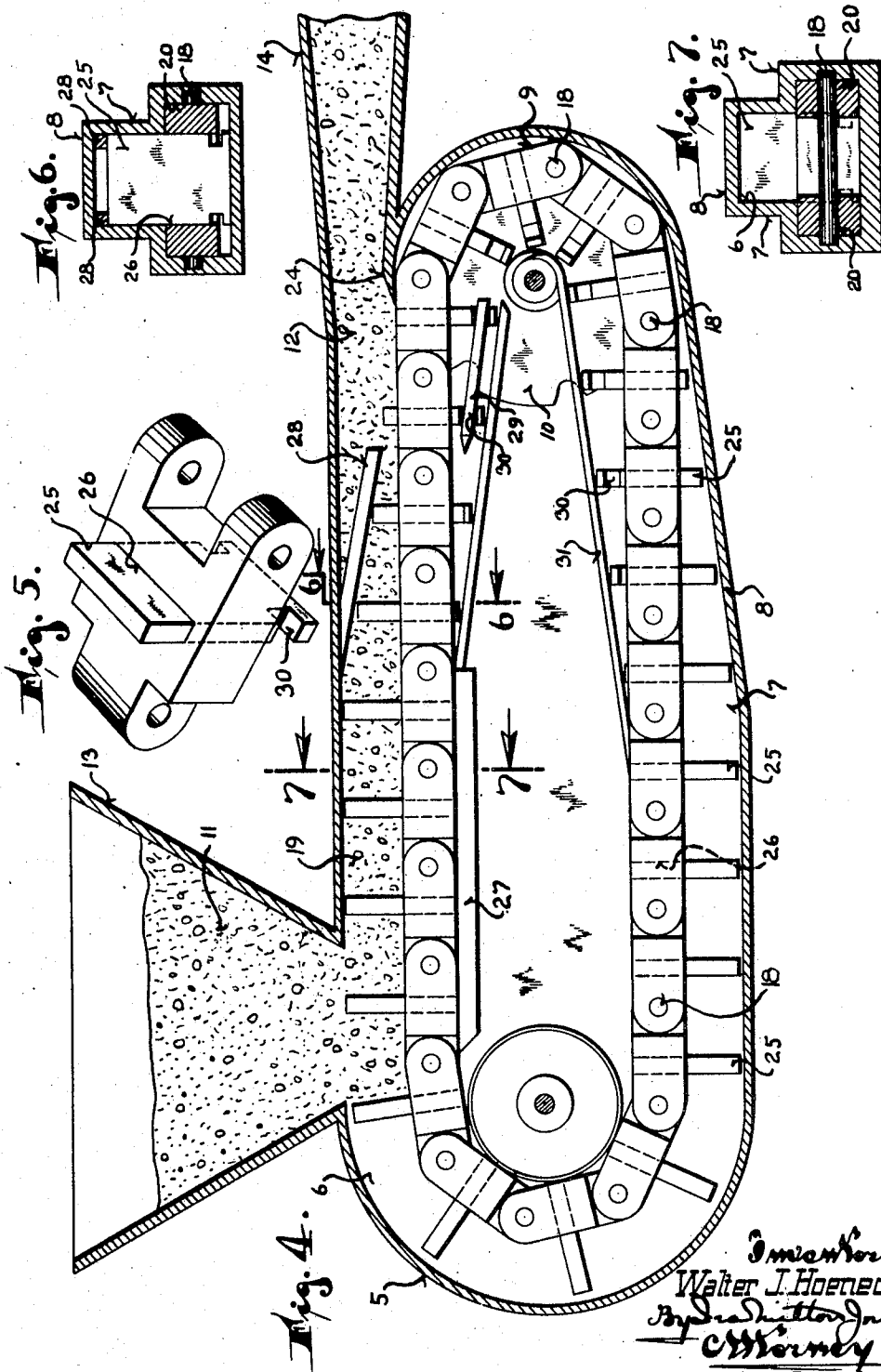
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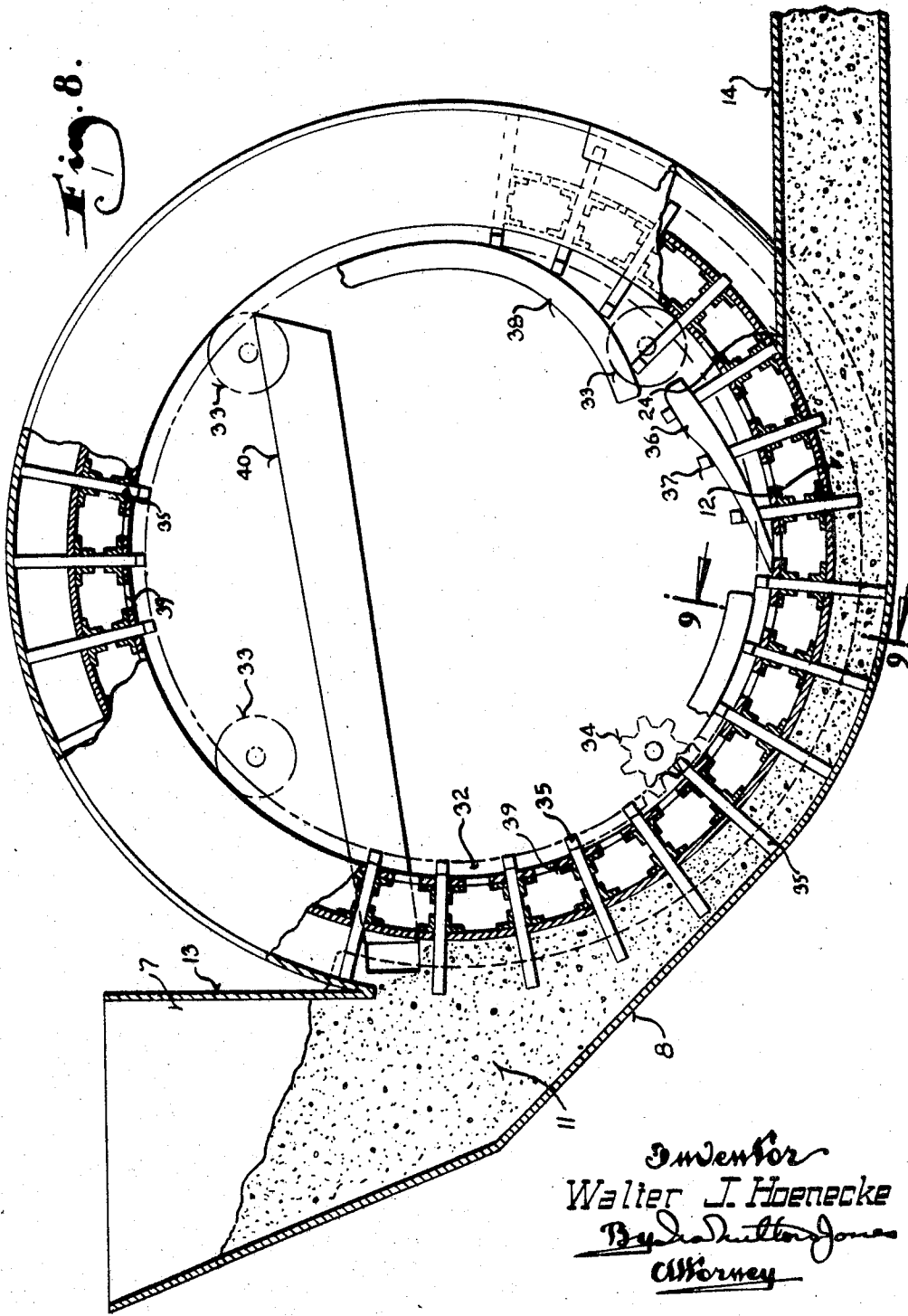
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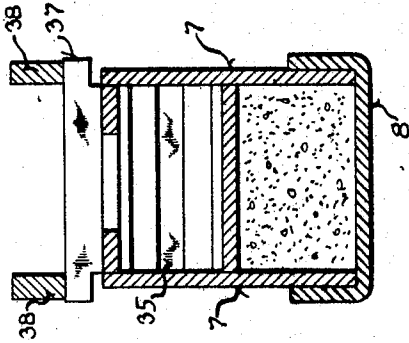


Fig. 9.

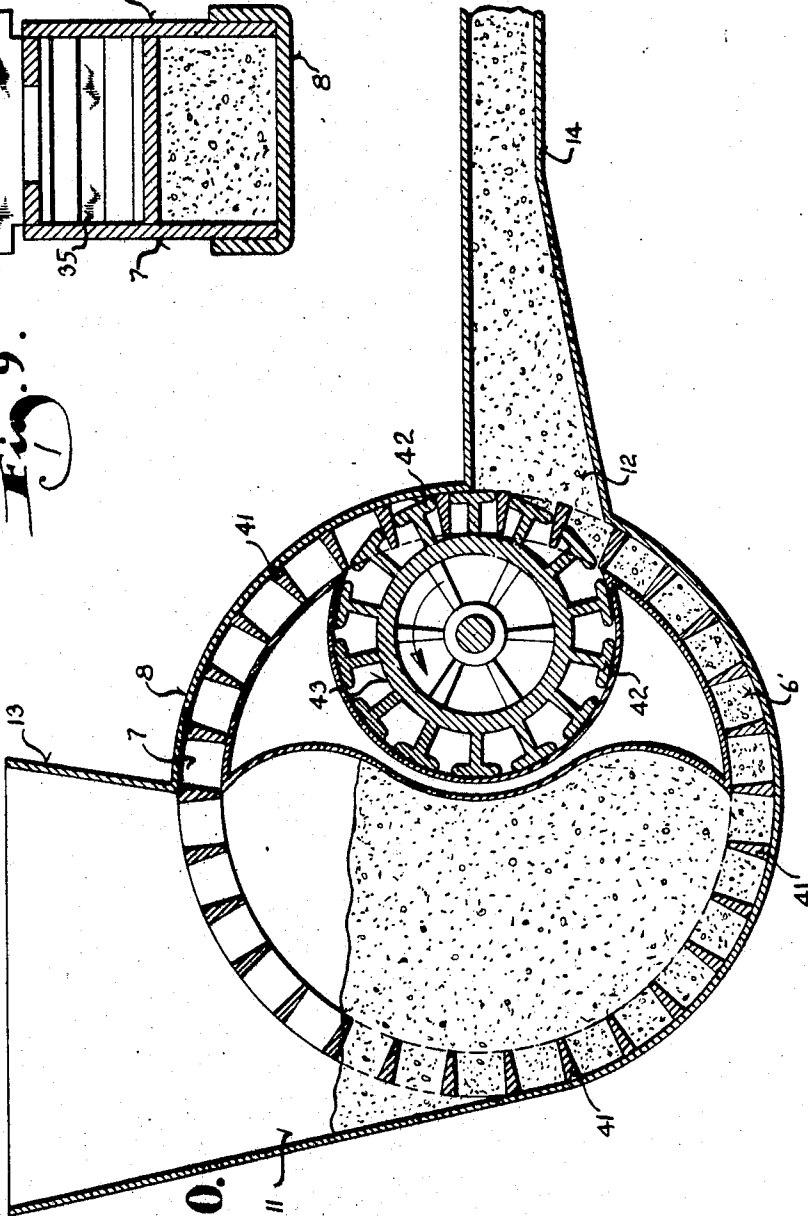


Fig. 10.

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UNITED STATES PATENT OFFICE

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CONCRETE PUMP

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4 Claims. (Cl. 198—170)

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This invention relates to pumps and refers particularly to a pump suitable for pumping concrete and similar material.

There are many instances where conventional methods of placing concrete are impractical and costly, but where it would be entirely feasible and much more economical to place the concrete into the forms by pumping the same from a remote point. However, the concrete pumps heretofore available have been very expensive machines entailing a great degree of care in maintenance and operation.

It is, therefore, an object of this invention to provide a simple inexpensive pump suitable for pumping concrete and similar materials.

Another object of this invention is to provide a pump wherein the pumping action is continuous as distinguished from the intermittent action of a reciprocating pump.

Another object of this invention is to provide a pump which is easily kept clean and in which the component parts are readily accessible and easily removed and replaced by one of ordinary skill.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiment of the invention constructed in accordance with the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a sectional view through a pump apparatus embodying this invention;

Figure 2 is a cross sectional view through Figure 1 on the plane of the line 2—2;

Figure 3 is a perspective view of two component elements of the pump shown in Figure 1;

Figure 4 is a sectional view similar to Figure 1 illustrating a modified embodiment of this invention;

Figure 5 is a perspective view of one of the component elements of the pump shown in Figure 4;

Figure 6 is a cross sectional view through Figure 4 on the plane of the line 6—6;

Figure 7 is a cross sectional view through Figure 4 on the plane of the line 7—7;

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Figure 8 is a view partly in section and partly in side elevation illustrating another embodiment of the invention;

Figure 9 is a cross sectional view through Figure 8 on the plane of the line 9—9; and

Figure 10 is a sectional view showing still another embodiment of the invention.

Referring now particularly to the accompanying drawings, in which like numerals indicate like parts, the numeral 5 designates a generally oval shaped housing structure formed of steel plate or any other suitable material and defining an endless passage 6 having side walls 7 and an outer wall 8. The inner wall of the passage is formed by the links of an endless chain 9 arranged to travel along said passage, the chain being trained over driving sprockets 10 located at one end of the housing structure.

The upper stretch of the passage 6 constitutes the active portion of the pump and has an inlet port 11 and an outlet port 12 opening thereto at spaced points.

A supply hopper 13 provides for the introduction of freshly mixed concrete into the passage 6 through the inlet port 11, and a discharge tube 14 leads from the discharge port to conduct the material from the pump. The tube 14 is adapted to have a conveyer pipe line (not shown) attached thereto to carry the concrete to any distance within the capacity of the pump.

The links 15 of the endless chain as best shown in Figure 3 are so formed as to provide openings 16 therethrough in which segments 17 move. These segments are pivotally mounted by the pins 18 which connect the links of the chain. While the chain is traveling in its straight stretch along that portion of the passage 6 lying between the inlet and outlet ports, the segments 17 are held in outwardly projected operative positions forming in effect piston members sliding through the passage 6 to coact with the walls of the passage and the links of the chain to form individual pockets 19 for advancing material from the inlet port to the outlet port.

As clearly shown in Figure 2 the side walls 7 of the passage have lateral track forming extensions 20 to accommodate the sides of the chain and enable the segments 17 to slidably engage the side walls of the passage. Any suitable means may be employed to hold the segments in their operative outwardly projected positions during this extent of their travel with the chain, as for instance, tracks extended in from the side walls 7 on which the inner edges of the segments may ride or, as specifically shown in Figure 1, the

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housing structure may have an auxiliary inner wall 21 on which segments ride.

This auxiliary inner wall extends along the passage from a point 22 adjacent to the driving sprockets 10, to a point adjacent to the outlet port 12. The edge 22 of this inner wall is engaged by the trailing portions of the segments as they approach. This moves them into their operative positions where they are held until they reach the outlet port 12 where the inner wall gradually drops away as at 23 to allow the segments to retract as they pass the outlet port.

This retraction of the segments permits them to pass the scraper 24 extending into the passage 6 adjacent to the outlet port and riding on the chain to divert the material being advanced along the passage out through the outlet port and into the discharge tube 14.

Any material which leaks past the chain and the segments drops down onto the portion 23 of the auxiliary inner wall and is carried out of the passage so as not to interfere with free movement of the chain and segments around their orbit.

The modification of Figures 4 and 5

If desired, the segments 17 may be supplanted by paddles 25 slidable in openings 26 in the links of the chain as shown in Figures 4 and 5. In this event the paddles 25 are held in their operative positions serving as pistons to advance the material from the inlet port to the outlet port by tracks 27 carried by the side walls of the housing structure and on which the inner ends of the paddles ride.

As the paddles approach the outlet port, cams 28 on the side walls of the passage partially retract the paddles. The completion of the retraction is effected by cams 29 carried by the inner walls of the housing structure and engaging in recesses or notches 30 in the side edges of the paddles. In this manner complete retraction of the paddles is effected before they reach the scraper 24.

As the paddles travel around the end of their orbit defined by the driving sprockets 10, cam tracks 31 gradually project the paddles back to their operative position, the passage being shaped to accommodate the gradual projection of the paddles as clearly shown.

As in the embodiment of the invention shown in Figures 1, 2 and 3, the sides of the passage are provided with lateral extensions to accommodate the endless chain and permit the paddles to serve as piston members.

The modification of Figures 8 and 9

The same general concept is also embodied in the construction illustrated in Figure 8 where in lieu of an endless chain type of carrier a ring member 32 is provided. This ring member is guided for rotation on idler rolls 33 and is driven by a sprocket 34 meshing with an internal ring gear mounted on the ring member.

As in the constructions already described, the housing structure is formed to provide the side and outer walls 7 and 8, respectively, of a passage connecting the inlet port 11 with the outlet port 12.

The ring member 32, which provides the inner wall of the passage has radial openings there-through at spaced intervals to slidably mount paddles 35 similar to the paddles 25 of the structure shown in Figures 4 and 5. These paddles extend into the passage to coact with the walls

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thereof and the ring 32 in the formation of individual pockets for advancing the material from the inlet port to the outlet port.

Upon reaching the outlet port the paddles 35 are retracted by cam means 36 engaging under lateral projections 37 on the inner ends of the paddles to permit the paddles to pass the scraper 24, and after they pass the scraper, other cam means 38 serve to restore the paddles to their operative positions and hold them there until they must be retracted.

Any material which enters the interior of the ring structure 32 is allowed to drop therefrom through openings 39 as it is carried around the upper portion of the orbit. Such material dropping from the openings 39 is caught by a trough 40 which leads back to the inlet hopper.

The modification of Figure 10

The embodiment of the invention shown in Figure 10, though different from those previously described, follows the same in its broad essentials.

As in these previously described embodiments the housing structure is formed of steel plate and has a passage 6' connecting the inlet port 11 with the outlet port 12. In this instance, however, the endless ring member which travels in the housing structure has fixed paddles or vanes 41 to coact with the walls of the passage 6' to form individual pockets for advancing material from the inlet to the outlet.

As these pockets reach the outlet the material therein is expelled and forced into the discharge tube by piston members 42 extending radially from and rigidly mounted on a rotating member 43. The piston members mesh with the pockets defined by the paddles or vanes 41 and force the material therefrom as clearly shown in Figure 10.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art that this invention provides an exceedingly simple, inexpensive pump suitable for handling concrete and similar materials.

What I claim as my invention is:

1. A pump of the character described, comprising: a housing structure defining an endless passage having spaced inlet and outlet ports; an endless chain within said passage, the links of said chain coacting to form a bottom wall for the passage between its inlet and outlet ports, said links having transverse openings; segments pivotally mounted in said openings and of a size to project into the passage and act as piston members to advance material from the inlet port to the outlet port; and a scraper at the outlet port riding on the outer surface of the chain to deflect material from the passage and out through the outlet port, said segments being retractible as they approach the scraper to enable the same to pass the scraper.

2. A pump for pumping concrete and similar materials comprising: a housing structure defining an endless passage having spaced inlet and outlet ports opening into said passage; a discharge tube leading from the outlet port; an endless chain mounted in said passage; sprocket wheels for driving said endless chain, the links of said chain coacting to form an inner wall for the passage between the inlet and outlet ports and said links having openings therethrough; segments pivotally mounted on said links for motion in said openings, said segments being of a

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size to project into the passage and serve as piston members during their travel from the inlet port to the outlet port; means for holding the segments in their operative positions projecting into the passage during their travel from the inlet port to the outlet port, said means being formed to permit retraction of the segments as they approach the outlet port so that said segments no longer project into the passage but contact with the links of the chain to form the inner wall thereof.

3. A pump of the character described comprising: a housing structure defining an endless passage having spaced inlet and outlet ports; an endless carrier member within said passage forming an inner wall thereof between the inlet and outlet ports, said carrier member having transverse openings; piston members; pivotal mountings for said piston members by which they are mounted on said carrier member to swing through said openings therein and into the passage, said piston members being of a size to extend across the passage so as to advance material from the inlet to the outlet port upon movement of the carrier member along the passage; means for moving the endless carrier member in a direction such that the inner wall of the passage formed by the endless carrier member between the inlet and outlet ports moves from the former toward the latter; and a scraper at the outlet port riding on the carrier member to deflect material from the passage and out through the outlet port, said piston members being retractible as they approach the scraper to enable the same to pass the scraper.

4. A pump of the character described comprising: a housing structure defining an endless passage having spaced inlet and outlet ports; an endless carrier member movable along said passage and forming an inner wall thereof between the inlet and outlet ports, said carrier member having transverse openings; piston members; pivotal mountings for said piston members by which they are attached to said carrier member in a manner enabling them to swing through said

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openings into and out of said passage, said piston members being of a size to extend across the passage when positioned therein so as to advance material from the inlet to the outlet port upon movement of the carrier member along the passage, the relationship between piston members and the walls of the transverse openings in the carrier member being such that the piston members are not supported by the walls of said openings against the reaction of the material being pumped, whereby said piston members are easily retracted; means wholly apart from the walls of the transverse openings for supporting the piston members in an operative position against the reaction of the material being pumped; means for moving the endless carrier member in a direction such that the inner wall of the passage formed by the carrier member between the inlet and outlet ports moves from the former toward the latter; and means at the outlet port for deflecting material from the passage and out through the outlet port, the piston members being retractible as they approach said last named means.

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