Jan. 13, 1931. C. G. CLAPP 1,788,451

BUILDING MATERIAL PLACEMENT MACHINE

Filed Jan. 8, 1929 2 Sheets-Sheet 1

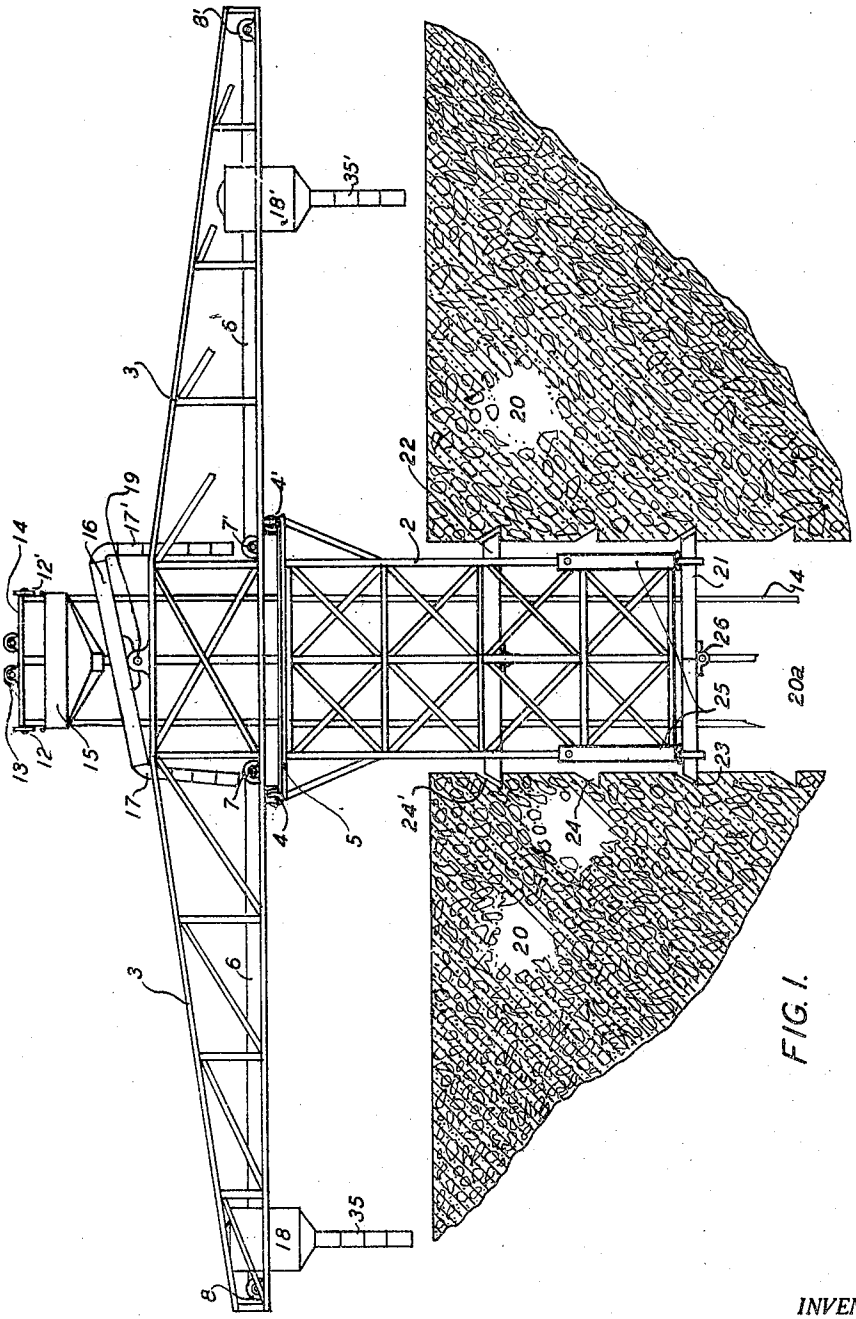


FIG. 1.

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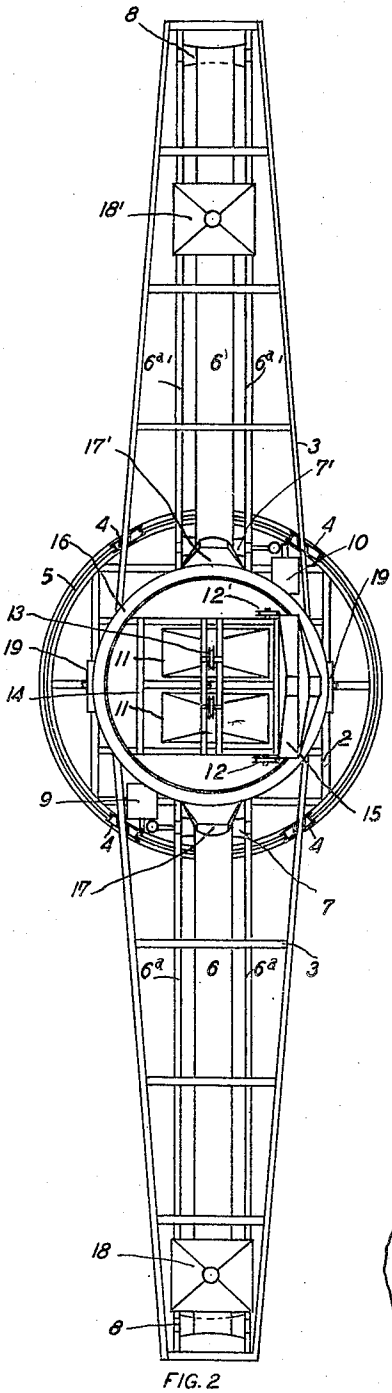


FIG. 2

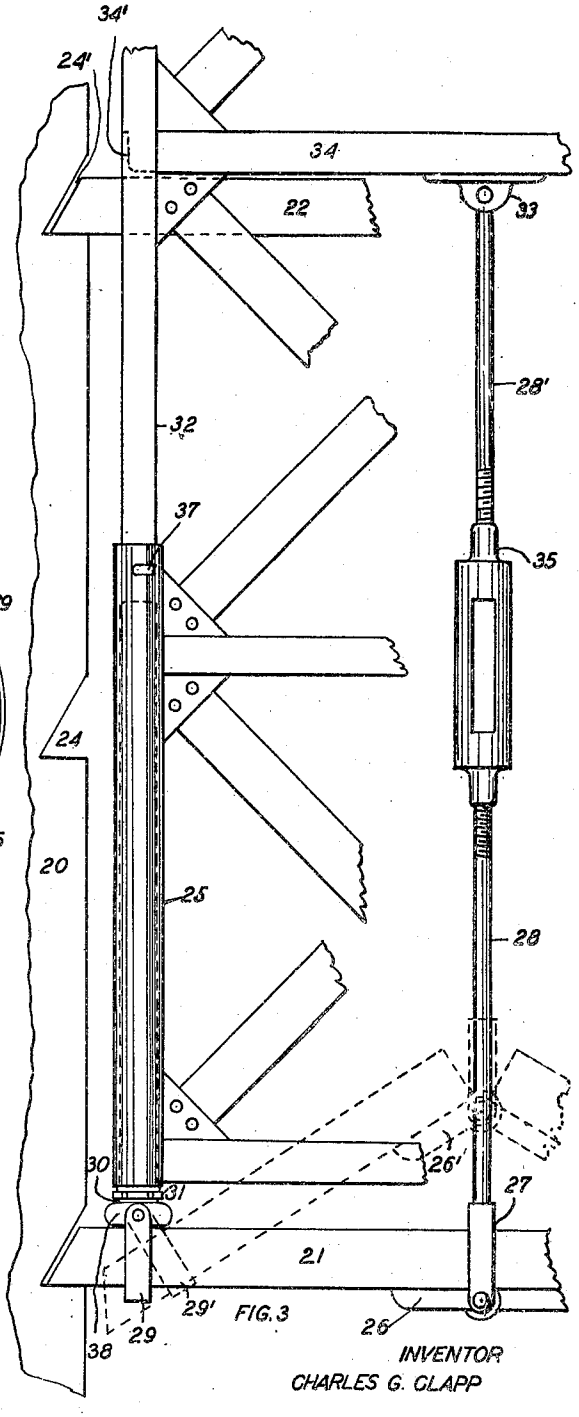


FIG. 3

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BUILDING-MATERIAL-PLACEMENT MACHINE

Application filed January 8, 1929. Serial No. 331,049.

My invention relates to a machine for the pouring or placement of hydraulic concrete, or other similar building material, such as is used in the construction of monolithic dams, buildings, and other structures wherever mixed concrete is to be distributed and placed in forms thruout a comparatively large area.

One of the objects of my invention is to provide a means whereby the material may be placed in any position on the work from a centrally located tower of comparatively low elevation, thus obviating the necessity of numerous guy wires and extensive and elaborate chuting systems; another object is to provide means whereby the material may be placed within the area of the swing of a revolving cantilever beam and from either side of the tower without change of position of the super-structure; a further object is to afford a means whereby distribution and placement of the material may be effected within a minimum time after the mix, and with a minimum of power expended in lifting the material to the point of distribution in the tower. Other objects will appear hereinafter.

I attain these objects by the device illustrated in the accompanying drawings in which Fig. 1, represents a side elevational view of the entire machine; Fig. 2, represents a plan view; Fig. 3, represents an enlarged fractional view of one corner of the supporting and lifting mechanism.

Similar numerals refer to similar parts thruout the several views.

The tower 2 rests upon beams 21 and 22, the ends of which are supported in niches formed in the walls of the shaft 20*a* left in the structure being formed, and which provides a means of access to the base of the structure 20 when it is desired to place the concrete mixer at the base.

Upon this tower the cantilever beam 3 rests, being supported by trunnion wheels 4 running on the annular track 5. The wheels 4 are journaled to the lower longitudinal members of the beam, while the track is made an integral part of the tower structure. On either side of and within the beam 3 conveyor belts 6 and 6′ run on rollers 7 and 7′ and 8 and 8′, and are driven thru gearing by electric motors 9 and 10 in the direction indicated.

Material is hoisted from the shaft 20*a* in skips 11 and 11′ running in the conventional manner by a cable over sheaves 13 and in the elevator tower 14 positioned within the tower 2 and provided with skip guides. This inner tower 14 may be extended with its skip guides to reach the loading platform for the skips, which may remain at the bottom of the shaft, or may be later established at an intermediate position, as the building of the structure progresses. The skips dump into hopper 15 in the usual conventional manner by tripping horns integral with the hopper structure. This hopper is also equipped with a conventional discharge regulation gate thru which the material flows into the circular tilting chute 16. This chute is positioned on the central portion of the beam 3 by pintles 19, and is so constructed that it may be tilted whereby material may be discharged onto either belt 6, thru the semi-flexible chute 17, or onto belt 6′ thru the similar chute 17′. As the beam swings on the tower 2 the distance between the discharge chute on hopper 15 and the corresponding place of receiving this discharge on chute 16 will vary. Since it is desirable to keep this distance uniform, to prevent splashing and disturbance of the mix, the hopper 15 is suspended on cables running over pulleys 12 and 12′ by means of which its vertical position on tower 2 may be changed and a vertical adjustment thereby effected.

From the conveyor belts the material is removed by the trippers 18 and 18′ from which it is conveyed to the place of deposit thru the flexible chutes 35 and 35′. Trippers 18 and 18′ are slidable along the rails 6*a* and 6*b*, and 6*a*′ and 6*b*′ thus enabling the chutes 35 and 35′ to reach any part of the structure being poured within the circumference of the swing of the beam 3 and as far beyond this as the chutes themselves will reach. The beam 3 may be turned manually by cables attached to its ends, or mechanically by electric motors 9 and 10 operating thru appropriate clutch

and gear mechanism on a large annular gear on the inside of the track 5.

The tower 2 is shown in the preferred form as having a square cross-section. It is built mainly of angle-steel in the conventional manner having cross beams, as 34, dividing it into sections which are braced by the usual lattice construction. The lower ends of the corner members are welded onto four cylinders 25 which are tied into the structure by cross-beams and lattice members as shown in Fig. 3. Within these cylinders the piston rods 30 operate. Glands 31 are used to seal in these pistons; the rods themselves acting as pistons, and terminating in feet 38 which rest upon cross-beams 21. The weight of tower 2 rests mainly on these two beams 21 (only one of which is shown in Figs. 1 and 3, but which are identical, each being under two legs of the tower). All these beams are hinged in the middle as shown at 26 in Fig. 3. The yoke 27 connects the hinge 26 to the rods 28 and 28′ and turnbuckle 35. The upper rod 28′ is anchored to cross-beam 34 by the support 33. Upper beams 22 are positioned under cross-members, one of which is indicated in Fig. 3 marked 34′. They are equipped with turnbuckles, and stirrup retaining means similar to the lower beams 21.

As the work advances and it becomes necessary to raise the tower 2, upper beams 22 are broken at the hinge, bent upward and given a position similar to that of the lower beam as indicated by the dotted lines, Fig. 3.

In this position the ends of the feet of the beam are drawn toward the tower so as not to strike the side walls of the shaft. It is necessary to raise the tower slightly to accomplish this, since there is a slight downward turning moment of the ends of 22 as it is bent upward in the middle. The tower 2 is then raised by forcing oil or other suitable fluid thru ports 37, interconnected by piping to all cylinders. The four cylinders, comprising as they do a hydraulic lifting mechanism are thus made to lift the entire structure a distance of a little more than a section, and enough to permit the upper beam to be straightened and its ends forced into niches 24′, thus forming a temporary support for the tower. While the weight of the tower is on these upper beams, the lower beams 21 are broken at the hinges by means of the turnbuckle and drawn up to the position indicated by the dotted lines. The upper rod of the turnbuckle is then removed from its support 33 leaving the beam supported by the stirrups 29. Pressure is then reversed in the cylinders 25 and the pistons, together with the beam raised by atmospheric pressure to a position such that when the beam is again straightened its ends will engage niches, such as 24. Extra section of the inner tower including the necessary skip guides are then added to extend the guide ways to the loading platform.

It will be seen that the cantilever beam 3 is supported by the tower at substantially the mid-length of said beam, and that the elements for hoisting, dumping and conveying the building material to the place of use are combined therewith in such a manner as to produce a balanced structure particularly well adapted for use in building up a wall at opposite sides of the shaft 20*a* within which the tower is shown to be mounted.

It is to be noted that if the situation of the structure being poured is such that the concrete is conveniently mixed at a point above the top of the tower, such as the side wall of a canyon in which a dam structure is being built, the hoisting skips and mechanism need not be used, and the material may be directly chuted into the hopper 15 by gravity. The principle of distribution and placement, however, together with the method of elevation of the tower would be the same.

Having now, fully described my invention, and realizing that to those familiar with the art, various changes in the specific structure herein described might be made, which would, nevertheless, remain within the spirit of my invention as herein disclosed, I wish to be limited only by the following claims.

I claim:—

1. In a device of the kind disclosed, in combination, a central supporting tower, an annular track attached to the upper portion of said supporting tower, a horizontal composite beam centrally positioned on said supporting tower, supported on rollers running on said annular track, conveying mechanism operating longitudinally within said beam, tripping mechanism movable longitudinally on said beam and adjustable conveyance chutes from said tripping mechanism to the place of deposit.

2. In a device of the kind disclosed, in combination, a central supporting tower; an annular track attached to the upper portion of said supporting tower; a horizontal composite beam centrally positioned on said supporting tower, supported on rollers running on said annular track; conveying mechanism operating longitudinally within said beam; tripping mechanism movable along said beam; adjustable conveyance troughs adapted to convey material from said tripping mechanism to the place of deposit; means for conveyance of material onto said conveying mechanism operating in said beam.

3. In a device of the kind disclosed, in combination, a supporting tower having an annular supporting track upon its upper portion; a rotatable cantilever beam centrally positioned and supported on said tower by means of rollers running on said supporting track; a hopper positioned on said supporting tower adapted to receive and discharge

material; a tilting circular chute cooperative with said hopper and adapted to convey material upon either of two conveyor belts operating in said beam; lateral conveying mechanism mounted upon said beam; tripping mechanism adapted to remove material from said lateral conveying mechanism and being movable along said beam; and means to receive material from said tripping mechanism and convey same by gravity to the place of deposit, on both sides of said tower.

CHARLES G. CLAPP.