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MATERIAL HANDLING APPARATUS

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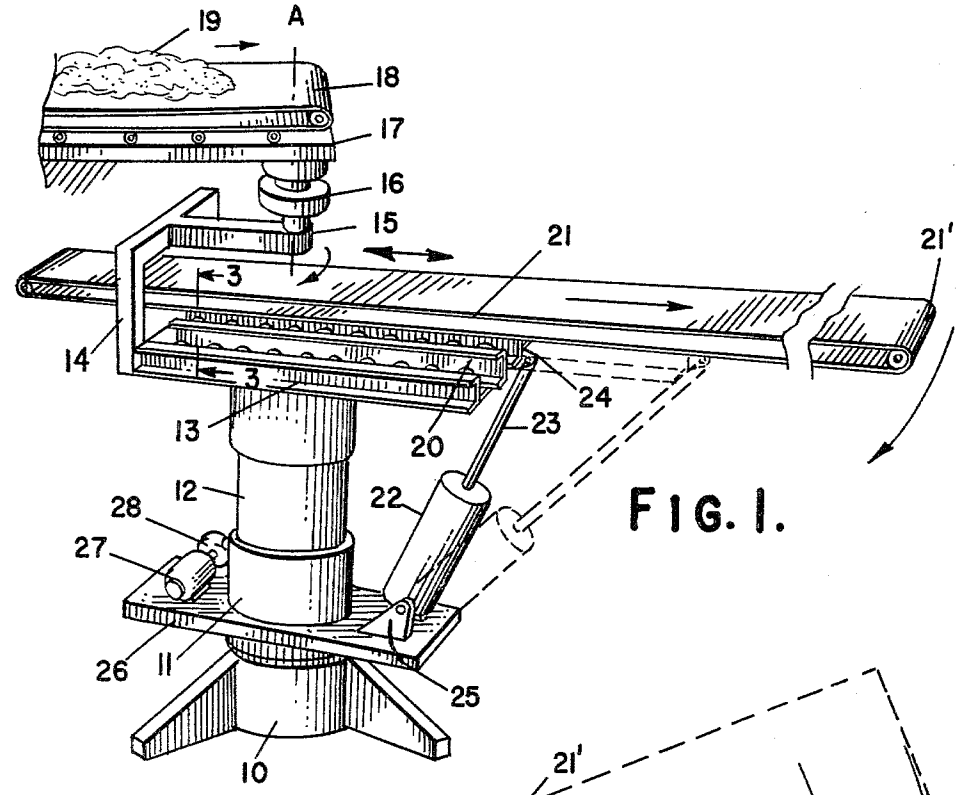


FIG. 1.

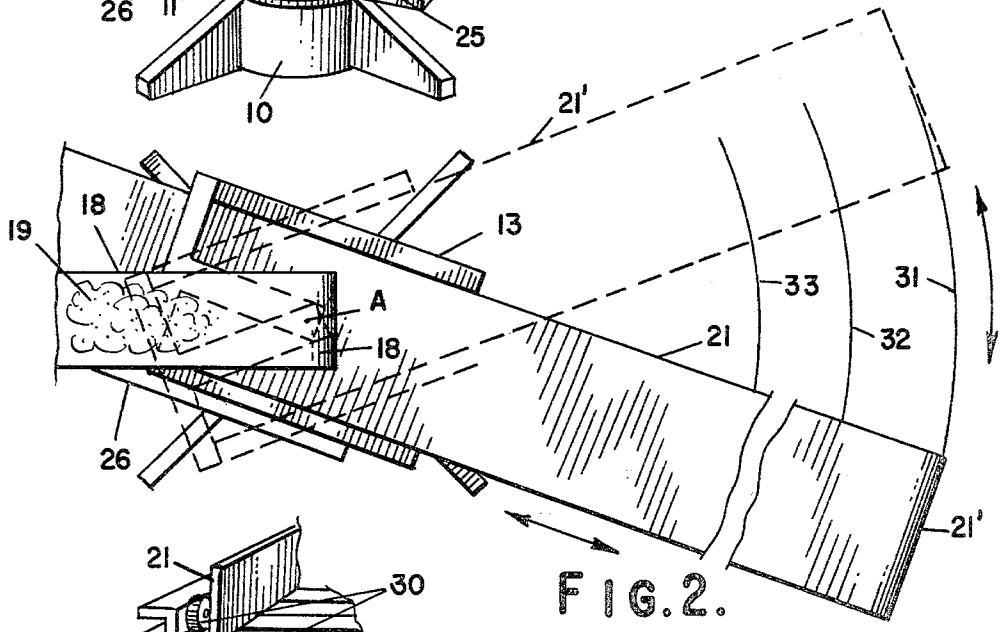


FIG. 2.

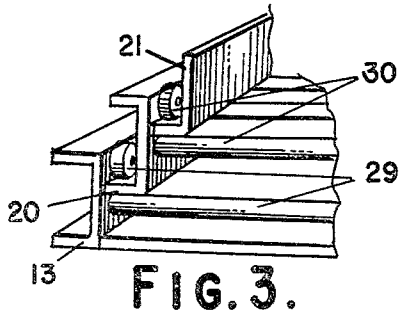


FIG. 3.

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MATERIAL HANDLING APPARATUS

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This invention relates generally to material handling apparatus and more particularly, to an improved portable type conveyor apparatus useful in construction work wherein a given area is to be covered with material such as cement or concrete.

In laying concrete slabs such as for commercial garage floors, factory floors, and the like, considerable manual labor is involved in transporting the cement from a source to the particular area to be covered. Generally, push or power carts, cranes or similar means are used by several men to deposit the concrete in various portions of the area preparatory to forming the slab.

While conveyor systems have been provided for delivering the concrete to a convenient location close to the area on which the slab is to be constructed, there is still required the transportation of the cement or concrete from the delivery conveyor to positions to cover the area on which the slab is to be formed.

With the foregoing in mind, it is a primary object of this invention to provide an improved portable type material handling apparatus, particularly designed for delivering concrete from a source to cover a given area in a continuous manner so that an entire concrete slab may be formed relatively quickly.

More particularly, it is an object to provide a material handling apparatus capable of being operated by one individual for distributing material over a given area in a very rapid manner as compared to prior art means, to the end that considerable savings in labor and costs can be effected.

Briefly, these and other objects and advantages of this invention are attained by providing a material depositing conveyor means including an elongated cantilevered conveyor portion. This material depositing conveyor means is rotatably mounted with respect to a base support such that the cantilevered conveyor portion may be swung over a relatively large arc. The mounting for the conveyor means also includes means enabling retracting of the elongated cantilevered portion thereof, so that the depositing end of the conveyor may be swung over smaller arcs and by progressive retraction and subsequent swinging of the conveyor, an entire area may be covered with material supplied to the conveyor in a relatively rapid manner.

The entire apparatus itself is relatively small and may be operated by one man who effects the swinging and retracting movements of the depositing conveyor so that a desired area may be covered with material such as cement or concrete.

A better understanding of the invention will be had by now referring to a preferred embodiment thereof as illustrated in the accompanying drawings, in which:

FIGURE 1 is a perspective view of the material handling apparatus of this invention;

FIGURE 2 is a top plan view thereof useful in explaining the operation of the apparatus; and

FIGURE 3 is a fragmentary cross-section showing certain details of the apparatus.

Referring first to FIGURE 1, the apparatus includes a base support 10 for supporting a table means. This table means includes telescoping column structures 11 and 12 mounting a table 13. The telescoping column structures 11 and 12 and table 13 may rotate as a unit within the base support 10, there being provided a simple thrust bearing within this support. Also, the telescoping column

structures 11 and 12 may be telescoped outwardly as will be described subsequently to raise and lower the level of the table 13.

As shown in FIGURE 1, the table 13 includes an open frame structure 14 secured to its rear end. This frame structure serves to support an arm 15 which extends over the top of the table 13 as shown. The arm 15, in turn, carries a rotatable thrust type bearing 16 which serves to support the end of a delivery table 17 supporting a material delivery conveyor 18. The arrangement is such that the axis of rotation of the bearing 16 is coaxial with the axis of rotation A of the table 13 and telescoping columns 11 and 12 within the base support 10.

The material delivery conveyor structures 17 and 18 may constitute conventional apparatus wherein material such as concrete 19 may be delivered to a certain location. Ordinarily, the concrete 19 would be dumped by the delivery conveyor 18 into a worker's push or power cart, and thence this material transported by the worker to a specific location. With the apparatus of the present invention, however, the end of the delivery conveyor 18 and platform 17 is supported over the thrust bearing 16 so that the table structure 13 may rotate beneath this conveyor while the conveyor support platform 17 is stationary.

Mounted on the table 13 is a material depositing conveyor means including a supporting conveyor 20 having rollers for enabling longitudinal movement back and forth on top of the table 13. This supporting conveyor 20 in turn supports a principal conveyor 21 including an elongated cantilevered conveyor portion terminating in a depositing end 21'. As indicated, this principal conveyor is mounted for longitudinal movement along the supporting conveyor 20 so that the principal conveyor may be retracted or extended, the rear end portion thereof passing through the open frame structure 14.

In order to provide sufficient stabilization for this structure, there is provided a hydraulic cylinder 22 and piston 23 connected at 24 to the front end of the supporting conveyor 20 and at 25 to a supporting platform 26 secured to the column 11. The connections 24 and 25 constitute pivots so that support will be provided continuously during outward movement of the table 13 and the material depositing conveyor means mounted thereon.

Hydraulic fluid for the cylinder 22 to enable it to extend the piston 23 or retract the same and thus control longitudinal movement of the supporting conveyor 20, is provided by a motor 27 and hydraulic pump 28 mounted on the rear of the platform 26 to provide a counter-balance weight for the extended cantilevered end of the depositing conveyor 21. Further weights may be added to the platform 26 if desired.

With reference to FIGURE 2, it will be noted that as a consequence of supporting the end of the delivery conveyor 18 in the thrust bearing 16 in coaxial alignment with the axis of rotation A of the table 13, the end of the delivery conveyor 18 will be properly positioned to deliver material such as concrete to the principal conveyor and table structure. In other words, the swinging of the principal conveyor in an horizontal plane about the axis A takes place while the delivery conveyor 18 is coaxial with the center of rotation of the conveyor 21, material will always be deposited on the conveyor during swinging movement thereof.

FIGURE 3 illustrates one means for supporting the cantilevered end portion 21' of the conveyor 21. As shown, there may be provided pairs of upper and lower rollers 29 sandwiching the lower flange of a side member constituting part of the conveyor 20. Similarly, the conveyor 21 may be locked against any possible tilting movement by pairs of upper and lower rollers 30 sandwiching the lower flange of a side member constituting part of the conveyor 21.

With the foregoing description of the components in mind, the operation of the material handling apparatus will now be described. Assume first that a given area is to be covered with concrete and that this concrete is to be delivered by a conventional conveyor such as indicated at **18** in FIGURE 1. The end of this conveyor and support **17** therefor as positioned above the thrust bearing **16** by moving the entire material handling apparatus under the end of the delivery conveyor. The delivery conveyor may then deposit concrete **19** directly onto the top of the principal conveyor **21** and operation of this conveyor will transport the concrete to the depositing end **21'**. Initially, the principal conveyor **21** is extended to the right as viewed in FIGURE 1 so that the cantilevered end portion thereof is at its furtherest distance from the main base support structure **10**. In this instance, the supporting conveyor **20** will be extended to the dotted line position illustrated in FIGURE 1 to provide proper support for the principal conveyor **21**.

With reference now to FIGURE 2, and with the conveyor **21** extended to its maximum position, the table **13** may be swung about the axis A so that the depositing end **21'** of the conveyor **21** describes an arc such as indicated at **31** in FIGURE 2. As the end **21'** of the conveyor describes this arc, material will be deposited therefrom onto the area and after one complete swing, the depositing end **21'** of the principal conveyor **21** may be retracted, the rear end of the conveyor passing through the open frame **14** as described heretofore in conjunction with FIGURE 1. This retraction takes place in progressive steps by operation of the hydraulic cylinder **22** and by simple manual pulling of the conveyor **21** rearwardly. After retraction of a given amount, the conveyor **21** is swung back along a smaller arc such as indicated at **32** continuously depositing material during this swinging movement. The next retraction will enable the depositing end **21'** to swing along a still smaller arc such as **33**. Thus, an entire area may readily be covered by material initially deposited from the delivery conveyor **18** to the principal conveyor **21**.

The telescoping columns **11** and **12** described in FIGURE 1 may be provided with hydraulic fluid from the same pump **28** as supplies fluid to the cylinder **22** to raise and lower the table **13**. By this arrangement, the level of the end of the principal conveyor **21** above the particular area to be covered with material may be adjusted.

Various valves and the like for operating the hydraulic cylinder **22** and the telescoping columns **11** and **12** are entirely conventional and, therefore, are not set forth or described. The entire apparatus is sufficiently light in construction to enable a single workman to swing the table **13** manually about the axis A, and to retract or extend the principal conveyor **21** relative to the supporting conveyor **20** as the depositing of the material takes place. Thus, an entire area may be covered by a single workman in a very short time to the end that construction of concrete slabs, or the depositing of gravel or similar material is greatly facilitated and can be effected with considerably less labor and cost than has heretofore been required.

While swinging and retracting movements of the conveyor have been described as being effected manually, motors could be used to perform these movements.

From the foregoing description, it will thus be evident that the present invention has provided a greatly improved material handling apparatus. While only one specific embodiment of the invention has been set forth, various changes that fall clearly within the scope and spirit of the invention will occur to those skilled in the art. The invention is therefore not to be thought of as limited to the particular material handling apparatus set forth merely for illustrative purposes.

What is claimed is:

1. A material handling apparatus for depositing material over a given area comprising, in combination: a base support; telescoping column means rotatably supported by and extending upwardly from said base support; a table mounted to the upper end of said telescoping column means; an open frame structure extending upwardly from one edge of said table and including an arm extending over said table in vertical spaced relationship thereto; a thrust bearing supported at the end of said arm in coaxial alignment with the axis of rotation of said column means and table for supporting a material delivery conveyor; and a material depositing conveyor means mounted on said table beneath said material delivery conveyor and including a supporting conveyor mounted on top of said table for movement therealong; and a principal conveyor including an elongated cantilever conveyor portion mounted on top of said supporting conveyor for movement along said supporting conveyor, said conveyor means being movable longitudinally along said table with the rear end thereof passing through said open frame structure and rotatable with said table so that the far end of said cantilevered conveyor portion may be swept over an arc of 360°, thence retracted and swept over an arc of smaller radius, and so forth to deposit said material over said given area.

2. A material handling apparatus according to claim 1, including a hydraulic cylinder and piston extending between said base support and the forward end of said supporting conveyor for stabilizing said supporting conveyor; and hydraulic pump means secured to said base support for supplying fluid to said hydraulic cylinder as said supporting conveyor and principal conveyor are extended and for supplying fluid to said telescoping column means for raising said table.

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