A selectively self-propelled cart has mounted thereon an extendable platform which can be extended, for example by a scissor arrangement, to ceiling height to form a support mold for concrete. The cart has a separable drive unit, and both the extension mechanism for the scissors as well as the drive unit are operated by a compressed fluid, each with its separate operating motor or cylinder. The compressed fluid, such as oil is obtained from a pump driven by a self-contained prime mover such as a gasoline engine or a battery supplied electric motor, the prime mover and the pump, or compressor for the operating fluid being removable, and selectively connectable separable either the extension mechanism for the scissors or the separable drive unit for the cart carrying the mold frame.

4 Claims, 3 Drawing Figures
MOBILE CONCRETE CEILING MOLD PLATFORM

The present invention relates to a platform to form a lower mold for the ceiling of poured concrete structures which is mobile, and in which the mold platform itself can be extended or retracted against a cart frame on which the wheels to move the apparatus are located.

It has previously been proposed to provide mobile ceiling support elements for poured concrete structures; to be economical in use, however, these molds must be quite large and their transport to and from a construction zone may be difficult because of the heavy weight to be handled, and the potentially awkward size of the unit. If the units are to be transported over longer paths, the difficulties in using mobile, re-usable mold forms for poured concrete ceiling constructions become multiplied.

It is an object of the present invention to provide a mobile ceiling mold platform which is simple in use and which has simplified handling and which does not, however, introduce substantial additional first costs.

Subject matter of the present invention: Briefly, a wheeled frame is provided, to which a drive unit, such as a drive dolly is attached; preferably, the drive dolly is separate from the cart or frame. A hydraulic or pneumatic power source, common to both the wheeled drive of the dolly, as well as to an erection cylinder, or other mechanism for the platform is provided, preferably mounted, separably on the cart or on the dolly.

In a preferred embodiment, the power source of compressed fluid, such as compressed air or oil under pressure is provided by a compressor driven by a prime mover such as an internal combustion engine, or an electric motor, supplied from batteries. The prime mover and its energy source are separably mounted on either the cart or frame, or on the drive dolly. If mounted on the drive dolly, it can be left there and the drive dolly can be used to place any number of carts with the ceiling mold platforms in position, and then provide the necessary pressure fluid to extend the platform to the desired height. Once placed, the platform can readily be locked in place, either by sealing an incompressible fluid in a given space, or by mechanical arrangements.

The invention will be described by way of example with reference to the accompanying drawings, wherein:

FIG. 1 is a schematic side view of the apparatus in which the mold platform, when in collapsed position, is shown in full lines, and in chain-dotted lines when in extended position;
FIG. 2 is a top view, with the platform removed, of the cart frame and the drive dolly; and
FIG. 3 is a fragmentary view of the drive dolly with the source of power mounted thereon, the remainder being similar to the embodiment of FIG. 2.

A cart, generally designated GW has a lifting device HS, in the form of interlocking scissors, which move a mold platform ST forming a support for a ceiling platform mold for pouring of concrete thereon. A hydraulic cylinder Z is swingably secured to frame R of the cart GW and, when subjected to hydraulic pressure fluid, stretches the scissor extension arrangement as seen in FIG. 1, from the full line position to the chain-dotted position. Such scissor arrangements are known in the art, and need not be described in detail. One, or both of the base ends of the base scissor links are slidably located on the cart GW.

Operative power is provided by a common hydraulic pressure source AA, which provides hydraulic pressure both for a hydraulic motor FM to move the cart GW, as well as for the hydraulic cylinder Z lifting, or permitting depression of the lifting arrangement HS. The cart GW can be moved by releasably securing thereto a drive unit, such as a dolly AF, to which the drive motor M is secured. The power source AA is likewise removably and releasably mounted on the cart GW. The drive dolly AF can swing about a horizontal axis AH with respect to the cart GW and, by removing a bolt, for example, is releasably connected therewith. A power or driven wheel AL is secured to the dolly AF, and connected with the drive motor FM. The forward part of the dolly TF can swing about a vertical axis AV. The motor FM is controlled by means of a switch S, and a forward-backward control slider St, the control units being preferably arranged at a forward extension, or guide post D of the dolly AF.

The hydraulic power source AA includes a prime mover Mz, which may be an internal combustion engine with attached fuel tank, or an electric motor, supplied from batteries. The prime mover drives a hydraulic oil pump, preferably a gear pump P, which is connected by means of a suction line SL with a supply tank OB for pressure fluid (see FIG. 2).

The oil pump P is connected over pressure line DL with the hydraulic cylinder Z of the lifting device HS. Another hydraulic pressure line DL connects to the hydraulic motor FM on the dolly. Return of hydraulic fluid is over a return line RL connecting to the tank OB. Since the hydraulic pressure supply of the power source AA should be removable from the cart or, if mounted on the dolly AF, should be separable from the cart GW, quick-release couplings are interposed at suitable points in the pressure and return lines DL, RL; some of these lines, preferably, are flexible. These couplings, and the flexible nature of the lines have not been shown in the drawings since they are well known and the illustration is thereby simplified.

FIG. 3 illustrates location of the hydraulic pressure source AA on the dolly AF. A control switch C is provided to selectively connect the output of pump P either to the pressure line DL connected with the hydraulic cylinder Z or with the pressure line DL connecting with the drive motor FM or isolating the pressure lines from the pump.

The drive wheel AL has a coaxial gear 1 secured thereto, which is engaged by a chain 2, connected to a pinion 3 on the output shaft of drive motor FM. Upon rotation of motor FM, power is transmitted to wheel AL to move the dolly, and with it the cart GW. The cart and the dolly containing the drive wheel AL are additionally interconnected by means of a spring 4 (FIG. 1) which tends to swing the rear portion TH of the dolly AF in counter-clockwise direction about the horizontal axis AH, to tend to press the drive wheel AL towards the support surface, to increase friction of the drive wheel AL over the running surface thereof. Preferably, drive wheel AL is a pneumatic tire.

The horizontal axis AH for the dolly AF essentially consists of a pin or bolt, rotatably journaled in the rear portion TH of the drive dolly AF. By removing the bolt or pin AH, which is set in two projections N of the cart
GW, the entire dolley AF, and with it the power source AA, if mounted thereon (FIG. 3), can readily be separated from the cart GW. If the power source AA is mounted on the cart GW, separation of the quick-release couplings of the oil pressure lines DL and RL will additionally be needed.

If the prime mover Ma for the hydraulic power source AA is an internal combustion engine, then an ordinary gasoline engine, preferably a two-cycle engine, or a Diesel engine is suitable. If the prime mover is an electric motor, batteries can be used, and a battery charging controller can be incorporated therewith, so that in motion, the cart-dolley combination is independent from the power lines, but batteries can readily be re-charged when the cart GW is stationary, during hardening of concrete, for example, and even when the hydraulic cylinder Z is being supplied with pressure fluid during raising of platform ST.

The mobile mold and platform apparatus has the advantage that the motor drive of the dolley permits high mobility of the entire concrete mold. The power source, or on the cart, or on the dolley, can be readily de-mounted from the dolley, so that the investment costs of the mold apparatus, for a large casting surface can be reduced since the various carts GW with the mold platforms ST need not, each, have their own drive assemblies secured thereto. The long rest period, during which use of a drive motor, and changes in supply of pressure fluid are not required, would make the fixed assembly of drive motors and prime movers to each cart rather uneconomical.

The hydraulic power source AA can supply hydraulic pressure fluid for the cylinder Z which, after extension to the chain-dotted position can be separated off from further pressure supply, thus maintaining the extended position even under load. The prime mover, and the hydraulic pressure supply pump are then no longer needed and the entire power source can be moved, separately or together with the dolley AF to supply pressure fluid for other carts GW, to extend their hydraulic cylinders and likewise to drive the motors FM of the dollies for the cart. The versatility of drive by means of pressure fluid apparatus, preferably hydraulic apparatus, greatly increases the economic utility of even a few carts GW. If a compressible fluid is used, rather than a non-compressible fluid such as oil then, after the platform ST has been extended, the scissors can be locked in place mechanically, as well known in the art.

Utilizing a pressure fluid motor and preferably hydraulic motor for the dolley AF has the additional advantage that the drive wheel, upon blocking of further oil supply and drain, is automatically blocked, so that no brake need be used, and still movement, on flat or inclined surfaces, can be completely controlled by the oil and from motor FM. No gearing or clutches need be used with a hydraulic drive motor, since starting torques can be controlled by oil flow. Permanent connection to outside power sources, such as electric lines, is not necessary.

Various changes and variations can be made within the inventive concept. Thus, although a hydraulic pressure source is preferred, pneumatic pressure can be used, the drive motor then being a compressed air motor, and the return line RL being replaced by a controlled exhaust port (control being desirable to avoid the necessity of a separate brake). The power source AA, including the motor, pump, and pressure fluid supply (such as tank OB, or a compressed air tank) can be connected, removably, either with the cart GW (FIGS. 1 and 2) or on the dolley AF (FIG. 3).

I claim:

1. Mobile concrete ceiling mold apparatus comprising
   a wheeled frame (R; GW);
   a mold support platform (ST) on the frame;
   vertically extendable means (HS) supporting the frame and movable between an extended position and a collapsed position;
   a separable, wheeled drive dolly (AF), selectively connectable to and disconnectable from the wheeled frame (R; GW);
   a single pressure fluid power source (AA) including a prime mover (Ma) and an energy source thereof and a fluid compressor pump (P) located on the dolly;
   pressure fluid actuated means (Z) acting on the extendable means (HS) to extend the same and fluid interconnection lines interconnecting the pressure fluid actuated means (Z) and the fluid compressor pump (P) to raise the platform by hydraulic pressure upon application of pressure fluid from the compressor pump;
   a pressure fluid actuated drive motor (FM) directly connected to at least one of the wheels of the drive dolly, and fluid connection lines connecting the fluid compressor pump (P) to the pressure fluid drive motor (FM) to move the driven dolly with, or without the frame under power derived from the pressure fluid;
   and control means (S, St, C) selectively establishing fluid communication between the power source (AA), the fluid actuated means (Z), and the drive motor (FM) to provide motive power for the dolly (R, GW) to move the dolly with, or without the frame and, selectively, provide pressure fluid to the fluid actuated means (Z) to extend the position of the platform.

2. Apparatus according to claim 1, including separable coupling means having a horizontal swing axis interconnecting the dolly (AF) and the frame (R, GW).

3. Apparatus according to claim 1, including a vertical axle (Av) interconnecting the dolly and the frame.

4. Apparatus according to claim 1, wherein the pressure fluid is a hydraulic fluid.

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