

July 8, 1952

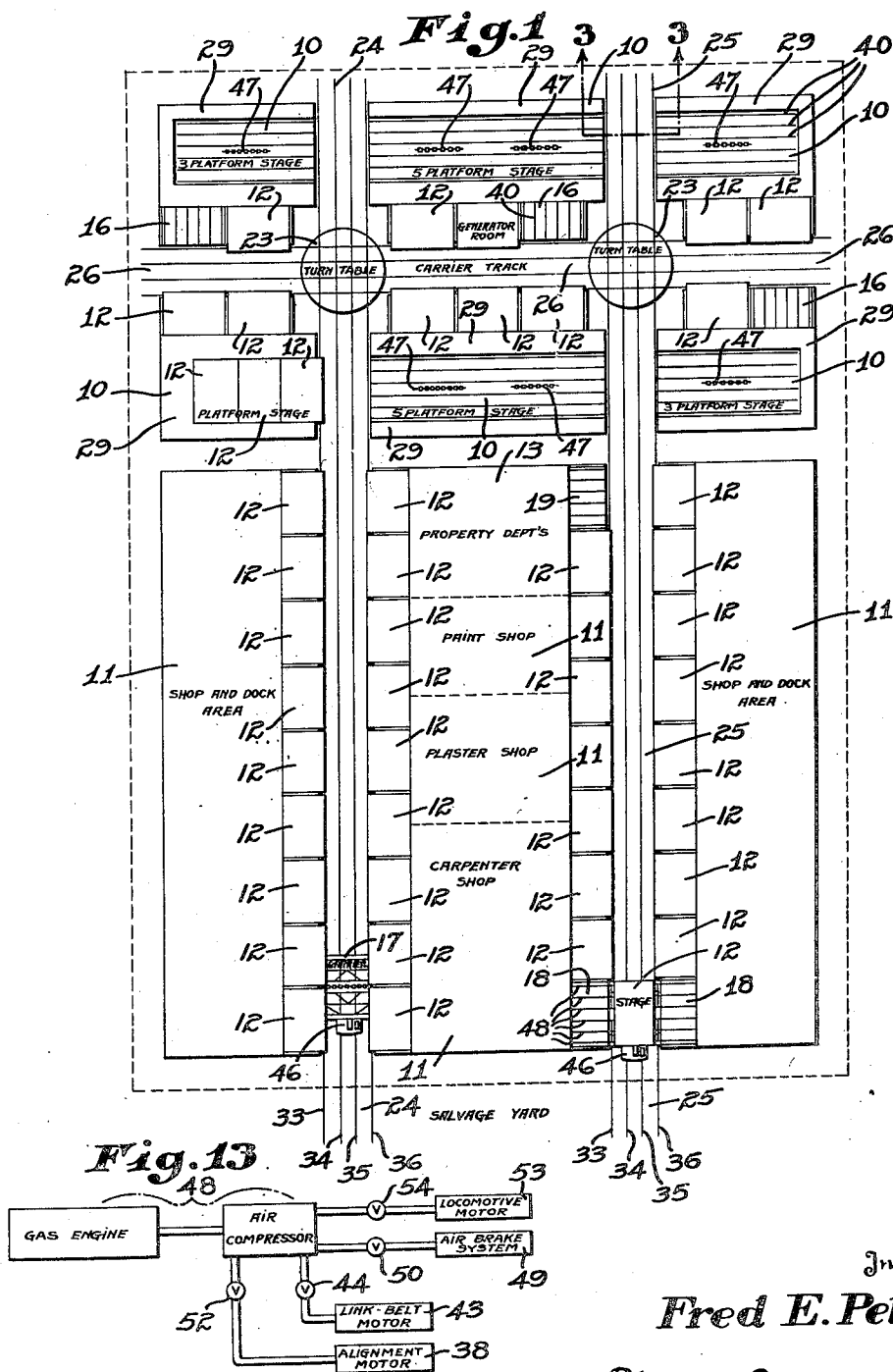
F. E. PELTON

2,602,196

SYSTEM FOR HANDLING MOVING PICTURE SETS

Filed Aug. 1, 1947

6 Sheets-Sheet 1



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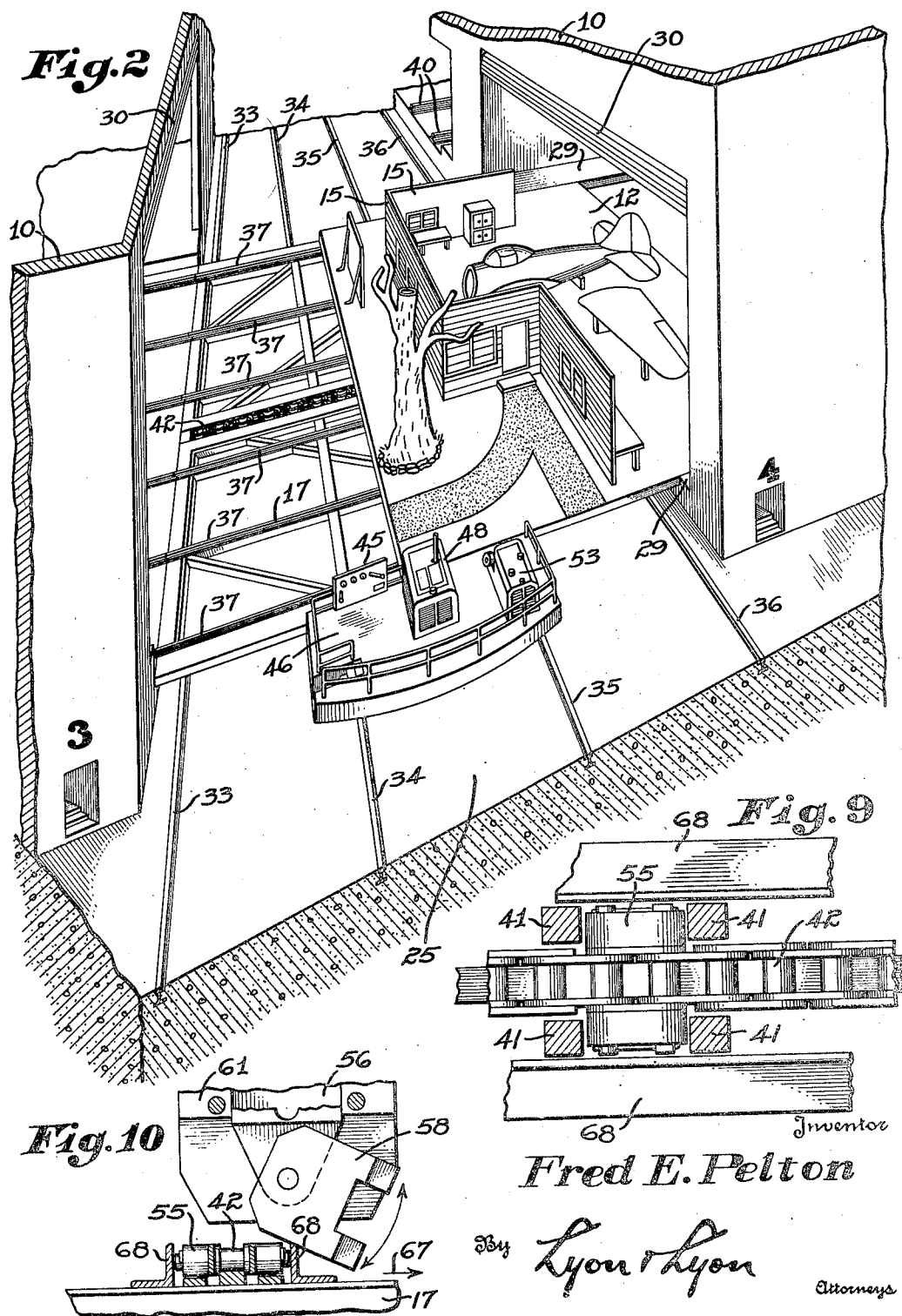
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SYSTEM FOR HANDLING MOVING PICTURE SETS

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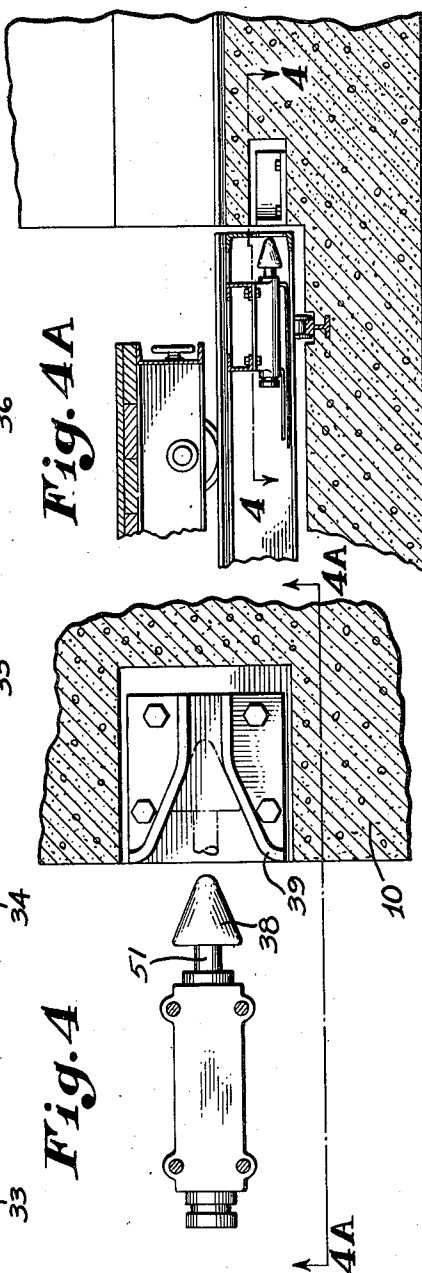
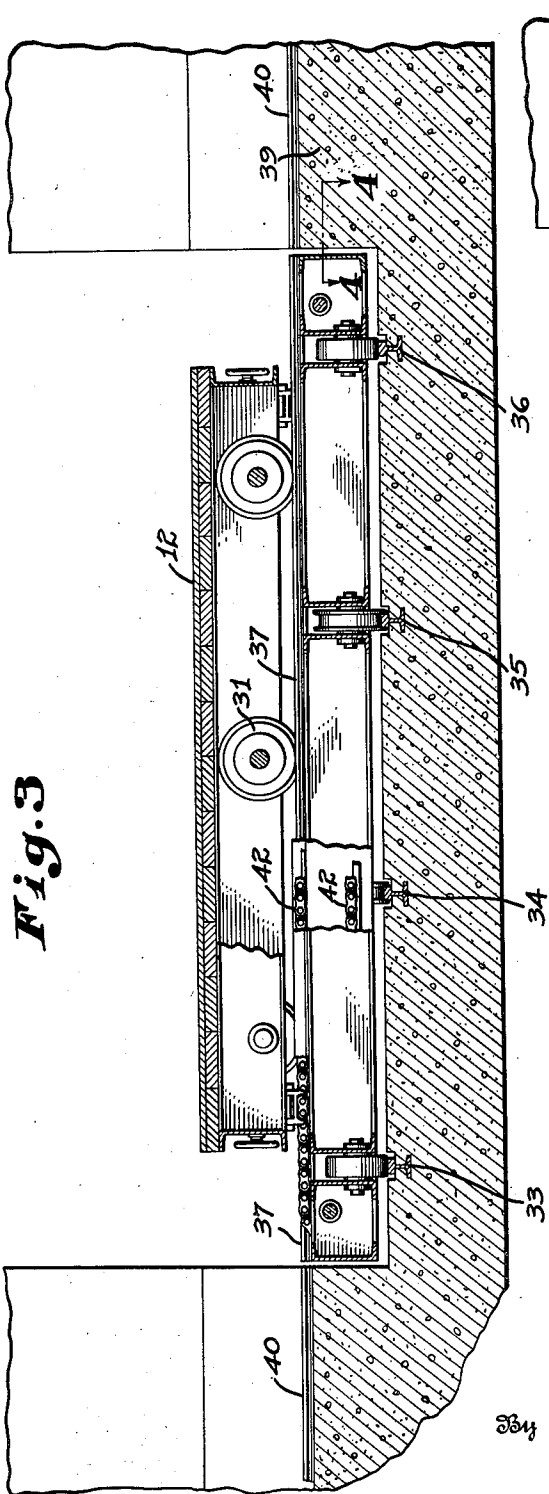
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SYSTEM FOR HANDLING MOVING PICTURE SETS

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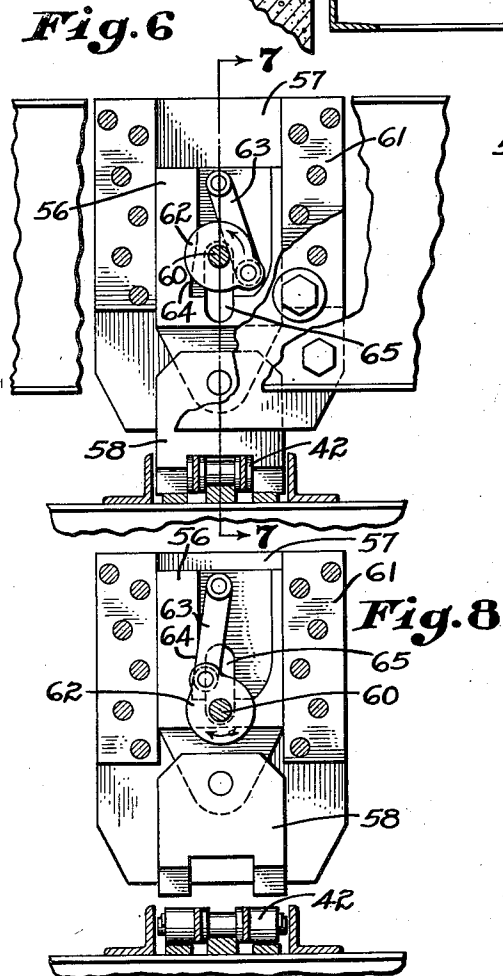
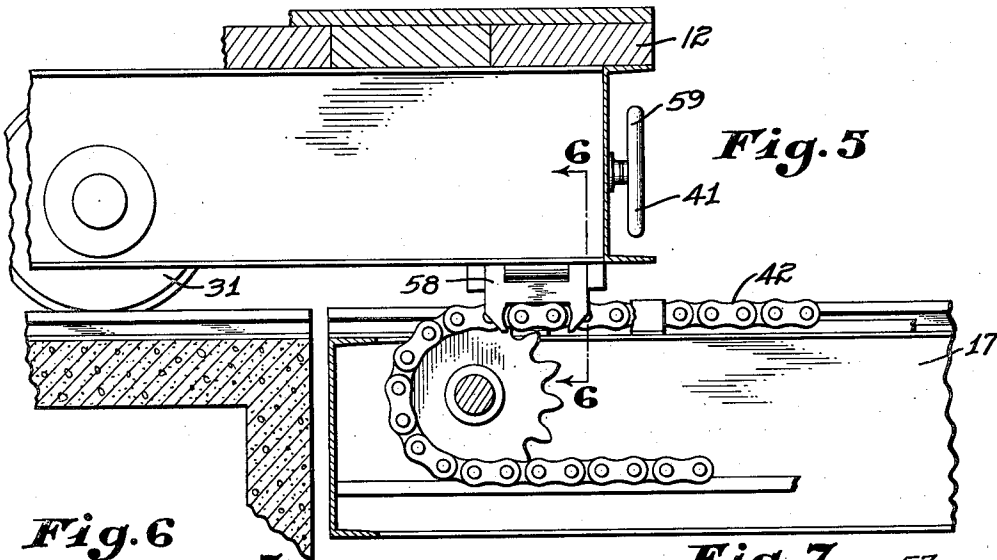
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SYSTEM FOR HANDLING MOVING PICTURE SETS

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SYSTEM FOR HANDLING MOVING PICTURE SETS

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Fig. 11

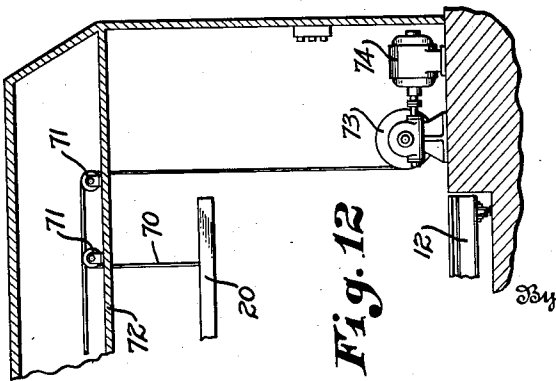
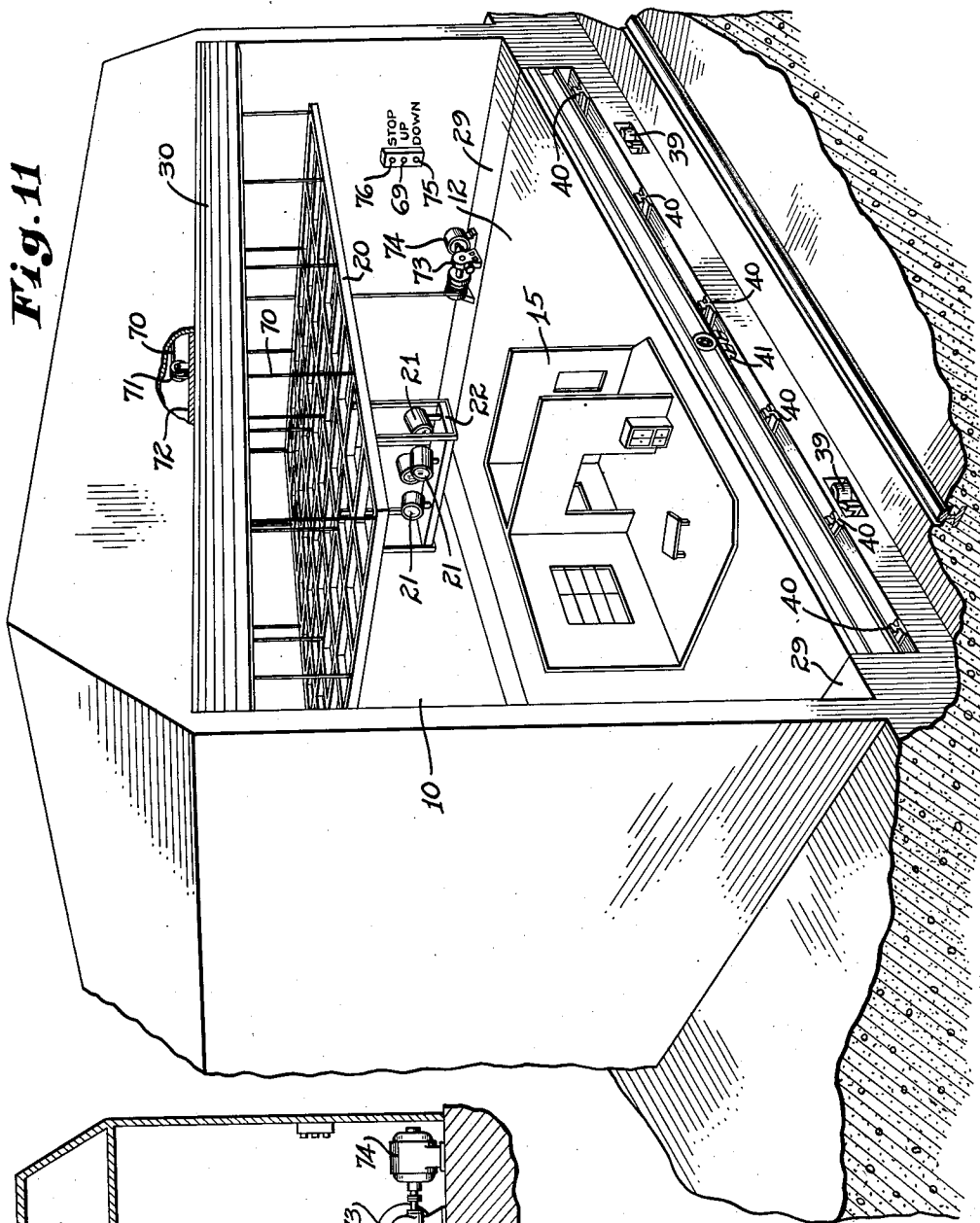


Fig. 12

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SYSTEM FOR HANDLING MOVING PICTURE SETS

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Fig. 14

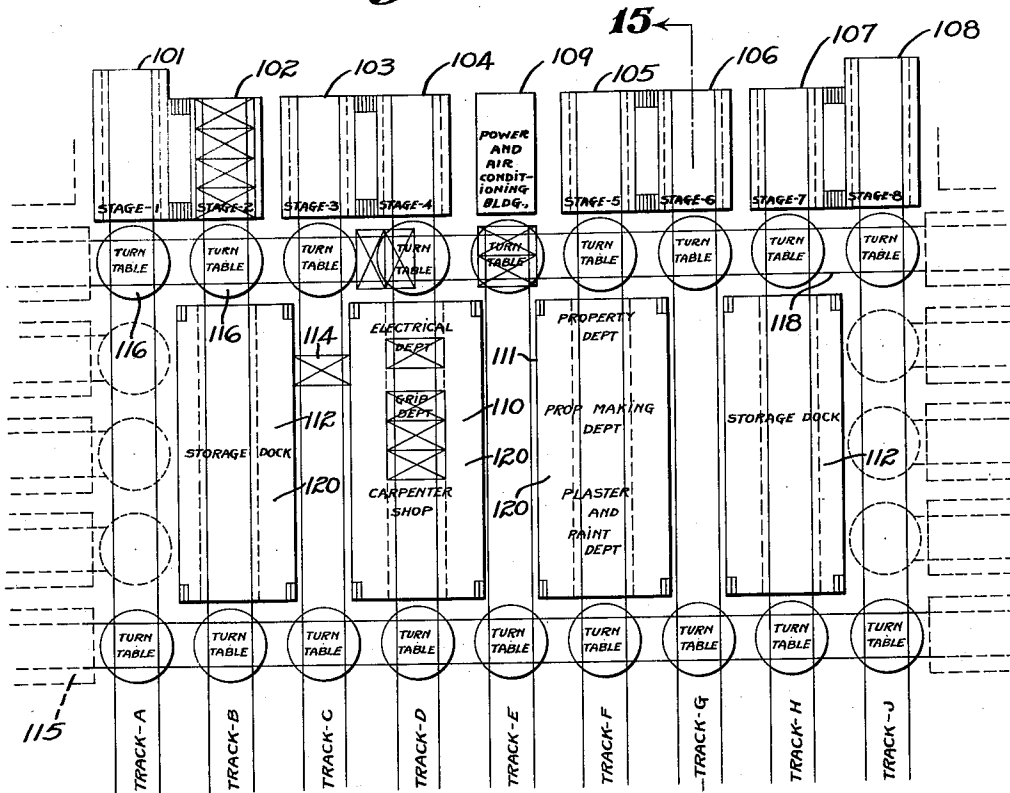
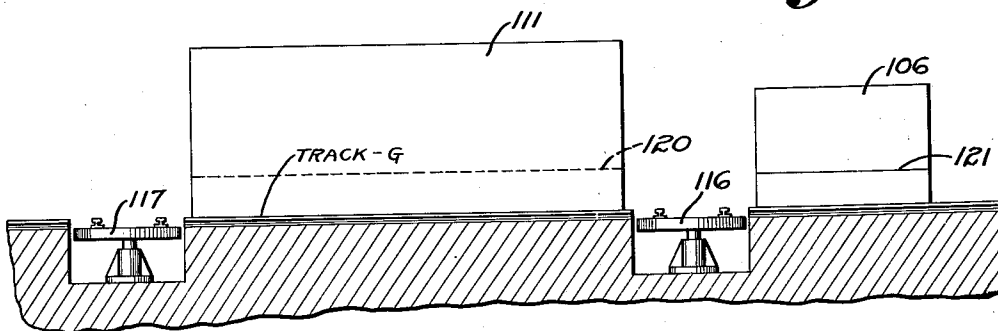


Fig. 15



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UNITED STATES PATENT OFFICE

2,602,196

SYSTEM FOR HANDLING MOVING
PICTURE SETS

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Application August 1, 1947, Serial No. 765,611

4 Claims. (Cl. 20—1.123)

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The present invention relates to a system and apparatus useful in the fabrication and handling of motion picture and television sets and their illumination and has for its general object the provision of new methods whereby sets are handled more efficiently and more economically, and with greater flexibility of operation than is possible at the present time.

The present application is a continuation in part of my earlier U. S. patent application, Serial Number 660,272 filed April 6, 1946, pertaining to a "System for Handling Motion picture sets," which has become abandoned.

At the present time, the method of preparing sets for shooting pictures in a motion picture studio requires the provision of a large number of sound proof stages on which the sets, in whole or in part, are constructed. During the construction of the set, the set is scaffolded for light platforms, or such light platforms are suspended from trusses and lamps are placed on the light platforms and electrically connected. The set is then dressed with the necessary rugs, draperies, furniture, electrical fixtures, hand props, greens, backings, etc.

In present set installations, electrical lighting and dressing takes place directly on the sound proof stage and may interfere with any shooting activities on the stage at that time. Likewise, the settings are necessarily rearranged or repaired directly on the sound proof stage which likewise interferes with shooting the picture; hence, it has been necessary to provide a relatively large number of sound proof stages so as to permit preparation activities to proceed on several stages while shooting takes place on the other stages, and the shooting units are scheduled from stage to stage during a work day if the sets required are on other stages. If a set must be installed or work done on it, on a stage where a unit is shooting, this work must be done at night or delayed until the stage is not in use for active shooting. This condition arises very frequently in present day motion picture studios and as a result day and night service from the industrial departments has been found necessary. This night service plus the widespread use of both day and night service tends to inefficiency and increased costs, and the working conditions on stages results in inefficiency in constructing or reworking the sets.

Specifically, under the present method of studio operation, from the time sets are constructed until they are eventually struck and salvaged, they go through many or all of the following activities:

1. Fabrication and sub-assembly in shops.
2. Construction and installation on stages.
3. Dressing.
4. Scaffolding for overhead lamps.

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5. Electrical rigging.

6. Shooting.

7. Hold

(a) intact for rushes (dailies)

(b) and fold

(c) for retakes

(d) as a standing set.

8. Prop strike.

9. Electrical strike.

10. Set strike.

11. Salvage.

Under this present day method of operation, only about one-third of the stage space time is used for shooting; the balance of the time and other activities (excluding items 1 and 11) are taking place on the stages.

Present day stages for motion picture photography and sound recording are relatively expensive structures. They are sound proof, ventilated or air conditioned, lined with acoustic materials and connected to generator rooms with heavy copper cables, and yet only in shooting are these special requirements necessary. As a result, a studio, to operate with any reasonable degree of efficiency, must have from 2½ to 3 times as many stages as there are companies shooting.

Another object of the present invention is to provide motion picture and television studios which are relatively inexpensive to build and which produce substantial savings when in operation.

Still another object of the present invention is to provide a system and facilities permitting streamlined operations and the use of assembly line principles in the construction and operation of sets used in motion picture and television studios.

Yet a further object of the present invention is to provide an improved set handling system in which practically all of the sets for the production of a motion picture may be propelled in advance without interfering with the sets currently shooting.

Yet a further object of the present invention is to provide an improved set handling system in which the necessity for constructing and installing sets immediately adjacent to the stages in which they are subsequently shot is obviated, in which case sound translation between the work and shop area and the stage or shooting area is obviated and the necessity for controlling noise and isolating the shop floors is made unnecessary.

Yet a further object of the present invention is to provide an improved motion picture and television studio incorporating means limiting costly delaying on stage construction and set dressings, obviate the present time consuming electrical light scaffold "rigging" after the set has been prepared, and the wasted days of set,

"prop," and electrical "striking" (decommissioning).

Yet a further object of the present invention is to provide an improved set handling system in which a complete set after shooting may be removed from the stage in a very short time without the necessity for striking in the stage.

Yet another object of the present invention is to provide a novel system for handling motion picture and television sets which provides for building work sets as well as changing, renewal or repair thereof, apart from the sound proof stages on which the photography is actually accomplished.

A further object of the present invention is to provide a system for handling motion picture sets which will permit construction and preparation of, and/or any change in the sets at central workshops and movement thereof to and from the sound stages with a minimum of interference either with respect to the sets themselves or to the photographing or recording of the picture.

Still a further object of this invention is to provide a system for handling motion picture sets which is simple and compact in arrangement, inexpensive to construct, and which lends itself to a maximum saving in time, effort and expense in the production of motion pictures.

Yet a further object of the present invention is to provide an improved set handling system in which sets are erected in position, are never thereafter moved and travel along their rails to the stages under weather-proof ceilings.

Still a further object of the present invention is to provide an improved method and apparatus in a motion picture or television studio wherein a movable ceiling arranged to support platforms with lights thereon is mounted over the stage, which may be lowered to the stage floor for convenient handling without the necessity of expensive and time consuming rigging. Inasmuch as each set, progressing through the successive stages from "carpenter shop to final dressing" with furniture, comprises a predetermined position in the stage in accordance with the present invention, these lights may be accurately installed and positioned well in advance.

Yet a further object of the present invention is to provide an improved method and apparatus for use in motion picture and television studios wherein the overhead lamps may be properly positioned in a predetermined position within the stage for shooting sets before their arrival.

Still a further object of the present invention is to provide an improved set handling system in which sets are built on mobile platforms that later become part of the floor of a sound stage.

Yet a further object of the present invention is to provide a set handling system in which stage and shop space is used efficiently and in particular such that practically the entire stage area is available for mobile platforms.

Yet a further object of the present invention is to provide an improved set handling system in which any particular platform upon which a set is built may be held indefinitely outside of the stage, and used in other productions, or later in the same production.

Still a further object of the present invention is to provide an improved set handling system in which means are provided for reversing the position of platforms upon which sides are built end for end whereby such platforms may be oriented 180° and may enter the stage with either end forward.

Yet a further object of the present invention is to provide an improved set handling system in which shop space is used efficiently and in particular to provide a system wherein empty platforms always may be placed opposite the work shops so that the sets can be built directly on the platform without additional handling.

Yet a further object of the present invention is to provide an improved system for handling motion picture sets in which a particular set may be built in advance and transported to any stage and placed in any order which may be required or desired in such stage.

Still a further object of the present invention is to provide an improved set handling system in which movable platforms carrying a set may be used in a plurality of different stages regardless of whether or not the floor space in such stages is partially occupied by other platforms.

Still a further object of the present invention is to provide an improved set handling system incorporating platforms which may be moved into a stage from either one or both ends thereof and wherein their relative positions may be established in any desired order.

Yet a further object of the present invention is to provide an improved set handling system in which stage space is used efficiently and in particular to provide a system wherein a stage may be used if any platform is ready with its set, regardless of where the platform may be stored awaiting its turn in the stage.

Still a further object of the present invention is to provide an improved set handling system in which more than one movable platform may be used for additional sets in a stage without the necessity of striking the sets originally in the stage whereby any reasonable number of sets may be built and installed in advance of shooting time.

Yet a further object of the present invention is to provide an improved set handling system including mobile platforms upon which sets are built on which craftsmen of different trades such as carpenters, painters and the like are not required to work near a fixed position of the platform but in accordance with the present invention, work shops are segregated by crafts and sized accordingly to the requirements of the craft so that platforms may be brought to any shop and transferred between shops.

Other objects and advantageous features of this invention may be had from the following description and one embodiment thereof may be seen in the accompanying drawings wherein similar characters of reference designate corresponding parts, and wherein:

Figure 1 is a schematic layout of a motion picture or television studio incorporating the present invention wherein my novel method and system may be practiced.

Figure 2 is a view in perspective of a portion of the studio arrangement shown schematically in Figure 1 and shows one of the mobile platforms thereof in the process of being transferred from the mobile carrier into a sound stage.

Figure 3 is a view in side elevation and partly in section showing an empty mobile platform on its mobile carrier adjacent stages and corresponds approximately to a view taken on the line 3—3 of Figure 1 when the carrier is moved into corresponding position.

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 3 and also line 4—4 of Figure 4A.

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Figure 4A is a view taken substantially on line 4A—4A of Figure 4.

Figure 5 is a longitudinal section through a portion of a carrier and a portion of a mobile platform in its normal stored position in a shelter where it projects a slight distance into the tracked carrier streets with the clutch member thereon in clutch engaging position and shows the manner in which the platform may be moved onto its carrier.

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 5.

Figure 7 is a sectional view taken substantially on the line 7—7 of Figure 6.

Figure 8 is a sectional view similar to the sectional view shown in Figure 6 but with the clutch element on the platform raised out of chain engaging position.

Figure 9 is a sectional view taken substantially on the line 9—9 of Figure 7.

Figure 10 is a view similar to the view shown in Figure 6 and shows the manner in which the clutch engaging element is automatically pivoted out of harm's way under the following conditions: when the platform projects a small distance out of a landing zone, and the clutch element is inadvertently left in its lowermost position and the movable carrier moves past such clutch element.

Figure 11 is a perspective view of a portion of a motion picture or television stage shown in Figures 1 and 2 and shows the manner in which the grid-like false ceiling upon which light platforms may be releasably secured, may be raised and lowered.

Figure 12 is a sectional view showing more specifically the manner in which the false ceiling shown in Figure 11 may be lowered and elevated.

Figure 13 is a schematic representation of the operating mechanism carried on the mobile carrier and driving locomotive.

Figure 14 is a schematic layout of a modified system of handling motion picture sets also embodying features of the present invention.

Figure 15 is a fragmentary sectional view, partly in section, showing particularly the transfer and directing means for the mobile units and is taken substantially on the line 15—15 of Figure 14.

While the system and apparatus disclosed herein are described in specific relationship to motion picture studios, the description is exemplary of the manner in which the system and apparatus may find utility in television studios. It is therefore understood that unless specifically limited to a motion picture studio or to a television studio the claims appended hereto are applicable to both types of studio.

It is understood that while the preferred system and apparatus disclosed herein embody six sound stages, three shop and/or dock areas, three tracked streets, two carriers and locomotives, a generator room and forty-nine shelters, the particular requirements of a specific motion picture or television studio embodying the present invention may necessitate more or less of each of the above items.

In accordance with the present invention many of the difficulties of operation are overcome and the cost of construction, lighting, dressing and operating the sets is materially reduced. Likewise, the work is greatly expedited and improved efficiency obtained. One or a number of sound proof stages 10 may be positioned near or grouped around a central plant which includes such nec-

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essary adjuncts to motion picture products as air conditioning apparatus, light and power plants or control equipment and workshops 11 where the stage settings are produced, changed or repaired. Mobile floor units or platforms 12 are provided to form the set area of the stage floor, the mobile floor units 12 being such that one or more may be used to form a single stage for picture shooting purposes. Tracks and transfer means interconnecting the workshops and the sound proof stages are provided on which the mobile floor units may be selectively moved from workshop to actual receiving building in which the pictures are produced, or vice versa, as desired. By such an arrangement there is provided a system for handling motion picture sets wherein the great majority of all of the activities or work on the sets other than the actual picture shooting and recording can be accomplished away from the sound proof stage and interference with the continuity of picture shooting and recording is reduced to an absolute minimum.

Studios built in accordance with the teachings and apparatus disclosed herein obviate the inherent disadvantages residing in present day conventional studios. Following the teachings of the present invention, the great majority of the man hours of the non-shooting operations are performed off the stage where subsequently the shooting takes place. This is accomplished in the preferred embodiment of the present invention by building sections of the stage floors as movable "platforms" and transporting these platforms from shop to stage and from stage to stage on what I term herein as "carriers" 17 which run on railroad type of tracks. These movable platforms roll into what I term herein as "shelters" 18 adjacent to all of the workshops where they become extensions of shop floors. The sets are built directly on the platforms and need be handled but once in the assembly process.

Basically the preferred embodiment of the present system incorporates completely roofed-in craft shops 11, property departments 13, stage shelters 16, work shop shelters 18, property department shelters 19, turntables 23, tracked streets 24, 25 and stages 26, and sound stages 10, all linked by broad gauge tracks. Along this assembly line a compressed air locomotive 46 moves 60' x 80' platforms 12 carrying the completed sets 15.

Each sound stage 10 accommodates from three to five such interchangeable platforms 12 which may be trundled into the big sound proof, air conditioned building, still on their tracks. Thereafter they can be moved in and out of the stages 10 as needed and stored in any one of the empty shelters 16, 18, 19 when temporarily out of use.

In accordance with certain phases of the present invention, the sets 15 are built on the stage floor constituting at least one mobile platform which is movable to a position outside the stages. Instead of hauling dozens of wall, floor and ceiling units to the stages in small groups, or supplying the stages with building materials for set construction, sets are built, erected and completed at the shops 11 under good working conditions, with convenient power machinery and accessible supplies. The sets 15 remain on the platform 12, which are moved from place to place as they undergo the various operations of set activities.

The previously enumerated activities comprising 11 in number may be performed in accordance with the system shown in Figures 1-13 embodying the preferred form of the present in-

vention as outlined immediately below where the titles correspond to such previously enumerated activities.

1.—Fabrication and sub-assembly in shops

Fabrication of the sets 15 in the shops 11 is in accordance with present day practice. But, the full assembly is made on the mobile platforms 12 while they are in shelters 18 adjacent to the various shops. A mobile platform 12 (empty or partially filled) is transferred via a carrier 17 to one of the shelters adjacent the carpenter shop. The structure of the set is built in a predetermined position on the platform 12 and all of the carpentry is completed. If there is a small plaster job on the set, the plasterers may work on the set while it is adjacent to the carpenter shop, but if there is a large amount of plastering, the platform may be moved to one of the shelters at the plaster shop. This same principle will apply to painting. However, if the painting is a spray job, the platform 12 may be transferred to the paint shop where one or more of the shelters is equipped for spraying.

Since the platforms 12 fit accurately into all stages 10, sets that require two or more platforms for their structure may be built in sections which may meet in line when eventually placed in position on the stage.

The allocation of platforms 12 to shop shelters 18 may be made according to the volume of construction activity in any particular craft, but normally the system operates on an assembly line principle starting with carpentry and ending with painting.

With intelligent planning a reasonably constant labor force in each craft can handle the work, since the pressure of stage space for shooting activities versus stage space for construction activities is practically eliminated.

2.—Construction and installation on stages

Except when it is impracticable to build certain kinds of sets on the platforms at the shops, this operation is entirely eliminated in the system herein described. (Note: These instances are rare; typical cases would be farm yards, ice rinks, etc. For this type of set, platforms would be moved to the stage for the final construction work.)

3.—Dressing

After the construction work on the set 15 has been completed, the platform 12 upon which it is mounted is moved to one of the property department shelters 19 for dressing. This assumes that props are stocked in the property department, or have been assembled there in advance. After this operation the set is ready for inspection by the director, and the platform is held in one of the shelters 16, 18, 19 awaiting dispatching to the stage. (Note: if rented props are used, they may not be in the property department at the time the set is first available for dressing, but props may be placed on the set while it is in a storage shelter or after the set is transferred to the stage.)

4 and 5.—Scaffolding for overhead lamps and electrical rigging

These operations may be done on the stage at night between the time the old outgoing set is removed and before the shooting call for the new incoming set the next morning. Normally, there are 14 or 15 hours available each night for

these operations. Since the position of the incoming set 15 on any platform 12 is fixed, and the position of that platform in the stage is specified, the scaffold and lamp arrangement can be predetermined and the crews may proceed with their work before the incoming set is actually in position, using the false ceiling construction 20 shown in Figures 11 and 12.

Referring to Figure 11, suspended from the roof trusses of the stage 10 are elevating scaffold grids or false ceiling construction 20, there being one grid for each platform position. The scaffold grids 20 may be raised and lowered between the stage floor and the overhead roof trusses.

Before the outgoing set is removed from the stage, the floor lamps and any other miscellaneous equipment may be transferred to the stage shelves 29 and the grid structure 20 is hoisted clear of the outgoing set.

To scaffold and rig the incoming set, the grid structure 20 is lowered to a convenient level above the stage floor, permitting the crew to work on the stage floor, thus eliminating the necessity of some of the crew going aloft.

The beds and legs of scaffolds 22 are attached and braced to the grid structure 20 in a semi-permanent manner, as for example, by bolts and nuts, and the lamps 21 are placed in position on the scaffolds, all while the scaffold beds rest on the stage floor. Generally, the lamps 21 are not removed from their scaffold beds when the beds are rearranged for the incoming set.

The grid structure 20, complete with scaffolds and lamps, is then hoisted out of the path of the incoming set. After the platform 12, having the set 15 mounted thereon in predetermined position, is rolled into position, the grid structure 20 is lowered to the proper height above the set walls, and, if desired, sway braced to the stage walls.

During the night the grip crew may likewise hang or place any new backings required and the electricians may place the appropriate lights.

6.—Shooting

Shooting proceeds just as it does under the present method of operation, but subject to cast commitments, scenes may be shot in continuity without material extra expense. If several sequences are to be shot in the same set, the set may be stored intact in any one of the shelters 16, 18, 19 between sequences and scheduled back to the stage.

7.—Hold (a) intact for rushes; (b) and fold; (c) for retakes; (d) as a standing set

Whenever any of these operations is required and current stage space is needed, the set 15 on its platform 12 may be removed from the stage 10 and transferred to a shelter 16, 18, 19.

8.—Prop strike

Prop strikes normally take place after the set 15 is removed from the stage 10, either when the platform 12 is in a shelter 16, 18, 19 or when the platform is adjacent to the property department.

9.—Electrical strike

This operation has been described under activity items 4 and 5. The overhead lamps 21 (Figure 11) may be removed, if desired.

10. and 11.—Set strike and salvage

This completes the cycle and produces empty platform space for the next cycle.

If there are no set elements to be saved, the platform 12 is rolled to the salvage yard and cleared of the set. However, when set elements are to be saved, they may be segregated and later returned to the scene docks, either by truck or via the platforms 12.

Dimensions and stage floor construction

The size of the mobile platform 12 is of great importance. Its dimensions are the "key" dimensions of the studio. The size of the platform 12 controls the size of the shelters 16, 18, 19, the turntables 23, the carrier 17, the tracked streets 24, 25, 26 and indirectly the size of the stages 10. After careful research, the most useful size platform for a typical studio was determined to be a rectangle 60' x 80' in dimension, and the most useful stage, one which houses three platforms with their 80' sides adjoining.

Each stage 10 has a permanent floor shelf 29 which surrounds the platform area of the stage except at the large entrance doors. This shelf 29 is 20' or more in width and is built at a height flush with the upper surface or floor of the platforms 12. The stage floor area between the shelves 29 contain the rails on which the platforms 12 travel in and out of position in the stage 10.

The shelf area gives added space to the platform area and is used for camera angle foregrounds, entrances and exits, and for "backing" area. In addition the shelves 29 may be used for storage of miscellaneous equipment such as floor lamps, spare scaffolding, portable dressing rooms, grip equipment, prop equipment, make-up equipment, etc.

Adding the area of the shelves 29 to the area of the platforms 12, the dimensions of a three platform stage become 120' (20+80+20) wide by 200' (60+60+60+20) long. Special stages housing 4 or more platforms may be built.

Stage doors

Each stage has a large mechanically operated door 30 in one or both end walls, to permit the translation of platforms 12 in and out of the stage 10. These doors are 80' wide with a height consistent with the height of the trusses. Normally the door opening should clear a set 30' high.

Platform construction

The platform 12 is a welded steel frame with steel girders and beams, mounted on thirty car wheels 31. These wheels 31 support the frame in panels approximately 14' by 16'. The floor system of the platform consists of wood joists, sub floor and finish floor. The steel beams in the three central panels may be bolted together instead of welded and are removable to permit the building of stair wells in sets, if need be, without elevating the whole set. The entire steel frame is diagonally braced on the under side for rigidity.

Carrier construction

The carrier 17 is a welded steel frame 65' x 80' mounted on twenty-four wheels 32, which roll on four tracks 33, 34, 35, 36. Across the top of this steel frame comprising carrier 17 are six standard rails 37 identical in height, gauge and size with the rails in all the stages 10 and in all the shelters 16, 18, 19 all arranged for registry with and rotation thereon of the car wheels 31 of platform 12.

On the carrier 17 are male alignment wedges

38 which are arranged to cooperate with the stationary female locating devices to adjust the carrier into exact position, ensuring perfect alignment of the carrier rails 37 with the rails 40 in the stages and shelters.

While I have shown the male alignment devices mounted on the carrier and the female locating devices mounted at the entrance to stages and shelters, these cooperating devices are preferably located with the male alignment wedge on the locomotive 46 arranged to enter the female locating device, which is disposed in and at the middle of the carrier streets in predetermined position with respect to the stage and shelter openings, in which case only one alignment wedge and locating device is necessary.

Engaging device and link chain belt

Incaised at the middle of each of the 80' sides of the platform 12 is an engaging device or clutch member 41 which enables the platform 12 to be locked to a driven link chain belt 42 mounted for guided movement in the middle of the carrier 17 in a direction perpendicular to the path of travel of the carrier 17. This belt 42 may be driven in conventional manner by a reversible geared compressed air motor 43 as indicated in Figure 13 which may be controlled by valves 44 on the control board 45 on locomotive 46 arranged integrally with the carrier 17 and on one end thereof. This belt 42 may translate the platform 12 60' off either side of the carrier 17. Thus, it can move a platform 12 in and out of all shelters 16, 18, 19 and in and out of the first position in all stages 10. In order to move a platform from position 1 to positions 2 and 3 in a stage, a similar driven link chain belt 47 is required in the middle of the stage floor in position 2. A four or five platform stage requires two such belts 47, one each in positions 2 and 4. These belts 47 may be driven in either direction by a similar prime mover mounted in stage 10.

The locomotive

The carrier 17 is coupled to the locomotive 46 which runs on the two inboard rails 34, 35 of the 4 track systems 33, 34, 35, 36 in the carrier streets 24, 25, 26. One power unit 48, a large gas-driven air compressor, supplies power to operate the locomotive motor 53 through control valve 54 to cause propulsion of drive wheels on rails 34, 35, the air brake system 49 (Figure 13) for carrier 17 through air brake valve 50, the air motor 43 which operates the link chain belt 42, and the pistons 51 of the alignment motor or wedges 38 which is controlled by valve 52. As explained previously, as an alternative construction, only one alignment motor or wedge 38 may be mounted on the locomotive for cooperation with a centrally located female locating device 39 in the tracked streets.

The carrier 17 with its locomotive 46 may be operated by two men; one who controls the valves supplying the air, and the other who operates the clutch engaging device 41.

The turntable

To change the direction of the carrier 17 at street intersections, turntables 23 are used. They are rotating platforms 105' in diameter, sufficiently large to encircle the carrier 17 with its connected locomotive 46. Two sets of tracks on the turntable cross at 90°. Hence, after every quarter turn, the tracks in the carrier streets and

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on the turntable are in line. The turntables 23 may be driven by electric or air motors and its rotation may be controlled by automatic stop mechanism.

The clutch or engaging device 41 shown specifically in Figures 5-11 mounted on each end of a platform 12 embodies important features of the present invention. The device 41 is arranged to selectively engage cooperating lugs 55 carried on the endless belt 42 as indicated in Figure 9 whereby the belt may drive the connected platform 12.

Device 41 has a vertically movable dog carrier element 56 slidably mounted in a vertical guideway 57 with a pivoted dog element 58 at its lower end for engagement with the cleat on lug 55 on belt 42. The carrier element 56 and attached dog element 58 may be maintained in an elevated position by a manually operable over center mechanism comprising: a manually operable control wheel 59 having its shaft 60 journaled for rotation in the housing 61 with a crank element 62 on shaft pivoted to one end of thrust rod 63 which has its other end pivoted on the slidable dog carrier 56, downward movement of carrier 56 from its raised position shown in Figure 8 being prevented by engagement of the rod 63 with the carrier face 64. Downward motion of the carrier 56 from its lowermost position shown in Figure 6 is prevented due to engagement of shaft 60 with the curved face 65 on the carrier 56.

Thus, the dog member 58 may be moved from its lowermost position shown in Figure 6 to its raised retracted position shown in Figure 8 by turning the control handle 59 through a distance of approximately 120° and in such case, the dog member 58 remains in its raised position until the control handle 59 is rotated in a reverse direction to an extent where the pivot point defined by the connection of crank member 62 with rod 63 passes its over center position in which case the carrier 63 and attached dog 58 may fall by gravity into clutch engaging position. This required reverse movement of handle 59 is relatively small as is evident from an inspection of Figures 6 and 8.

The dog element 58 is pivoted on its carrier 56 about an axis substantially parallel to the direction of the travel of belt 42 to allow the dog 58 to be brushed aside by the belt guard 68 as indicated in Figure 10 when inadvertently or intentionally the dog member 58 is left in its lowermost position wherein it may be engaged by the chain 42 as the carrier 17 upon which it is mounted travels in the direction indicated by the arrow 67. This is important since as shown in Figure 5, the platform 12, when in any one of the shelters, has an end overhanging above the path of movement of the carrier 17 whereby the dog element 58 may be dropped into position over the belt 42. This overhanging end of the platform, of course, is not in the path of movement of a similar platform on the carrier. For this reason the transverse length of the carrier is somewhat longer than the platform as indicated in Figure 3 to provide clearance.

It is noted that when the dog element 58 is dropped into position over belt 42 it is not essential that the engaging cleat or lug 55 on belt 42 be directly under it since the dog members are provided with the cam surfaces 58A which when the belt 42 travels under it causes the dog 58 and attached carrier 56 to move upwardly into the guideway 57 from where it subsequently falls by gravity forces onto and over such lug 58 as such lug is propelled into registry position shown in Figure 9.

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As indicated above, the platforms 12, when in stored position in any one of the shelters 16, 18, 19 project into the carrier streets a distance sufficient to allow a driving connection with the endless chain on the carrier. This is not necessarily true when the platforms 12 are placed in position in a stage since in that case it is desirable, for the taking of sound pictures, to close the sound stage doors 30 to sound proof the stage in which case the platforms 12 are moved entirely within the stage by the chain drive 47 which may be of identical construction and driven by similar means as is the chain 42 on the carrier. Thus, when a platform is moved into a sound stage both chain drives 42 and 47 are operated in succession, in that order, to move the platform completely within the sound stage. These chain drives are, of course, operated in succession, in reverse order, in movement of a platform out of a stage onto a carrier.

The system shown in Figure 1 may be operated with two carriers and sufficient platforms to fill all but five or six shelters, the shelters empty at any particular time being useful in platform transferring operations.

Another important feature of the present invention is the false ceiling structure 20 shown in Figures 11 and 12. This ceiling structure 20 may be raised upon operation of the "up" push-button 69 which serves to automatically raise and stop the structure 20 in accordance with apparatus well understood in the electrical elevator art. Such apparatus may include flexible cables 70 having one of their ends attached to the structure 20 and passing over pulleys 71 mounted on the stationary ceiling structure 72 and having their other end wound on a drum 73 which is driven by the electric motor 74, the motor 74 being controlled by the "up" button 69, the "down" button 75, and the "stop" button 76.

When the "down" button 75 is pressed, the grid-like false ceiling 20 is lowered to a point above the stage floor to allow craftsmen standing on the stage floor to attach the scaffolding 22 onto the cross members comprising the grid structure 20 and also to correct position of the lamps 21. This may be done when the platforms 12 are outside of the stage.

The height of the mobile platform 12 mounted on the carrier 17 determines the height of the stage shelves, the shop floors and the dock floors. This height may be 32" above the carrier track level. The rails 37 on the carrier, in the stages and in the shelters, may be 16½" above the carrier track level.

The tracks in the carrier streets 24, 25, 26 on which the carrier 17 travels are laid with no gradient, and are imbedded in the pavement so that there are no obstacles to pedestrian or vehicle traffic. The entire area of the stages, shops, shelters and tracked streets is under cover. Thus sets with their furnishings are protected from the weather as they are transported around the studio. The regular traffic streets which serve the stages, shops and docks, are elevated 32" above the carrier track level, and are ramped down where they cross the carrier streets.

Back projection

Stages of three or more platforms may be used for longthrow back projection without actually striking any of the sets that may be in the range of the projector beam. The platforms containing such sets are merely rolled out of the stage, and held temporarily in storage shelters.

Street fronts

If a number of sections of street fronts are built on the ends of several platforms, these platforms may be arranged in different order or turned end for end before they are placed in position in the stage.

Thus many combinations of the same fronts may be used for different street scenes.

This same principle may be employed for outdoor shooting by extending the track system on the back lot.

Shallow tanks

Water-tight side boards and floors may be built on any platform and the whole area used as a shallow tank. Miniature water sets can be built at the prop shop and the water introduced after the platform is in the stage. If stage conditions are not required, miniatures may be shot while in their shelters at the prop shop.

Pits and tanks

Stage pits and tanks now can be utilized more generally because the platforms are mobile and sets can be so placed on the platforms to operate over or alongside the pit or tank. If another set with its platform is in the way, it can be repositioned. The stage rails in a wide tank may be built on portable trestles which can be moved temporarily when the tank is in use for water scenes.

To obtain efficient operating conditions, a studio built in accordance with the present invention should have enough mobile platforms to fill each stage three times. Thus, while one-third of the platforms may be tied up on the shooting stages, the other two-thirds are outside of the stages undergoing the various other operations at the shelters. In practical operation this number of platforms produces stage floor space for set activities equivalent to that of a conventional studio with three times as many stages. However, only one-third of the platforms are housed in expensive sound proof structures; the other two thirds are housed in shelters whose cost per square foot is less than one-half of the stage cost per square foot. In such a studio there is a saving in capital investment of $\frac{2}{3}$ of the stage cost of the comparable conventional studio.

The cost of the shops and other buildings in the studio described herein has been eliminated from this comparison because the same shops and other buildings are required under both systems. However, in the system embodying the present invention, since the platforms become shop floor extensions, many of the shop areas can be materially reduced, resulting in further savings in capital investment.

The modified system illustrated in Figures 14, 15 consists of a series of sound proof stages 101 to 108 and a power and air conditioning building 109, all placed alongside a shop and industrial area consisting of shops 110 and 111 and storage docks 112, the sound stages and the shops or work area being interconnected by a rail and turntable system which permits the selective shifting of mobile units 114, hereinafter more fully described, from any of the shops or storage docks to any of the sound stages, or vice versa. Another sound proof stage may be substituted for the power and air conditioning building if desired.

As shown in Figure 14, the system for handling motion picture sets is such that a single or any

number of sound stages may be increased or reduced in number as desired; for example, to increase the number of sound stages, a series of such stages could be placed along the ends of the entire work and storage area as illustrated by the dotted lines 115, and the number of sound stages could be further increased by placing additional sound stages along the lower side of the complete setup.

The track system interconnecting the work and storage area and sound stages consists of a plurality of tracks A to J, inclusive, extending transversely of the entire work and storage areas and each track ending within the area of a sound stage. Associated with each of the individual tracks, A. to J, inclusive, is a turntable 116 at the one side of the industrial area and a turntable 117 at the opposite side of the industrial area. The track E is aligned with the power and air conditioning building 109, but does not enter such building, and has a turntable 116 at one end thereof and a turntable 117 at the opposite end thereof. The turntables 116 are interconnected by a track 118 extending normal to the tracks A to J, inclusive, and the turntables 117 are interconnected by a track 119 also extending normal to tracks A to J, inclusive. In lieu of turntables, other direction changing devices may be used.

The mobile floor units 114 are provided with suitable wheels to enable them to travel over the tracks hereinbefore described, and the turntables 116 and 117 are preferably of such size as to carry two of the mobile floor units at one time. However, this may be varied in different installations. These movable floor units also are preferably of such size that they may be combined in various combinations of numbers of floor units to fit any or all sound stages and sets; that is, only one of the mobile floor units may be necessary for a certain stage or set, or two or more may be required to be combined for a particular stage or set.

In the particular arrangement shown, the two storage docks 112 are located at the opposite sides of the work and storage area, and intermediate the storage docks 112 are the shops 110 and 111. As indicated, the shop 110 may contain the carpenter shop, grip department and the electrical department, with the shop 111 having therein the property department, the prop making department and the plaster and paint department. This arrangement of the various departments in the shops 110 and 111 may be varied to suit the particular installation. As shown, the storage docks 112 and the shops 110 and 111 are provided with ledges or runways 120 along their sides, such ledges 120 being of sufficient height to provide for easy access from the ledges to the level of the mobile units. In the same manner the sound stages 101 to 108, inclusive, are provided with similar ledges or runways 121 on each side of the tracks running thereinto so that a level floor completely across the sound stage building may be provided by the ledges and the mobile units.

By this invention a routing system is provided whereby the sets may be completed, changed or repaired wholly apart from the sound stages, and, thus, any tying up of the sound stages for a period of time or interference with use of the sound stages in any manner for the making of motion pictures is avoided.

As will be seen, the mobile units 114 may be shifted individually or in groups from any part

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of the system to any other part. Assuming that a set is to be built completely, a single or any number of mobile units required may be taken from the tracks A, C, E, G or J, which may provide for storage space for the mobile units, or, if desired, a passageway from one transverse track to another, and may be started, for example, in the carpenter shop contained in the shop 120, the mobile unit or units 114 being shifted from one track to another to finally arrive within the shop 110 by the use of any suitable propelling or drawing means and the turntables 116 or 117. From the carpenter shop contained in the shop 110, and wherein the set is started to be constructed, the mobile units may be moved progressively through the grip department and electrical department in shop 110 and then transferred to the shop 111 by means of the turntables 116 or 117 and the tracks 118 and 119, where the partially completed sets on the mobile units may be passed through the property department, the prop making department and the plaster and paint department, or any other departments provided so that the mobile unit or units will emerge from the shops in such condition as to form a complete set. By the use of the turntables 116 and 117 and the tracks A to J, inclusive, the complete set then may be shifted to the assigned sound stage 101 to 108, inclusive, or a part of the complete set may be moved to one sound stage and a part to another sound stage if such separation is required in the taking of a picture. By the same use of the turntables 116 and 117 and the tracks A to J, inclusive, all or any part of a set may be removed from any sound stage and shifted to the shops for change or repair, leaving the remainder of the set within the sound stage and usable to whatever extent possible.

After the sets have served their purpose, or if the sets are not required for a period of time, they may be shifted from the sound stages on which they have been used to the storage docks 112, or to the tracks A, C, E, G and J, and left there until such time as they are needed again, or the sets may be moved into the shops 119 and 111 for disassembly and salvage or other disposal.

Referring to the drawings and to the preceding description, it will be seen that there is provided a system for handling motion picture sets embodying numerous novel and advantageous features. This system provides for the utilization of the sound stages to their fullest advantage without interference by reason of the manufacture of sets therein or the repair or change of such sets, and also provides for shifting the sets so that no sound stage need be held up by reason of having a set therein which is not in use, but must be held over for a later date.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. In a system of the character described for erecting motion picture and television sets, a movable carrier, a platform movable on said carrier, an endless belt on said carrier movable in a direction substantially perpendicular to the

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path of movement of said carrier, power means on said carrier arranged to propel said belt, and clutch engaging means mounted on said platform arranged for selective movement into engagement with said belt whereby said platform may be propelled from said carrier, said clutch engaging means including a dog member on said platform mounted both for vertical movement into engagement with said belt and also for pivotal movement about an axis perpendicular to the direction of movement of said carrier whereby said dog member may be moved out of harm's way.

2. The structure defined in claim 1, wherein said dog member is pivotally connected to a manually operable mechanism mounted on the platform.

3. The arrangement set forth in claim 1 in which track means support and guide the movement of said carrier, a stage disposed adjacent said track means, prime mover means on said stage for engaging and moving a platform onto and off said carrier, said platform having an end raised sufficiently above said carrier whereby said carrier may move underneath said platform while said platform is in position on said stage.

4. In a system of the character described for erecting motion picture and television sets, a mobile carrier, first track means supporting and guiding said carrier, a platform, second track means supporting and guiding the movement of said platform on said carrier, a stage mounted adjacent said first track means, co-operating guide means in said stage, said second track means on said carrier being alignable with said guide means on said stage, first prime mover means on said carrier for propelling said carrier on said first track means, second prime mover means on said carrier for moving said platform on said carrier, said second prime mover means including an endless belt on said carrier and movable transversely thereof, a dog member on said platform, manually operable clutch means on said platform for moving said dog member into engagement with said endless belt, said dog member being mounted both for vertical movement into engagement with said belt and also for pivotal movement about an axis perpendicular to the direction of movement of said carrier whereby said dog member may be moved out of harm's way, and turntable means in communication with the first mentioned track means for orienting said carrier on said platform whereby the platform may be moved into said stage in proper oriented direction.

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