W. F. IRRGANG.

WORK LIFTING APPARATUS.

APPLICATION FILED JUNE 25, 1917.

1,248,659.

Patented Dec. 4, 1917.

5 SHEETS—SHEET 1.

Fig. 1.

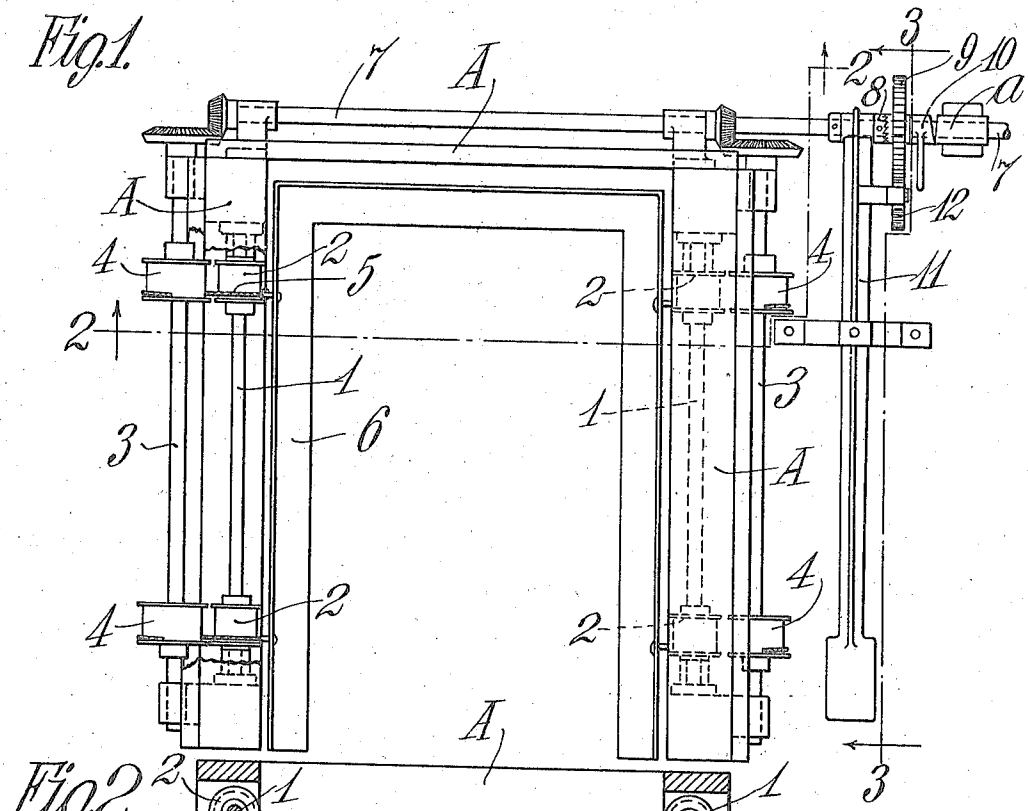
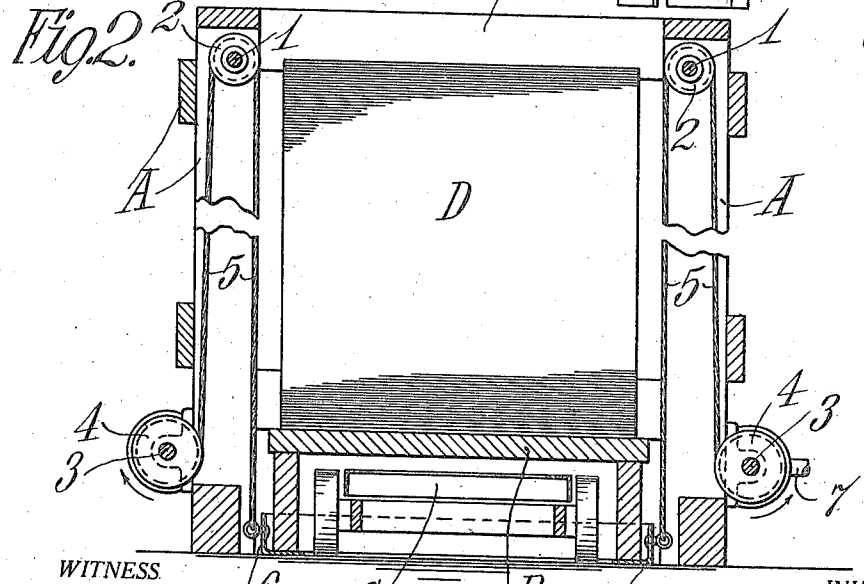


Fig. 2.



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5 SHEETS—SHEET 2.

Fig. 3.

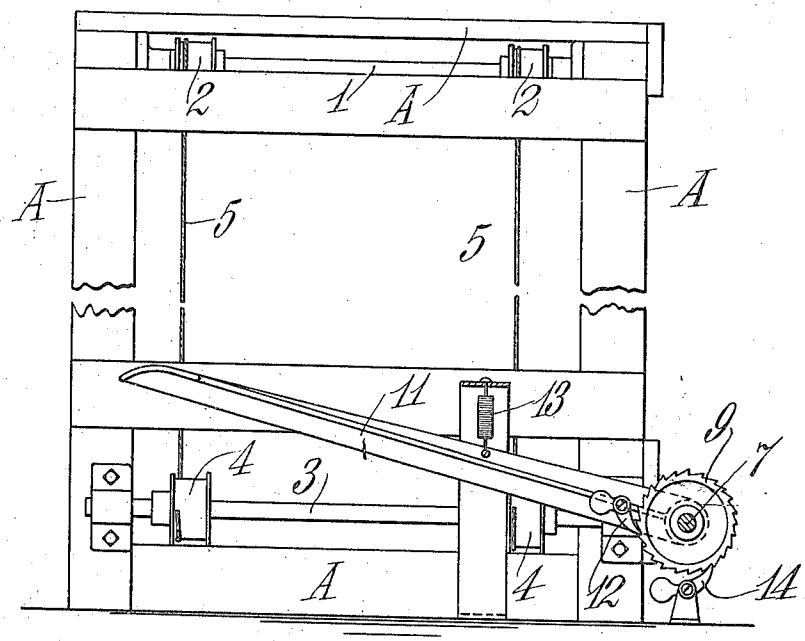


Fig. 4.

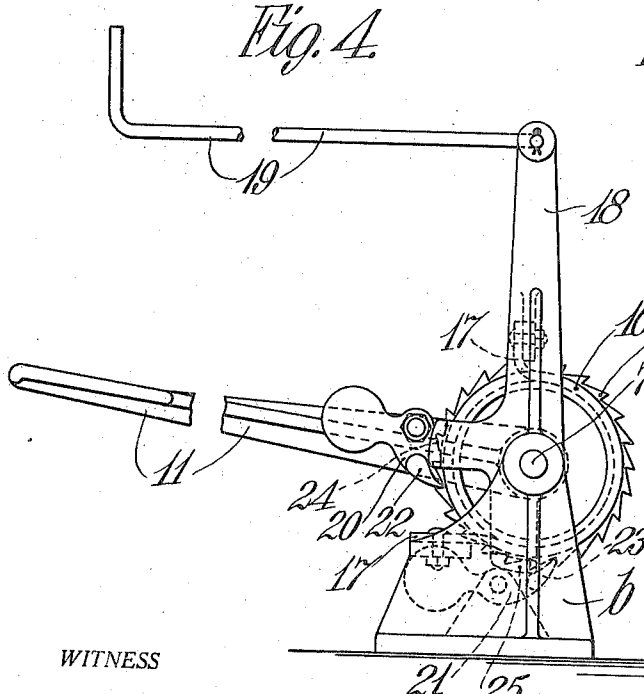
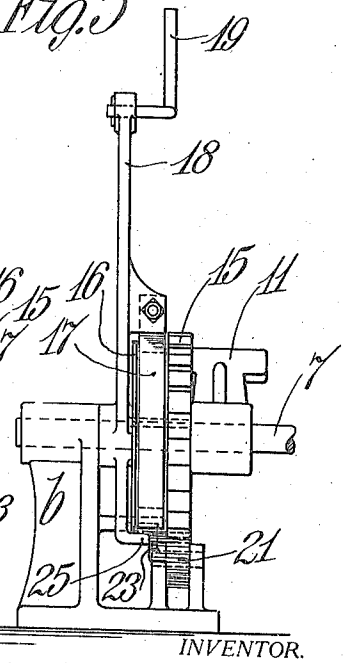


Fig. 5



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5 SHEETS—SHEET 3.

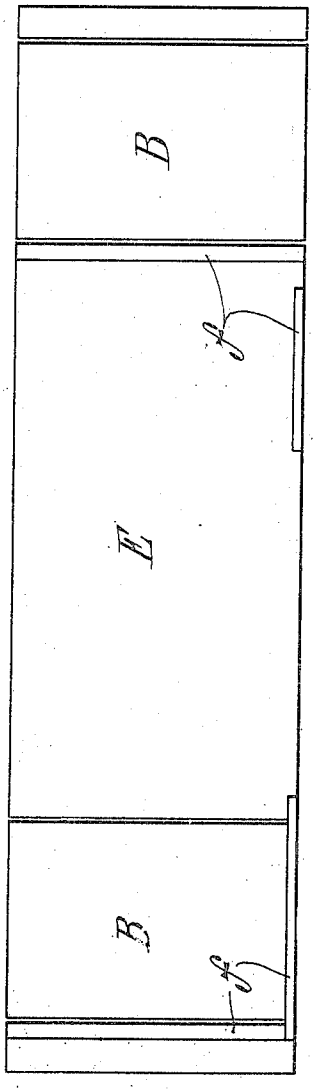


Fig. 6.

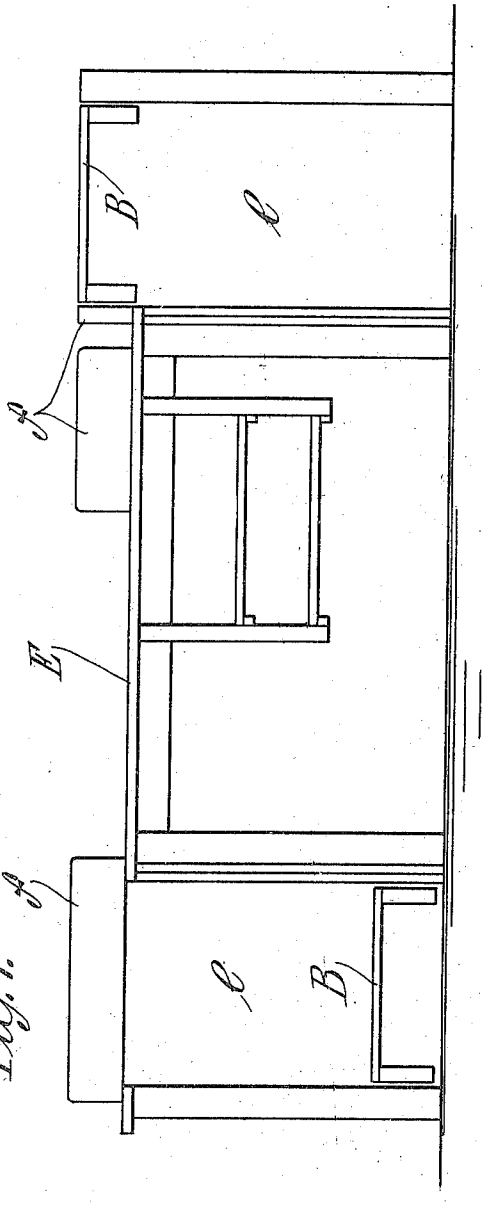


Fig. 7.

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5 SHEETS—SHEET 4.

Fig. 8a.

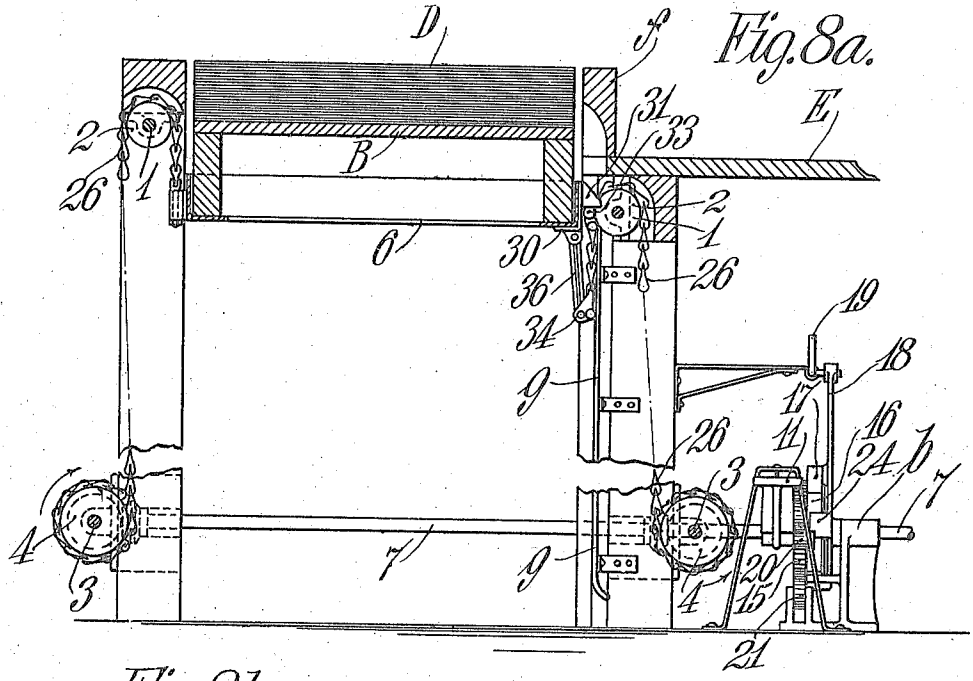
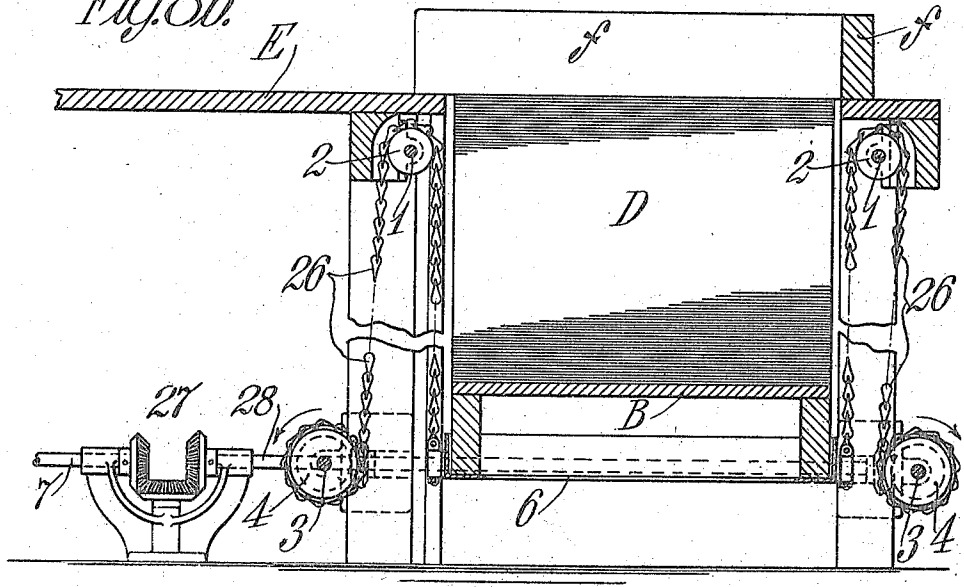


Fig. 8b.



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5 SHEETS—SHEET 5.

Fig. 9.

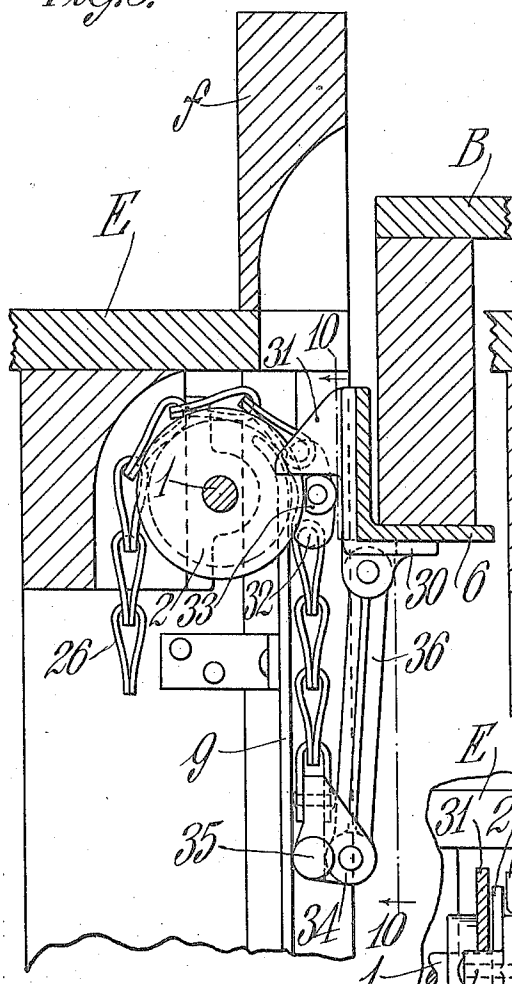


Fig. 11.

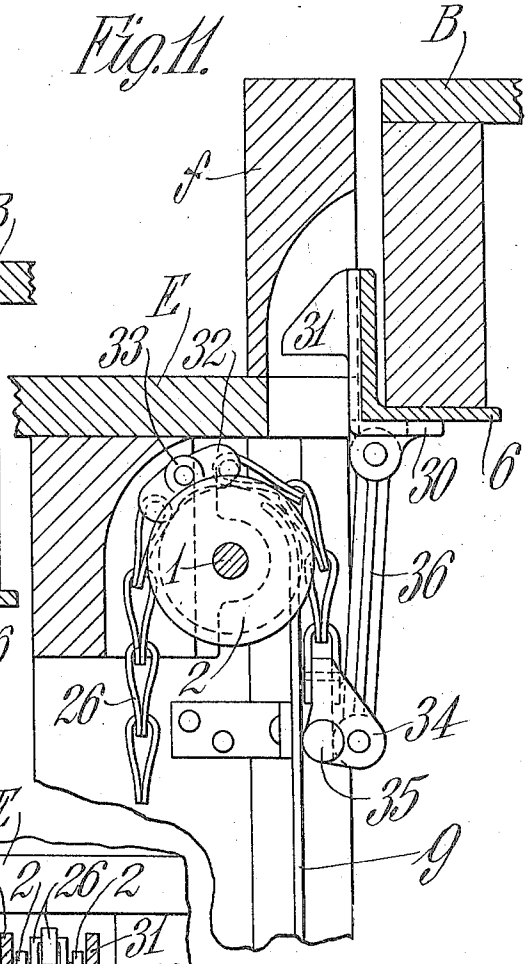
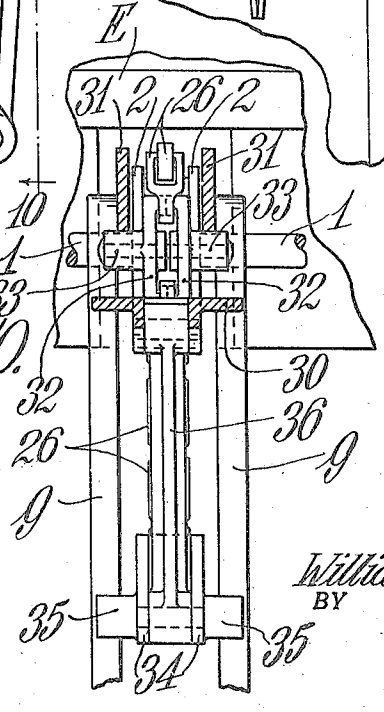


Fig. 10.



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WORK-LIFTING APPARATUS.

1,248,659. Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed June 25, 1917. Serial No. 176,739.

To all whom it may concern:

Be it known that I, WILLIAM F. IRRGANG, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Work-Lifting Apparatus, of which the following is a specification.

This invention relates to a lifting device for use in mills or factories where material is handled in large quantities. It is particularly designed for use with the platforms or skids of a master truck system. The latter includes apparatus to load and unload slightly raised platforms as units with work thereon.

One object of my invention is to provide an improved lifting apparatus which will serve as a station to receive a platform at the point desired to thereafter lift the platform as the load is taken off part by part whereby the top of the load at any time is approximately at the most convenient level.

Another object is to provide in combination with a "plater" table a set of stations of the character described whereby one platform may be unloaded while another is loaded part by part all at the most convenient level which is maintained by lifting or lowering the platforms according to whether they are being respectively unloaded or loaded.

Other objects of the invention will be apparent from the following detailed description and the scope of the annexed claims.

For the purposes of illustration, one preferred embodiment of the invention as used in connection with a "plater" table is shown in the accompanying drawing, in which—

Figure 1 is a plan view of the platform lift;

Fig. 2 is a sectional elevation thereof taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows;

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1 and looking in the direction of the arrows;

Fig. 4 is a side elevation showing a preferred modification of a step by step mechanism for use in connection with the platform lift;

Fig. 5 is an end elevation of Fig. 4;

Fig. 6 and Fig. 7 are plan and side elevational views, respectively, which illustrate diagrammatically the application of the platform lift to a "plater" table;

Fig. 8^a is a partial sectional elevation on an enlarged scale of the platform lift applied to a "plater" table;

Fig. 8^b is a continued portion of Fig. 8^a which is shown below in order to permit an adequate scale to be employed, Figs. 8^a and 8^b should be imagined as joined together;

Fig. 9 is a sectional elevation on an enlarged scale of a detail of the platform lifting mechanism;

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 9 and looking in the direction of the arrows; and

Fig. 11 is a view similar to Fig. 9 showing the parts in another position.

Referring to these drawings in detail and particularly to Figs. 1 to 3, inclusive, A represents a suitably braced frame, which is U-shaped in plan and is open at the top and at one end. Rotatably mounted on either side of the frame A near the top thereof are shafts 1 each of which have fixed thereto two or more drums 2. Near the bottom of the frames are other shafts 3, mounted in parallel relation with shafts 1, which each bear two or more drums 4. Secured to each of the latter are cables 5 which pass upwardly over the drums 2 and then downwardly and have their lower ends secured to a frame 6. This frame is substantially U-shaped and is preferably formed from angle iron as shown. The two parallel horizontal legs of the angle iron frame 6 are adapted to receive a platform B which is of the usual type employed with lifting trucks. In Fig. 2, C represents in conventional outline a lifting truck which is shown in lowered position as about to be withdrawn leaving the platform B loaded with sheet material D upon the frame 6.

The shafts 3 are each driven by bevel gearing to revolve in opposite directions by a shaft 7 mounted at the rear of frame A (see Fig. 1). Fixed to shaft 7 is a clutch element 8 and loosely mounted on the shaft is a ratchet wheel 9, which has formed on one face thereof a clutch element adapted to mate with the element 8. Between the other face of the ratchet 9 and a suitable fixed support *a* is a loosely mounted lever which has a cam face (see Fig. 1). This lever coacts with a cam face on the part *a* and is adapted normally to hold the clutch elements in

coöperative relation, whereby the ratchet may turn the shaft, but, when moved to another position, permits the disengagement of the clutch elements, whereby the shaft 7 may turn independently of the wheel 9. Loosely mounted on the shaft 7 is a lever 11 arranged at one end with a treadle for foot operation (see Fig. 3) and, pivotally secured on the lever, is a weighted pawl 12, which normally tends to engage the ratchet 9. The lever 11, when pushed downwardly turns the ratchet 9 in an obvious manner, and a spring 13 secured between the lever 11 and any suitable support returns the lever after the downward movement. 14 represents a weighted pawl, which also acts on the ratchet 9 to hold the latter in the well-known way. Thus, by means of the mechanism described, an operator can cause the load of sheet material D to be raised by suitable increments.

Figs. 4 and 5 illustrate a preferred form of step by step mechanism for use with the platform lifting device just described. The shaft 7 is journaled in a suitable support *b* and has secured thereto a ratchet wheel 15. The latter has secured thereon or as an integral part thereof a brake drum 16 and passing partially around the latter is a brake band 17, which is fixed at one end to the member *b* and at the other to a lever 18. This lever is loosely journaled on shaft 7 and has an operating arm 19 secured thereto which may be extended to any desired point for convenient operation. 11 represents the operating lever already described, which bears a weighted actuating pawl 20, and 21 is a similar weighted pawl pivoted in the bracket *b* to act as a holding pawl for the ratchet 15. These pawls have projections 22 and 23 formed thereon, which extend outwardly away from the ratchet 15, as clearly shown in Fig. 5 in connection with pawl 21. The lever 18 has extensions thereon, which bear inturned portions 24 and 25 and the latter are arranged to engage the projections 22 and 23, when the lever 18 is moved. It will thus be seen that the lever 11 acts as formerly to turn the shaft 7 and raise the frame 6 with load thereon by increments but that an improved means for lowering the frame 6 has been provided. Thus, when the frame is to be lowered, the operator pulls the rod 19 and the lever 18 immediately forces the brake band 17 against its drum 16 to check the descent of the frame 6. At the same time the inturned portions 24 and 25 act against projections 22 and 23 to withdraw the pawls 20 and 21 from the ratchet 15 to permit descent of the load.

The general structure and arrangement of the platform lifting device has been described, and the application of this device to a "plater" table will now be described. Figs. 6 and 7 show diagrammatically the general layout of the apparatus. E is the usual "plater" table where "books" of paper to be finished are "made up" to be passed through the plater (not shown), and later the books of finished paper are "broken down" after passing through the plater. The usual guides against which two sides of the sheets are placed during the book making operation are indicated at *f*. Formed near each end of the table E are vertical channels *e* in which the truck platforms B heretofore mentioned are mounted for movement in a manner to be described. The "books" are made up near the right-hand end of the table E, and the unfinished sheet material is delivered by the right-hand platform B somewhat above the level of the table from whence they may conveniently be taken by the operator engaged in making up the book. The operator, who breaks down the book, sits at the left-hand end of the table and, as the book is broken down, lays the finished sheets upon the left-hand platform B. The two platforms are arranged, as will later appear, to move in opposite directions, so that, as one load of sheet material D is being delivered to an operator by a lifting platform, another load is being built up upon a lowering platform by another operator.

Figs. 8[a] and 8[b] show respectively lifting and lowering platforms B having sheet material D thereon. These platforms B, as described in connection with Fig. 1, have frames 6 operable by chains 26, which are carried on the drums and shafts as already described. The step by step mechanism, shown in Figs. 4 and 5 and already described, is shown in the lower right-hand portion of Fig. 8[a] as a means to actuate the shaft 7 to raise the frame 6 by increments. This shaft 7 is connected by a reversing gear 27 (see Fig. 8[b]) to a shaft 28 which operates the right-hand drums 2 and 4 in a similar manner, shaft 7, and the left-hand drums. Thus, as the operator depresses the treadle 11, both platforms are moved by increments in opposite directions.

It is customary in plater tables for the "book making" operator to receive the sheets at a higher level than the table E, in fact, at the level of the top of guide *f*. It is, however, impracticable, as will be seen from an inspection of Fig. 8[a], to mount the drum 2 on the right-hand side of platform B at a sufficient height to accomplish this purpose. Therefore, an attachment is provided for this special purpose, whereby an additional lift above the level of the drum may be obtained. This device will now be described with particular reference to Figs. 9 to 11, inclusive. Secured to the U-shaped frame 6 is a bracket 30, which has spaced wings 31 extending outwardly into the path of the chain 26. The latter is divided and

has a connecting link 32 interposed between the divided portions, as clearly shown in Figs. 9 and 11. On either side of the link 32 are bosses 33, which, as shown in Fig. 10, extend outwardly beyond the spaced wings 31. These bosses 33 normally support the wings 31 and thus the frame 6. The lower end of the chain 26 bears a bracket 34 which has bosses 35 on either side thereof (see Fig. 10). Pivotally mounted in the bracket 34 is a link 36 which extends upwardly and is pivotally secured to the bracket 30. This lever 36 is slightly canted from the vertical for a purpose to be described and due to this cant an outward thrust is placed upon the bracket 34. To hold the part 34 against the thrust described, spaced vertical guide plates *g* are provided upon which the bosses 35 are adapted to ride as clearly shown in the drawings. The plates *g* are suitably supported from the frame of table E and are spaced sufficiently to receive the drum 2 therebetween.

Fig. 9 shows the platform B being lifted by the link 32 and wings 31. Continued turning of drum 2 will carry the link 32 around the drum so that the bosses 33 no longer underlie the wings 31. The lifting of the platform is then continued by the link 36, as shown in Fig. 11, the wings 31 passing upwardly into a suitable recess in the guide *f*. Thus, it is possible to carry the top of platform B up to the level of the top of guide *f* with the lifting devices all arranged below the table E out of the way of the operator. It is to be noted that, as the frame 6 is lowered, the bracket 34 will finally strike the floor, and it is necessary to provide means to remove the bracket and link 36 from the path of frame 6 to permit the latter to engage the floor. To effect this purpose the guides *g* (see Fig. 8[a]) are cut away near the floor, and the outward cant of the link 36 steers the bracket and link outwardly away from the frame.

Assuming the left-hand frame 6 (see Figs. 8[a] and 8[b]) to be lowered to the floor and the right-hand frame to be in its uppermost position with a platform B thereon, the general operation is as follows: An operator takes a pile of unfinished sheet material, which is loaded upon a platform B, and transports the same by means of a suitable lifting truck to the left-hand frame 6. The truck is backed into the open end of the U-shaped frame and then lowered to deposit the platform on the frame. One plater operator commences the "making up" of a book, taking sheets from the top of the pile D on the left-hand platform B. The other plater operator is engaged in "breaking down" a book and places the finished sheets on top of the right-hand platform B and passes the sheets of zinc and linen to the "making up" operator. The latter operator controls the step by step mechanism to operate both platforms and, from time to time, depresses the treadle 11 to lift her platform and lower the other platform. This operation is continued until the right-hand platform is loaded. The latter, if not already on the floor, is lowered by the treadle 11. A lifting truck is then backed under the right-hand platform, elevated to lift the platform from the floor, and the load of finished sheet material is drawn away. The handle 19 is then actuated, which releases the ratchets so that the left-hand platform B and frame 6 drops by gravity, or against the brake 16—17, and lifts the right-hand frame 6. A platform B is then placed on the latter, and a platform loaded with unfinished sheet material is wheeled into position on the left-hand frame 6 and the above described operations repeated.

It will thus be seen that the sheet handling mechanism described operates with the lifting truck to effect a large saving in labor heretofore thought necessary. It is no longer necessary to have additional operators to tend the two plater operators and supply them with unfinished material and remove finished material. With the arrangement described, the platforms may conveniently be loaded and unloaded by the operators themselves, and a single other operator can readily move the loaded platforms back and forth with a lifting truck to supply a large number of plater tables.

It is recognized that many modifications may be made in the specific structure heretofore described without departing from the scope of my invention which is defined in the appended claims.

What I claim is—

1. A load lifting apparatus, comprising a load supporting frame adapted when in lowered position to lie closely adjacent the floor, rotatable drums on opposite sides of the path of said frame, one of said drums by necessity being lower than the other, flexible members passing over said drums and adapted to be wound up to lift the frame, means on said members operable to support said frame until they pass above the axes of their drums, and a supplementary connection between the frame and the member on the lower drum operable, when the means on the last-named member moves above the axis of its drum, to carry the frame above the latter to the level to which the frame is moved by the other member.

2. A load lifting apparatus, comprising a load supporting frame adapted when in lowered position to lie closely adjacent the floor, rotatable drums on opposite sides of the path of said frame, one of said drums by necessity being lower than the other, flexi-

ble members passing over said drums and adapted to be wound up to lift the frame, means on said members operable to support said frame until they pass above the axes of their drums, and a supplementary connection between the frame and the member on the lower drum operable, when the means on the last-named member moves above the axis of its drum, to carry the frame above the latter to the level to which the frame is moved by the other member, and means whereby said supplementary connection may be moved out of the path of the frame as the latter approaches the floor so that the frame may be positioned closely adjacent the latter in its lowered position.

3. An apparatus for lifting loads, comprising, a frame to receive the load and adapted when in lowered position to lie closely adjacent the floor, rotatable drums on opposite sides of the path of said frame, the drum on one side of said frame being lower than that on the other side of the frame, flexible members passing over said drums and adapted to be wound up to lift the frame, and means connecting the members and frame, the connecting means for the lower drum including a device on the flexible member normally supporting the frame and movable around the drum out of supporting engagement with the frame, and a link connecting the frame to the flexible member below said device, said link being operable to lift the frame above the lower drum to the same level as that to which the other drum and flexible member is capable of moving it and said link being movable out of the path of the frame as it nears its lowermost position to permit the frame to lie closely adjacent the floor.

4. A load lifting apparatus comprising in combination, a frame to receive loads, an actuating shaft, operable connections from the latter to the frame arranged to move the frame, a ratchet on said shaft, a lever arranged for foot operation, a pawl thereon arranged normally to engage said ratchet, a holding pawl for said ratchet, whereby said frame may be lifted by increments, a drum fixed on said shaft, a second lever loose on said shaft, a brake band for said drum operable by said second lever, projections on each of said pawls engageable by said lever to withdraw said pawls from engagement with said ratchet, whereby the frame may descend by gravity and its descent may be checked by said brake.

5. An apparatus for lifting loads, comprising, a frame on which the load may be deposited, rotatable drums, flexible members passing over said drums, means on said members to support the frame, said members adapted to be wound up to lift the frame, and means connecting the frame to a point on said members below the first named means, and a device to rotate said drums, said last-named means being operable by movement of the members to lift the frame above the first named means and above the drums.

6. An apparatus for lifting loads, comprising, a frame on which the load may be deposited, rotatable drums, flexible members passing over the latter and adapted to be wound up to lift the frame, means on the members to support the frame, said means being movable out of supporting engagement with the frame as the latter approaches the end of its upper travel, parts pivotally connected to the members below said means and pivotally connected to said frame, and a device to rotate said drums, said parts being operable to support the frame after said means have moved out of supporting engagement with the frame and to lift the frame above said drums.

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