May 10, 1955 J. G. TALCOTT 2,708,012

APPARATUS FOR ERECTING STORAGE ENCLOSURES

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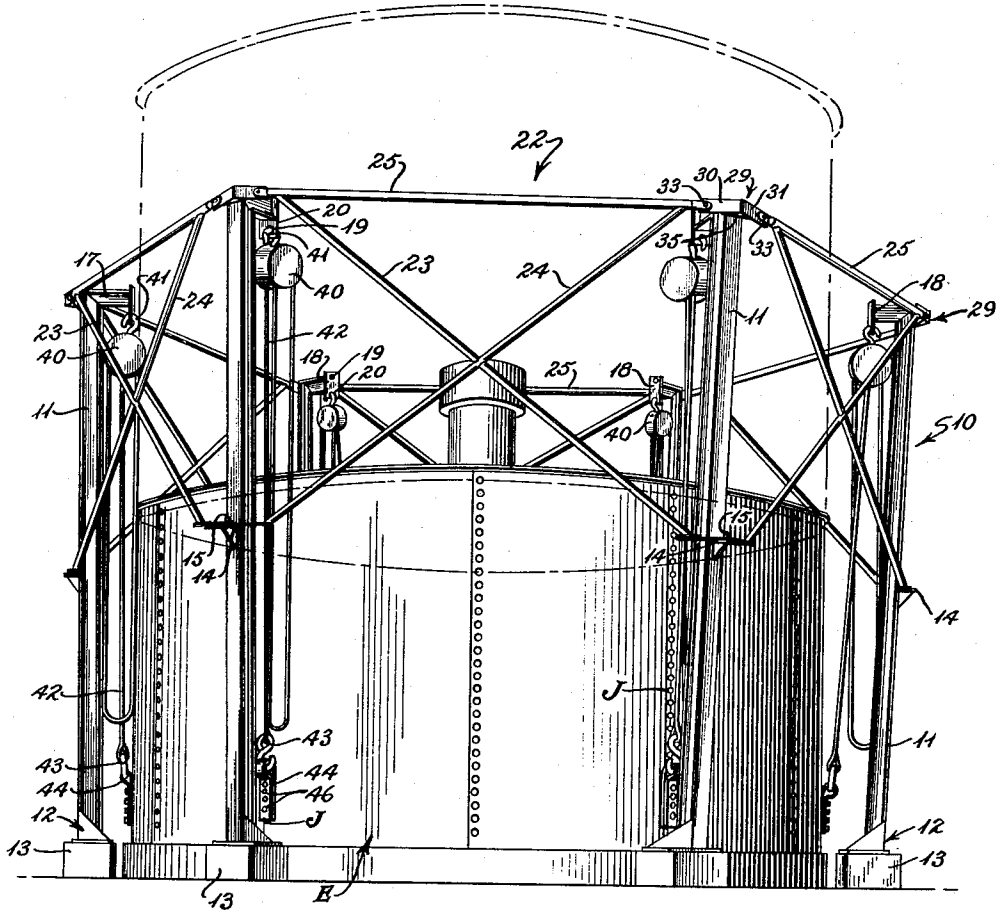


Fig. 1

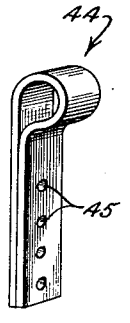


Fig. 7

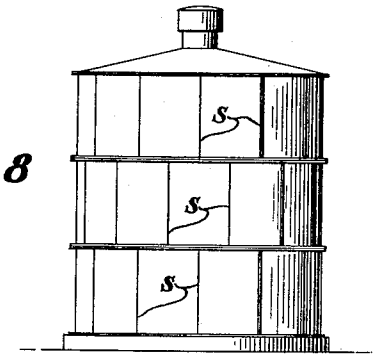


Fig. 8

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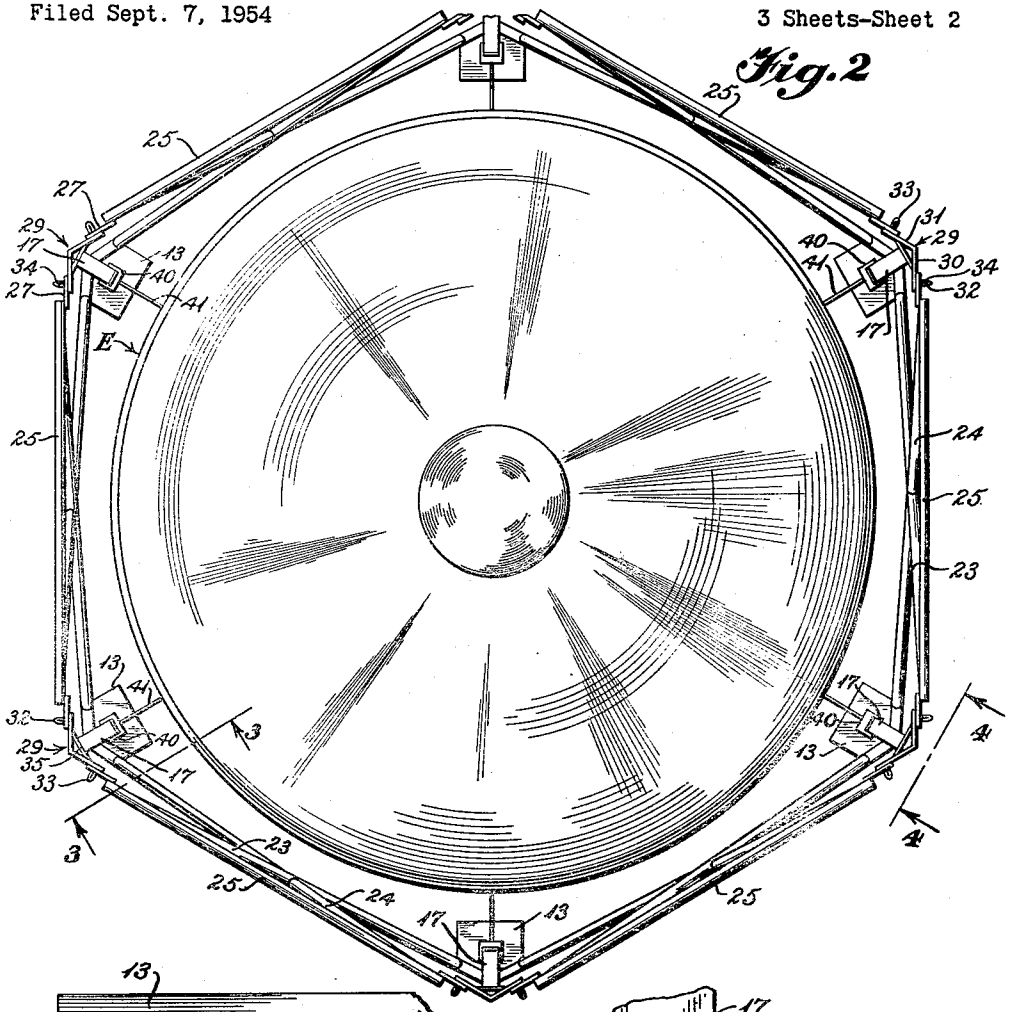
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Fig. 2



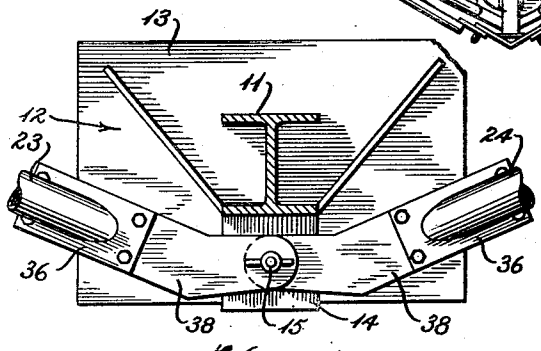


Fig. 5

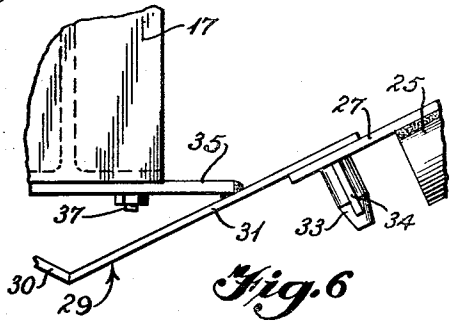


Fig. 6

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APPARATUS FOR ERECTING STORAGE ENCLOSURES

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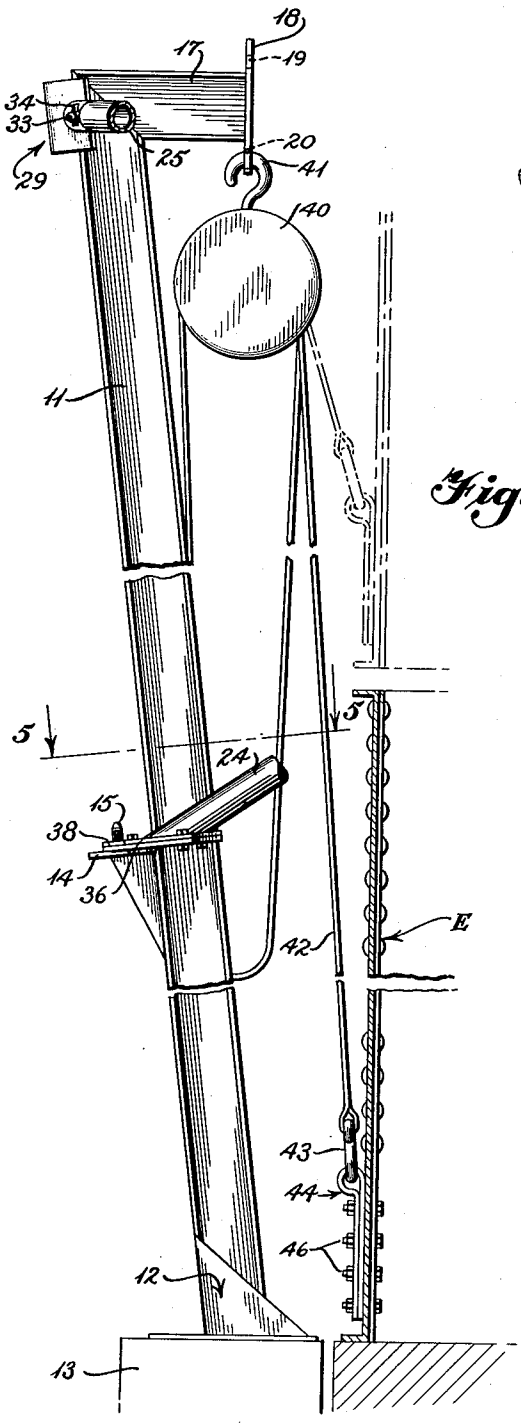


Fig. 3

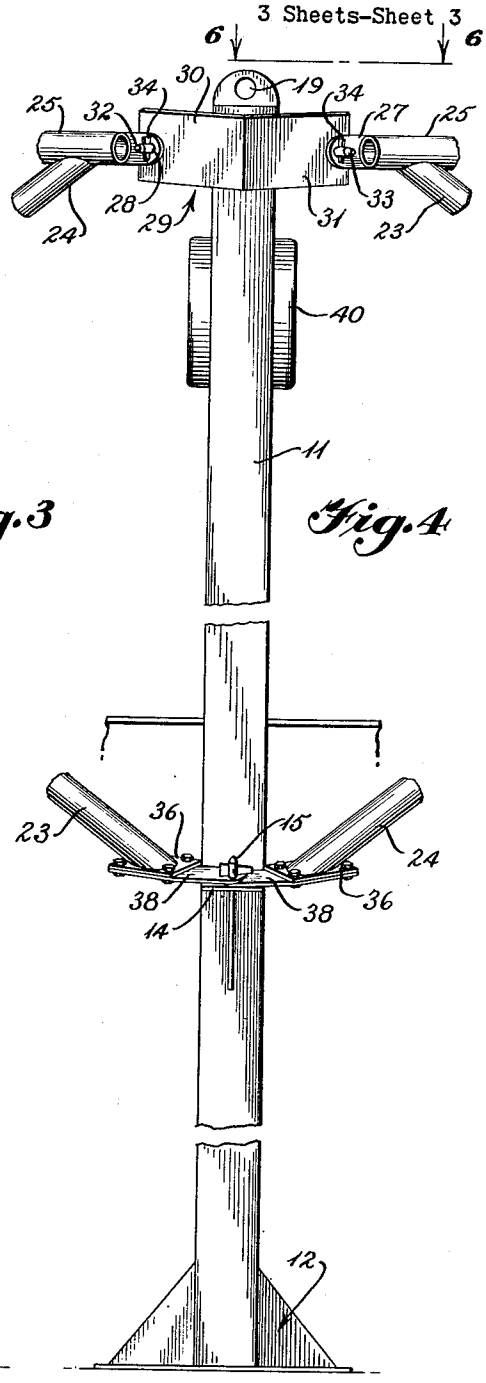


Fig. 4

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2,708,012

APPARATUS FOR ERECTING STORAGE ENCLOSURES

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Application September 7, 1954, Serial No. 454,561

5 Claims. (Cl. 189—3)

This invention relates to the construction of storage facilities such as grain storage tanks or bins which are commonly constructed of curved sheets or staves fastened together to form a cylinder and placed one on top of another to achieve the desired height.

The storage of grain has become of increasing importance in recent years not only because the demand may be spread out over the year but also because of the seasonal fluctuations in the quantities raised and variations in the demand for the feeding of livestock and to areas in low supply.

Heretofore, in the construction of grain storage enclosures of sheet material it has been necessary to erect scaffolding upwardly around each section as completed. The cost of the scaffolding and the difficulty of working above the ground at a substantial height has made such structures rather costly and their erection time consuming.

The present invention provides for the lifting of the constructed sections so that succeeding ones may be erected on the ground therebeneath and connected to the finished sections, even though the weight of the sections is great and the interior must be free of interfering structure which would hamper the workmen assembling the units.

Accordingly, it is an object of the present invention to provide apparatus for quickly and easily erecting heavy tall storage enclosures without the necessity for working at a substantial height above the ground or for erecting scaffolding at a substantial height above the ground.

A further object is the provision of a novel scaffolding framework which is easily adapted for the erection of storage enclosures of varying diameters.

A further object is the provision of a scaffolding framework having means for supporting a storage enclosure at spaced points around its periphery and for hoisting said enclosure and holding in raised position while the next succeeding enclosure section is erected therebeneath.

These and other objects of the invention will become apparent from the accompanying drawings taken in conjunction with the description, wherein:

Fig. 1 is a perspective illustrating one embodiment of the present invention;

Fig. 2, a top plan view of the structure of Fig. 1;

Fig. 3, a section on the line 3—3 of Fig. 2 to an enlarged scale;

Fig. 4, a section on the line 4—4 of Fig. 2, to an enlarged scale;

Fig. 5, a section on the line 5—5 of Fig. 3, to an enlarged scale;

Fig. 6, a section on the line 6—6 of Fig. 4, to an enlarged scale;

Fig. 7, a detail of a lifting lug; and

Fig. 8, an elevation of a completed storage bin.

Briefly stated, the invention includes a framework of interconnected substantially upright posts arranged in a circle and having a hoist connected to the upper ends of the posts for lifting a cylindrical section of an enclosure positioned within the framework. The framework is designed to support hoisting apparatus for a vertical lift without interference therewith and to support enclosures

several sections high from the lower portion thereof with a maximum degree of security and stability. It may be easily and quickly erected and dismantled and by using different connectors the same framework elements may be used for storage enclosures of varying diameters.

Referring to the drawings, the scaffolding **10** is comprised of a plurality of posts **11** having bases **12** mounted on blocks **13**. The posts are preferably of I-beam material although others may be used. The posts extend upwardly slightly more than the height of one enclosure section but not as high as two, such height having been found to be sufficient for multistoried enclosures.

The posts **11** are arranged in a circle or ring, or other desired configuration, the number employed depending on the diameter of the enclosure to be erected. Preferably, the enclosure E has a post positioned at every other joint J as illustrated in Fig. 1. The posts are inclined outwardly from the top in order that clearance may be provided for the hoisting mechanism and to strengthen the structure against inward collapse.

Approximately midway of the length of each post and on the outer flange thereof a center support plate **14** is mounted and has a pin **15** extending upwardly from the central portion thereof. At the top each post has an arm portion **17** which extends inwardly and has a hangar plate **18** approximately vertically over the base and has upper and lower apertures **19** and **20**.

In between each adjacent pair of posts a bracing framework **22** is employed and this comprises crossed pipe members **23, 24**, connected at their upper ends by a horizontally positioned pipe member **25**. With particular reference to Figs. 3 and 4, the pipe members **25** have ears **27** with apertures **28** connected thereto at each end. The pipe members **25** are mounted between the upper ends of an adjacent pair of posts by means of a hangar member **29** comprised of a pair of angularly disposed plates **30, 31** having pins **32, 33** projecting outwardly therefrom, the pins extending through the apertures **28** in the ears **27**. The pins have slots therein for the reception of wedge-shaped keepers **34**. Strut **35** extends between the plates **30, 31** and is attached by fasteners **37** to the upper end of a post **11**.

At their lower ends the crossed pipe members **23, 24** have horizontal plates **36** connected thereto to each of which is attached a connection plate **38**. The connection plates project beyond the horizontal plates **36** and each has an aperture therein for receiving the pin **15** in the plate **14** on the post, the connection plates overlapping for this purpose, as illustrated in Figs. 4 and 5.

A chock block or hoisting pulley **40** has a supporting hook **41** engaged with the aperture **20** in the plate **18** extending from the arm **17** at the upper end of each post. The line **42** from the block has a hook **43** for engagement with a strap or lifting lug **44** connected to the structure to be lifted. The lug **44** has a plurality of apertures **45** which are spaced the same as the apertures through which the fasteners **46** extend to join the adjacent edges of the staves.

In the operation of the device the scaffolding framework is first erected by positioning the posts and connecting the bracing therebetween. The posts are spaced sufficiently to enclose the bin which is to be erected, and may be lifted by engaging the upper apertures **19** in the hangar plates **18**, if desired. Next, one section of the bin is erected within the area defined by the framework. Instead of placing permanent fasteners through all of the openings for connecting the staves together, the lugs **44** are attached through the lowermost apertures. The hoisting block and tackle is then attached to the scaffolding and to the lifting lugs and the section is raised sufficiently high so that another section may be constructed therebeneath. The first section is held

in the upper position for as long as is necessary to construct the next succeeding section.

As illustrated in Fig. 8, the seams S of the sections are staggered between adjacent sections in order to provide a stronger structure. This is accomplished by building each section, after the first, with the seams offset from the raised section above, the hook of the hoisting tackle extending at an angle to the vertical, as indicated in Fig. 1, when the lift is begun. Lifting lugs are connected at proper locations on the second section for the lifting hooks in order that the second section may be raised for the construction of the third, if more than two sections are desired. After construction of the second section, the first section is lowered sufficiently to connect the first and second sections together. As many succeeding sections may be constructed as is desired.

The scaffolding is easily erected and the same posts and bracing elements may be used regardless of the diameter of the enclosure to be built. The only elements that vary according to the diameter of the area enclosed are the horizontal plates **38** which are connected to the lower ends of the cross pipes **23**, **24**, and the hangar members **29** which are connected to the upper ends of the post. By providing various sizes and dimensions of these elements, various size structures may be erected.

Accordingly, it will be apparent that the invention includes a scaffolding of low height for raising and supporting a circular enclosure in elevated position while a next succeeding section is constructed therebeneath. A saving in scaffolding material, time and labor for its construction, and easier assembling of individual sections at ground level is therefore provided.

The invention contemplates the construction of multi-storied enclosures of two or more sections or stories, Fig. 8 showing an enclosure of three sections for illustrative purposes. Obviously, more than three sections may be employed if desired.

Although a particular structure has been described and shown, it will be understood by those skilled in the art that the invention is not limited to the specific embodiment shown but that reasonable equivalents and variations therefrom are within its scope and that, therefore, the invention is only limited as found in the following claims.

What is claimed is:

1. Apparatus for lifting a section of a substantially cylindrical storage enclosure having lifting lugs extending outwardly therefrom, comprising a plurality of upstanding posts spaced equidistantly from each other and defining a circle within which a cylindrical storage enclosure may be constructed, said posts being inclined outwardly from an upward projection of said circle, a base supporting each post, a center support on the outer side of each post approximately midway of its length and having an upstanding pin, an arm at the top of each post extending inwardly, a vertical hangar plate at the end of each arm in substantially vertical alignment with the base and having upper and lower apertures, bracing between adjacent posts and comprising a pair of crossed pipes and a third pipe connecting the adjacent upper ends of said crossed pipes, an ear on each end of the third pipe and having an aperture therein, a hangar member for the upper end of each post, said hangar members each comprising a pair of angularly disposed plates and a strut extending between the inwardly inclined surfaces of the plates and connected to the upper end of the post, a pin extending substantially horizontally from the outer end of each plate on the outer surface thereof, the apertures in the ears of said third pipes engaging said pins, a horizontal plate connected to each of the lower ends of the cross pipes and having spaced fastener receiving apertures therein, a connection plate attached to each horizontal plate, each connection plate having an apertured extension, the apertured extension being engaged with one of said upstanding pins on a center support, and a hoisting mechanism suspended from the lower of the apertures in each of the hangar plates and having hook means for engaging the lifting lugs.

2. Apparatus for lifting a section of a substantially cylindrical storage enclosure comprising a plurality of upstanding posts arranged in a circle and inclined outwardly therefrom, a support on the outer side of each post and having an upstanding pin, an arm at the top of each post extending inwardly, a vertical hangar plate at the end of each arm, bracing between adjacent posts and comprising a pair of crossed pipes and a third pipe connecting the adjacent upper ends, an ear on each end of the third pipe and having an aperture therein, a hangar member for the upper end of each post, said hangar members comprising a pair of angularly disposed plates and a strut extending between the inwardly inclined surfaces of the plates and connected to the upper end of the post, a pin extending substantially horizontally from the outer end of each plate on the outer surface thereof, the apertures in the ears of said third pipes engaging said pins, a horizontal plate connected to each of the lower ends of the cross pipes, a connection plate attached to each horizontal plate, each connection plate having an apertured extension, the apertured extension being engaged with one of said upstanding pins on a center support, and a hoisting mechanism suspended from each of the hangar plate feet and having means for engaging the housing.

3. Apparatus for erecting a storage enclosure consisting of a plurality of vertically stacked sections, each section above the bottom section of the completed enclosure having means for connection with hoisting mechanism, said apparatus comprising a plurality of upstanding posts arranged around said enclosure, said posts being connected together around said enclosure by struts extending between adjacent posts, said posts and struts forming a scaffold entirely around the outside of the vertical walls of said enclosure in order that said enclosure may pass through the top of the scaffold, the height of said posts being greater than the height of a single section and substantially less than the height of the completed storage enclosure, and means supporting hoisting mechanism from the posts at an elevation above the top of the lowermost unelevated section.

4. The invention according to claim 3, said posts being inclined upwardly and outwardly from said enclosure, and said hoisting mechanism supporting means positioning the hoisting mechanism in substantially vertical alignment with the base of each post.

5. The invention according to claim 3 in which each hoisting mechanism supporting means comprises an arm attached to the top of the post and extending inwardly therefrom, said hoisting mechanism being mounted from the inner end of said inwardly extending arm at a point in substantially vertical alignment with the foot of each post.

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