

Dec. 19, 1933.

E. W. BURGESS

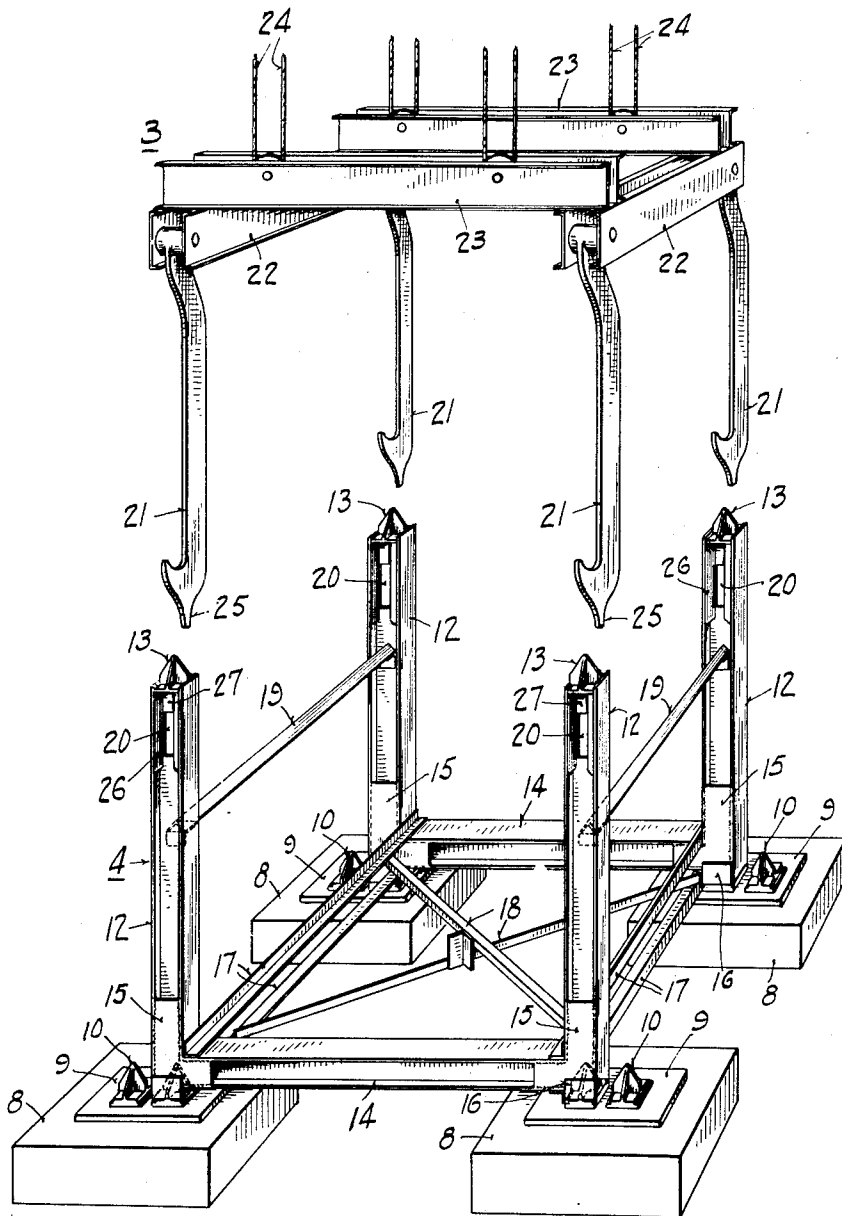
1,940,242

PIPE STORAGE APPARATUS

Filed Aug. 24, 1931

2 Sheets-Sheet 1

FIG. 1.



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2 Sheets-Sheet 2

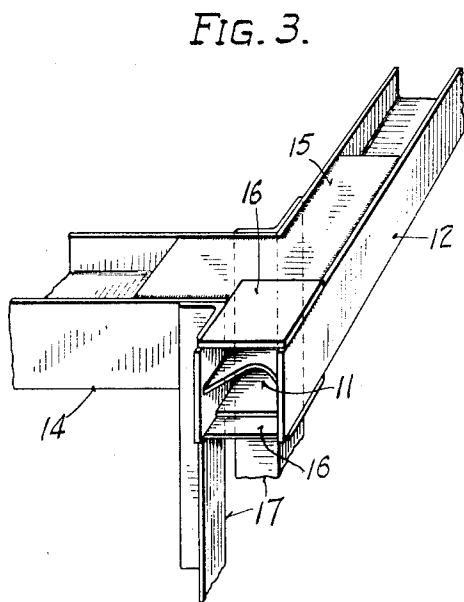
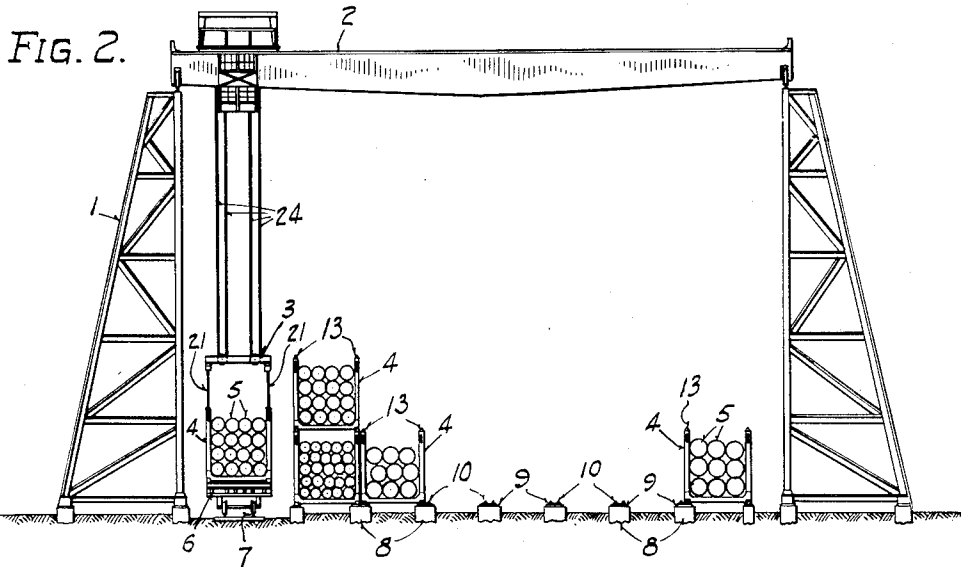


FIG. 4.

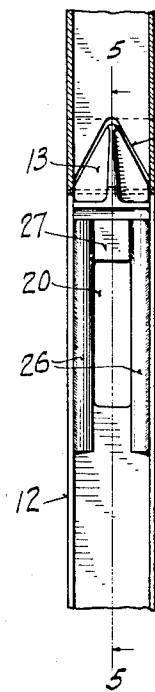
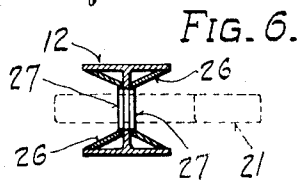
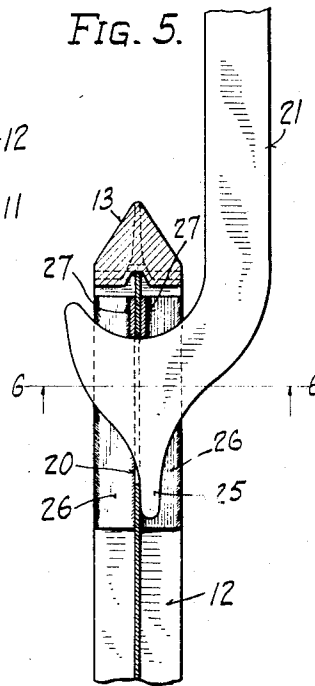


FIG. 5.



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PIPE STORAGE APPARATUS

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4 Claims. (Cl. 214—8)

This invention relates generally to material storage systems and particularly to a system for storing pipe in large quantities.

An object of the invention is to provide a storage system for storing material in large quantities so arranged that a number of units of the material may be readily placed in storage or quickly removed therefrom.

Another object of the invention is to provide a storage crate especially adapted for storing pipe in car load lots.

In accordance with the present invention, a storage system is provided for receiving in car load lots a large quantity of pipe of relatively large diameter. The pipe is piled in crates, each crate containing one car load of pipe, and the crates are adapted to be stacked one upon another on suitable foundations in the storage yard. The storage yard is served by a large crane having a lifting cradle designed to be engaged with the storage crates by the crane operator without the assistance of other workmen.

In a particular embodiment of the invention, when filled to capacity with pipe ten inches in diameter, the yard contains sufficient pipe to construct a pipe line approximately 450 miles in length, the crates of pipe being so arranged that the entire quantity of pipe may be removed from the yard in something less than eight days.

The objects of the invention that have been set forth and other objects that will be appreciated on further consideration of this specification in conjunction with the accompanying drawings, may be achieved by the apparatus shown in the different views thereof of which:

Figure 1 is a view in perspective of a material storage crate embodying the invention disposed on suitable foundations and a lifting cradle suspended above it;

Fig. 2 is a general view in end elevation of the storage system embodying the invention;

Fig. 3 is a view in perspective of one corner of a storage crate showing a recess in the bottom thereof for engaging a shoe on a foundation or on another crate;

Fig. 4 is a view in elevation of the top of one corner post of a crate interfitting with the bottom of another post shown in vertical section;

Fig. 5 is a view in section taken on the plane represented by the line 5—5 of Fig. 4 of the top of a post showing the manner in which it is engaged by a lifting hook, a portion of which is shown in elevation; and

Fig. 6 is a view in horizontal section of the top

of the post taken on the plane represented by the line 6—6 of Fig. 5 with the lifting hook represented in dotted lines.

As shown in Fig. 2, the storage system embodying the invention comprises, in general, a relatively large craneway 1 upon which a transfer or bridge crane 2 of the usual construction is disposed to operate. From the crane 2 is suspended a carrier or cradle 3 adapted to engage and lift a crate 4 that is of sufficient size to hold one car load of pipe 5 to be stored.

The crates 4 containing the pipe 5 may be brought to the storage yard on special flat cars 6 that operate on a standard track 7 extending along one edge of the storage yard. From the cars 6 the crates of pipe may be lifted by the crane and disposed upon suitable foundation blocks 8 within the yard or upon other similar crates already in position in the yard. As shown in Fig. 2, the foundation blocks 8 are spaced laterally of the craneway 1 in such manner that the crates 4 may be placed relatively close together over the width of the yard and it will be readily understood that the foundation blocks 8 are spaced longitudinally of the yard with regard to the length of pipe to be stored in such manner that the available space is used efficiently.

As shown in greater detail in Fig. 1, each of the foundation blocks 8 is provided with a load receiving shoe 9 having one or more upwardly projecting points or lugs 10, the surfaces of which are disposed to engage complementary recesses 11 in the under surfaces of the crates 4.

Each crate 4 comprises essentially four corner posts 12, in the lower ends of which the recesses 11 are formed, as shown in detail in Fig. 3. At their tops, the posts 12 are provided with projecting post caps or lugs 13 similar to the lugs 10 on the foundations 8 and spaced to enter the recesses 11 of another crate in such manner that crates may be stacked one upon another.

The two corner posts at each end of the crate are connected near their lower ends by a transverse member 14 upon which the load of pipe in the crate is supported. The transverse member 14 is preferably made from a structural element such as an I- or H-beam and is joined at its ends to the posts 12, which are likewise of I- or H-section, by welded joints. The joints are reinforced at each side by suitable gusset plates 15 that are welded to the edges of the flanges of both the cross member 14 and the posts 12.

Beneath the gusset plates 15 at each corner of the crate 4 the post 12 is provided with side plates 16 welded to the edges of the flanges and extending, as shown in Fig. 3, substantially to the bottom of the post. The side plates 16, together with the flanges of the post 12, constitute the recess 11 in the lower end of the post. As shown in Figs. 3 and 4, the web of the post 12 is cut away to conform substantially to the contour of the lugs 10 and 13. The ends of the flanges of the posts 12 are machined to provide flat surfaces at right angles to the axes of the posts to provide complementary seating surfaces adapted to be engaged when the crates are stacked one upon another.

The pairs of posts 12 at the ends of the crate and their respective connecting cross members 14 are joined by relatively light longitudinal members 17 of angle iron welded in place and the structure is braced diagonally by other angle members 18 joined by welding to the longitudinal members 17. The posts at each side of the crate may be further braced by suitable longitudinal members 19 connected preferably by welding to the posts near their upper ends.

To enable the carrier or cradle 3 of the crane 2 to engage the crate 4, each post 12 is provided at its upper end with a hook receiving lifting opening 20 formed by piercing the web of the post 12. For engaging the lifting opening 20, the carrier or cradle 3 is provided with four depending hooks 21 that are pivotally connected to longitudinal members 22. The longitudinal members 22 of the cradle 3 are connected by suitable transverse members 23 which are engaged by four lifting cables 24 that suspend the cradle 3 from the crane 2 in such manner that the longitudinal members 22 are held in parallel relation to the longitudinal members 17 and 19 of the crates 4.

With the cradle 3 thus suspended in longitudinal alignment with the crates 4, the hooks 21 may be readily engaged in the openings 20 by simply lowering the hooks to the level of the openings 20 and moving them into the openings 20 by longitudinal movement of the crane bridge 2 and the cradle 3. The crate 4 and its load may then be lifted and placed in position either on foundation blocks 8 or upon the top of another crate, the cradle 3 and the attached crate 4 being held in longitudinal alignment by the four lifting cables 24. After the crate has been placed in position, the hooks 21 may be readily disengaged by the crane operator without assistance by simply lowering the cradle slightly and moving it longitudinally to withdraw the hooks from the openings 20. To prevent the hooks 21 from slipping through the openings 20 when the cradle 3 is lowered, each hook is provided with a depending lug 25 that is adapted to engage the web of the post 12, as shown in Fig. 5.

In lifting a crate of pipe, for example from the car 6 shown in Fig. 2, the cradle 3 is lowered with the hooks 21 at each side thereof on opposite sides of the load of pipe 5. Thus the pipe 5 is utilized to some extent to guide the hooks 21 toward the openings 20 in the crate 4. To further guide the hooks 21, each opening 20 is flanked by angularly disposed guide plates 26 welded to the flange and web of the post, as best shown in the sectional view of Fig. 6. After the hooks 21 have been guided into the openings 20, they are moved upward into engagement with the edge of the web of the post 12 that defines the upper end of the opening 20. As shown in

Fig. 5, the web is reinforced at this point by reinforcing blocks 27 welded to each side thereof to provide a wide bearing surface for the hook 21. The post cap 13 is preferably of cast steel and is securely welded to the upper end of the post, thus further reinforcing it.

Although there is shown and described only one embodiment of the invention, various modifications may be made in the details of construction of the lifting crane and the storage crates without departing from the spirit and scope of this invention as defined in the appended claims.

I claim:

1. A material storage system comprising crates for material, each crate having four corner posts with elongated lifting openings near their upper ends, a crane for lifting the crates, a cradle suspended from the crane, four lifting hooks on the cradle all pointing in the same direction to engage the openings in the corner posts, and means for maintaining the cradle and the crates in alignment, whereby the hooks may be inserted in the lifting openings of a crate by moving the cradle longitudinally of the crate by means of the crane and without manual guidance.

2. Storage apparatus for pipe stock, comprising a relatively large craneway, foundations disposed in spaced relation within the craneway, upwardly projecting lugs on the foundations, crates for receiving pipe having four corner posts with lifting openings near their tops and with recesses in the under surfaces thereof for engaging the lugs on the foundations, a crane having four lifting cables operating on the craneway, a rectangular cradle suspended by the four lifting cables in such manner that it is restrained from rotating, and four hooks on the cradle, all the hooks extending in the same direction to engage the lifting openings in the four corner posts of one of the crates upon lateral movement relative to the crate, whereby a crate may be engaged, placed upon predetermined foundation lugs, and disengaged by the crane operator without the assistance of other workmen.

3. A system for storing relatively long pipe stock in car load lots, comprising a large craneway, load receiving lugs disposed in spaced relation within the craneway, crates for pipe having four corner posts with recessed bottoms disposed to engage the spaced load receiving lugs and with projecting tops provided with lifting openings, said crates being adapted to each support a car load of pipe in a direction longitudinal of the craneway and being adapted to be stacked one upon another, a crane provided with four lifting cables operating on the craneway, a rectangular cradle suspended by the four lifting cables in alignment with the craneway, and four hooks depending from the cradle in position to straddle the pipe in a crate and all extending in the same direction to engage simultaneously the lifting openings in the four corner posts of the crate, whereby a crate and its load of pipe may be lifted and stacked upon the load receiving lugs or upon another crate.

4. Storage apparatus for pipe stock, comprising a craneway, foundations in spaced relation within the craneway, crates for receiving pipe having four corner posts with lifting openings near their tops extending parallel to the pipe carried by the crates and recesses in the under surfaces thereof, lugs provided on the tops of the posts and on the foundation for engaging in the recesses provided in the under surfaces of

the crates, a crane having four lifting cables operating on the craneway, a rectangular cradle suspended by the four lifting cables in such manner that it is restrained from rotation, and four hooks on the cradle which extend in the same direction to engage in the four openings provided in the posts upon movement of the cradle in the direction parallel to the pipe, thereby to provide for engaging and disengaging the crates to provide for handling them without the assistance of workmen.

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10	85
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150