March 2, 1937. H. R. ANSEL 2,072,699

METALLIC STORAGE RACK FOR BARRELS

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Fig. 1.

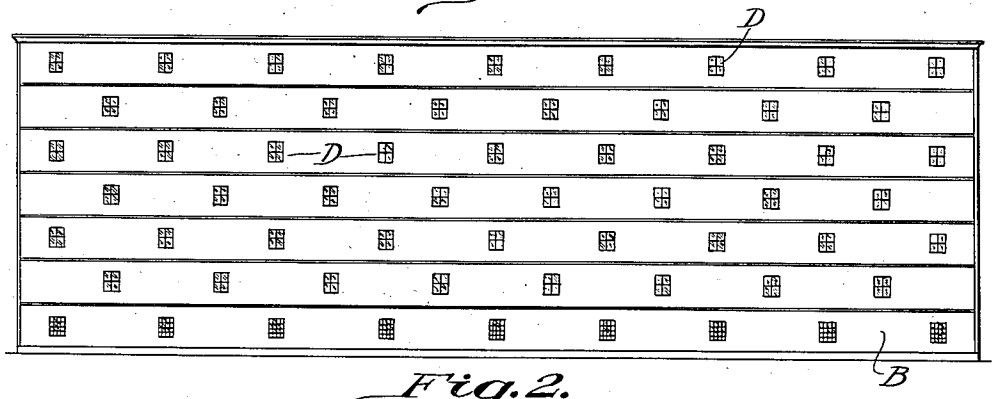


Fig. 2.

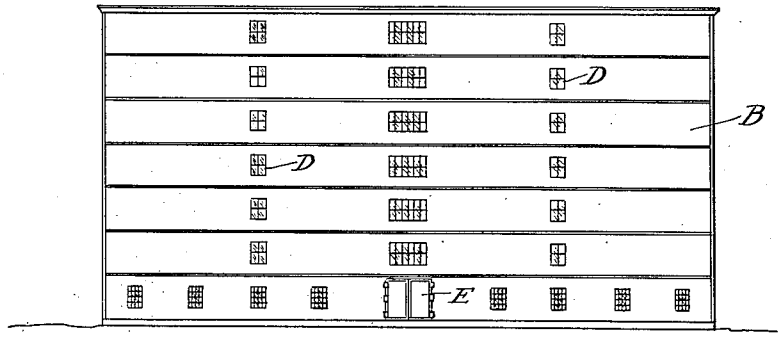
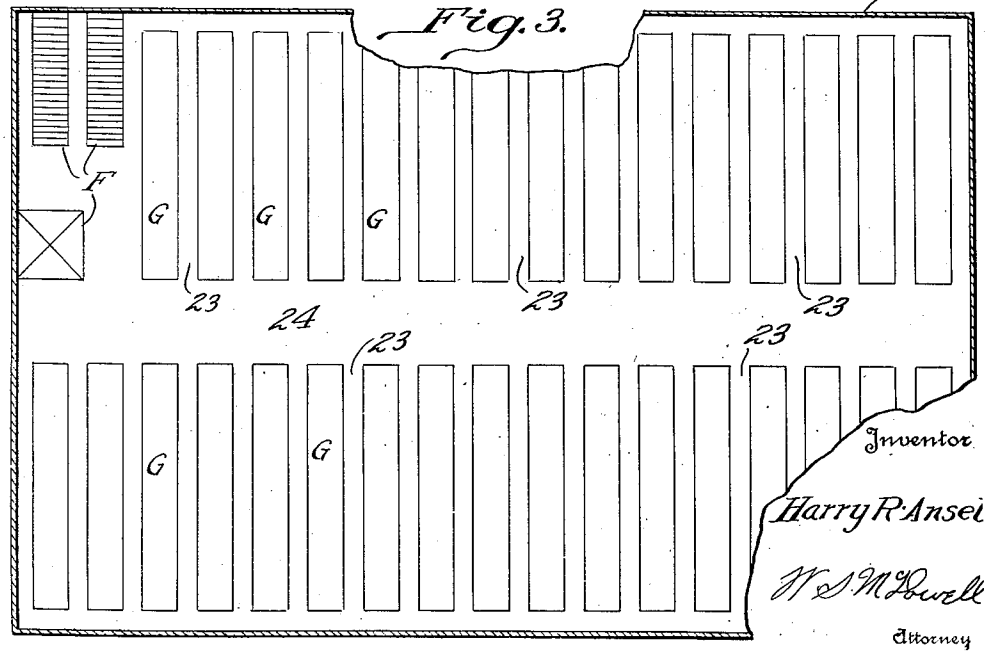


Fig. 3.

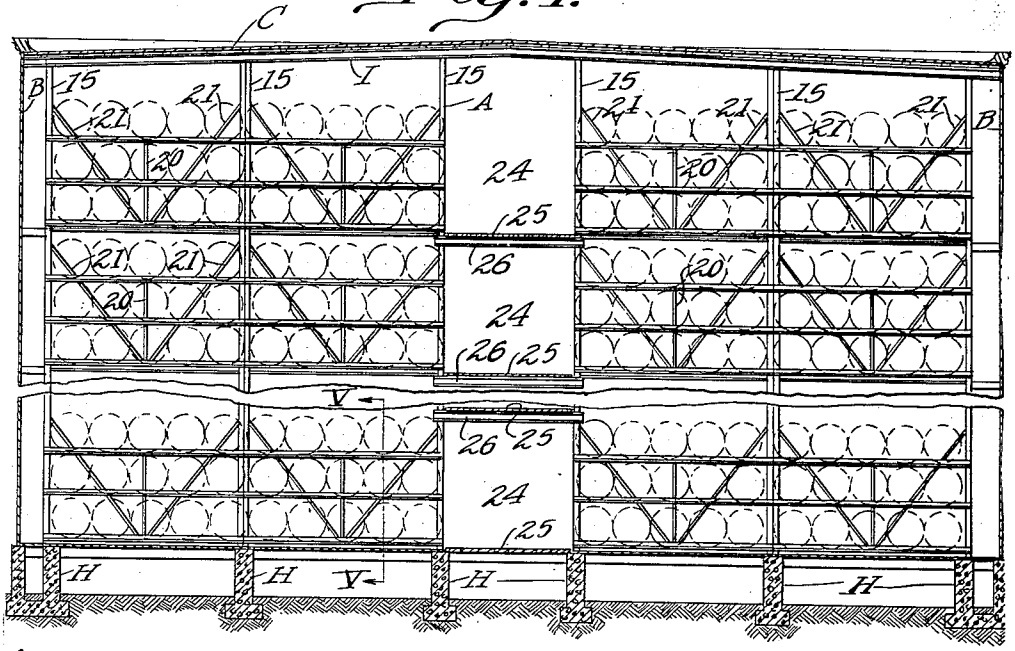


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METALLIC STORAGE RACK FOR BARRELS

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Fig. 4.



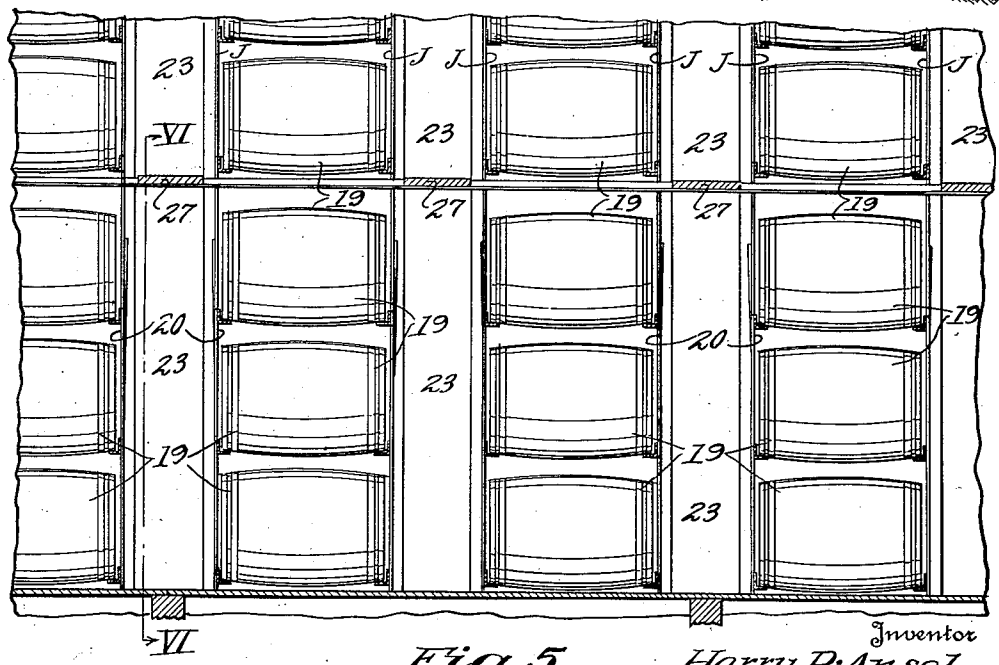


Fig. 5.

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Fig. 6.

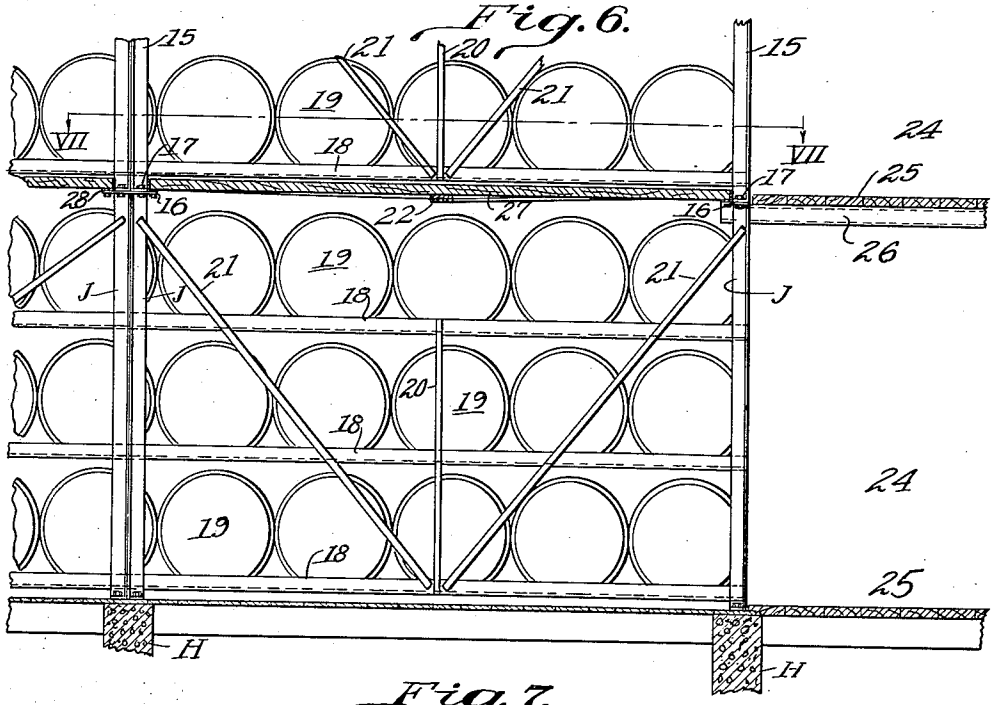
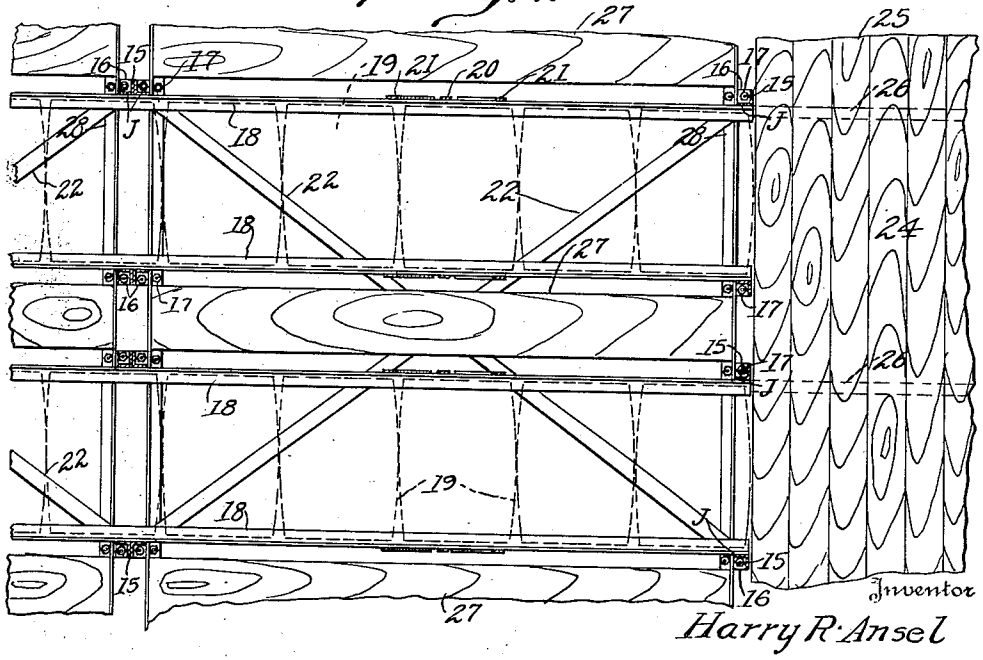


Fig. 7.



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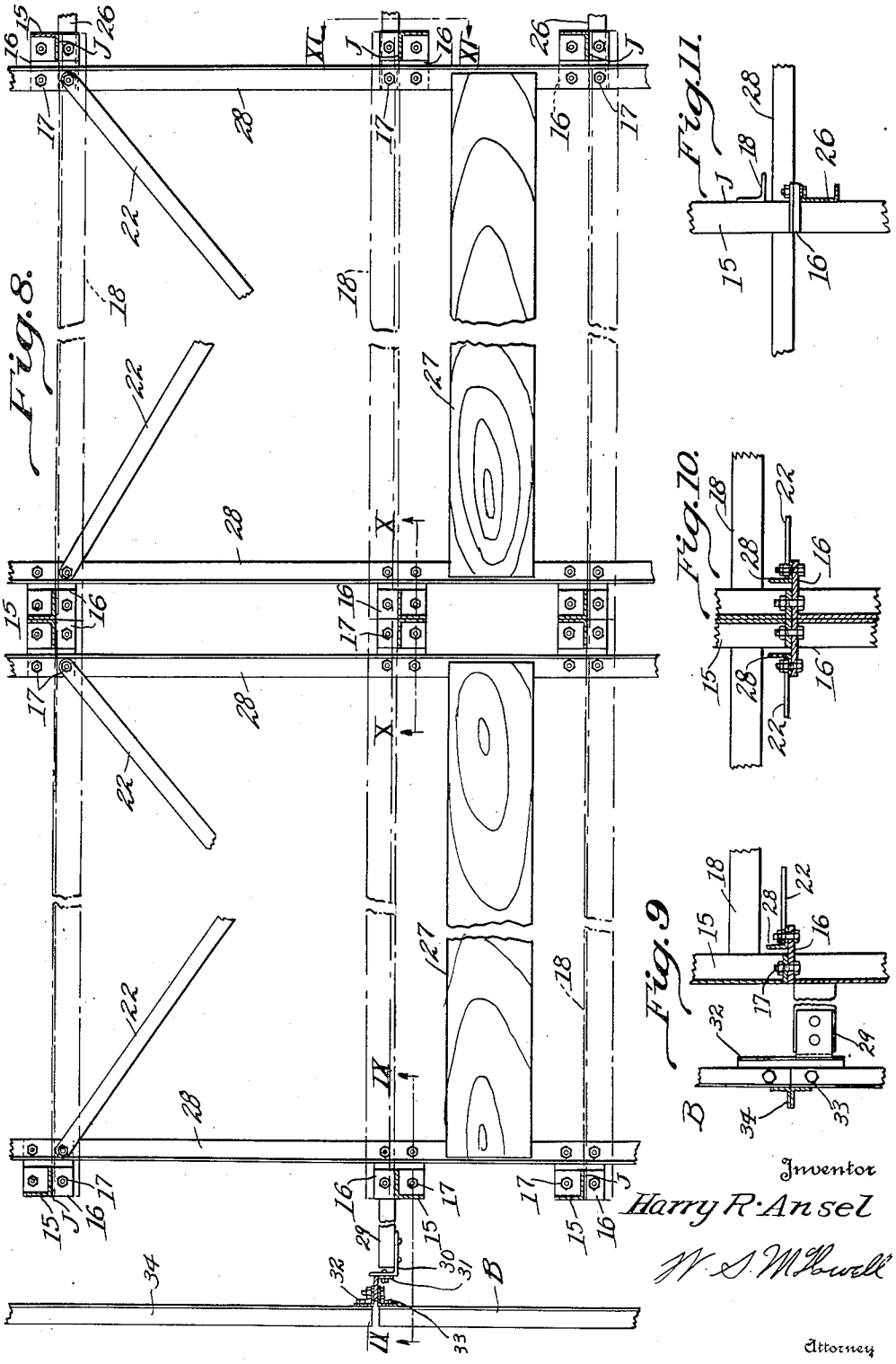
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METALLIC STORAGE RACK FOR BARRELS

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UNITED STATES PATENT OFFICE

2,072,699

METALLIC STORAGE RACK FOR BARRELS

Harry R. Ansel, Columbus, Ohio

Application April 5, 1934, Serial No. 719,160
Renewed December 31, 1936

4 Claims. (Cl. 211—71)

This invention relates to improvements in storage structures, an object thereof being to provide a novel storage structure formed primarily from light structural steel members constructed in units and which are adapted to be rigidly united in assembled order to provide for the compact support of kegs, barrels or the like in an orderly, accessible and securely supported manner.

While the present invention relates broadly to metallic storage mechanism designed for the support of various commodities, containers or products, for either display or storage purposes, yet, considering its more specific aspects, the storage structure is peculiarly suitable for the support of kegs or barrels used, for instance, in the storage and ageing of liquids. In the production of spiritous liquors the latter, following their initial formation, are placed in barrels or kegs and then stored for varying periods of time to undergo required ageing processes prior to their release for commercial or consumption purposes. Distillers of alcoholic beverages particularly are required to keep large quantities of barreled liquors constantly on hand for both ageing and general storage purposes. Heretofore, very little attention has been given to the efficient and economical construction of storage structures for the retention of a large number of liquid containing barrels. In most instances, conventional types of buildings have been employed having the necessary structural strength and required floor space for the reception of different kinds of racks of ordinary room height suitable to receive and support liquid holding barrels. Usually these structures have been excessively costly and/or inefficient in the matter of enabling a large number of barrels to be stored in a given minimum amount of space. Again, it has been customary for such structures to include expensive flooring, side walls and other kindred items of building expense not justified for the specific function of barrel storage.

It is therefore one of the outstanding objects of the present invention to provide a barrel storage structure of multi-storied building height comprising an open frame structure formed from structural steel building members and containing a plurality of parallel rack units of corresponding construction and which may be readily united during their course of erection in strong, substantial unitary relationship, producing a plurality of superposed racks designed for the support of barrels or kegs in substantially horizontal order, the duplicative construction of said units providing for flexibility in design so that said units may be readily assembled in order that their total barrel holding capacity may be adapted to the requirements of any particular situation.

It is another object of the invention to surround the framework of the storage structure with suitable weather-excluding walls in association with a protective roofing, and wherein said walls and roofing are rigidly united with the structural framework of the barrel storage structure, to the end of producing a building of marked strength, easily erectible and of low cost construction, having an unusually high barrel holding capacity per cubic foot of available internal building space.

It is a further object of the invention to construct the frame structure thereof comprising the barrel holding racks so that the barrels will be supported in a multiplicity of superposed horizontal rows or tiers, the said rows or tiers being separated by narrow aisles of sufficient width to admit of manual inspection of the ends or heads of said barrels and, also, to provide between the spaced ends of laterally adjoining rows of racks one or more longitudinally extending runways, the said aisles and runways being provided with a flooring by means of which a barrel or barrels may be removed from the ends of any single rack onto the runway in order to provide for loading purposes, the said aisles, however, being too narrow to admit of the movement of kegs or barrels of conventional size therethrough.

A further object of the invention rests in constructing the internal framework of the storage structure so that each of the barrel storage units formed therein, and which units are substantially of duplicate formation, will embody stationary vertical angle members with which are connected horizontally extending, parallel and vertically spaced barrel receiving angles, the latter being appropriately spaced so that the bottom flanges thereof will receive the ends of barrels placed horizontally thereon, and to provide in combination with the horizontal and vertical angle members of each rack unit improved truss braces designed to reenforce said angle members which are disposed advantageously to augment their essential strength, to the end of permitting light weight structural steel members to be utilized in the construction of the rack units and to avoid excessive weight and the higher costs incident to the employment of heavier structural members.

It is a further object to rigidly unite with the vertical angle members of the rack units transversely and horizontally extending beams which are employed in effecting the support of the flooring used in the narrow aisleways separating adjoining rack units and in the communicating runways which are employed for the servicing of said rack units.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention consists in the novel features of

construction, combinations of elements and arrangements of parts, hereinafter more fully described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevation of the external wall construction of the barrel storage structure formed in accordance with the present invention;

Fig. 2 is a front elevation of the external wall construction;

Fig. 3 is a horizontal sectional view taken through the barrel storage structure and indicating the operative positions of the individual rack units arranged therein;

Fig. 4 is a transverse vertical sectional view taken through said storage structure;

Fig. 5 is a detail vertical longitudinal sectional view on the plane disclosed by the line V—V of Fig. 4;

Fig. 6 is a detail vertical sectional view on the line VI—VI of Fig. 5;

Fig. 7 is a horizontal sectional view taken through a plurality of adjoining rack units on the plane indicated by the line VII—VII of Fig. 6;

Fig. 8 is a detail horizontal sectional view showing more particularly the connections of the racks and the side frame of the building;

Fig. 9 is a detail vertical sectional view on the line IX—IX of Fig. 8;

Fig. 10 is a similar view on the line X—X of Fig. 8;

Fig. 11 is a vertical sectional view on the line XI—XI of Fig. 8.

Referring more particularly to the drawings, and to the specific embodiment thereof therein illustrated, the improved barrel storage structure comprises essentially a structural steel framework A peculiarly constructed for the reception and storage of barreled liquids and a surrounding weather excluding wall structure B which includes a suitable type of roof C. The walls B and the roof C may be formed from any suitable materials such as masonry, concrete, tile, frame and siding, although I prefer to employ a sectional steel wall and roof structure, such as that disclosed in United States Patents Nos. 1,635,147, 1,659,988, 1,760,817, 1,770,063 and 1,780,862, since the type of wall structure set forth in these patents readily adapts itself to economy in manufacture and erection, the same being composed of a plurality of pre-formed, suitably insulated metallic panels, having their adjoining end edges ribbed and permanently united by metallic bonding strips. The walls B may be provided at suitable intervals with windows indicated at D and doors E. Also when the building is of multistoried height, one end of the building may be provided with one or more elevators and/or stairways F.

The steel barrel rack system disposed within the external walls of the building comprises a plurality of vertically disposed duplicative units, as indicated at G in Fig. 3, which units extend usually from the concrete foundation members H of the building to the roof beams I. Each of these units comprises vertically disposed structural steel members, which are indicated at **15**. In the specific form of the invention illustrated, these members have been shown as of angular form, although other structural steel shapes of standard manurfacture may be used. Each of the members **15** is preferably of a length equivalent to the height of a single story of the building, as such a length readily adapts the members for convenient handling during assembly and erection and likewise readily adapts the rack system to buildings of different height. Welded or otherwise secured to both ends of each of the members **15** are flat metallic splice plates **16**, by means of which the members **15** may be joined in vertically disposed order through the use of fastening devices **17** in the form of threaded connections, as shown, or by riveting or welding. Suitably secured to the inner legs *j* of the members **15**, preferably by welding, are vertically spaced horizontally extending angle irons or elements **18**. The latter are arranged in cooperative pairs so that their substantially horizontal flanges will be properly spaced to receive and support the ends of horizontally placed barrels or kegs **19** disposed thereon. Preferably, the elements **18** are of such length as to receive in closely associated relationship, as indicated in Fig. 6, five standard size barrels or kegs. To brace the structure to permit of the employment of light weight structural members, consistent with the weight of the load to be supported thereby, I employ the truss or brace rods disclosed particularly in Fig. 6. These brace rods comprise a central vertically extending rod **20** for each unit which is disposed approximately half way of the length of each of the horizontally extending angle elements **18** on which the barrels or kegs are supported, the rod **20**, disposed on each side of each unit being of sufficient length to engage with three of the angle elements and is secured to the latter by welding or other equivalent fastening agencies. In combination with each of the vertical rods **20** are upwardly diverging rods **21** which, at their lower ends, are welded or otherwise fastened to the lowermost of the angle iron elements **18** at points contiguous to the lower end of the complemental vertical rod **20**. Intermediately of their length, the rods **21** are likewise welded or otherwise secured to the outer legs of the angle elements **18** at points intermediate the rod **20** and the ends of the elements **18**. The upper ends of the rods **21** are welded, or otherwise substantially secured, to the legs *j* of the vertical angle members **15**, the rods **20** and **21** acting as tension members to brace the horizontally extending angle elements **18** and to enable the latter to support the weight of the liquid filled kegs deposited thereon without structural deformation. If desired, the horizontal legs of the angle elements **18** may be shaped to conform to the inclination or curvature of the ends of the barrels or kegs **19**, in order that the latter may have extended surface contact with the elements **18** in lieu of mere line contact.

As shown in Figs. 6 and 7, when the rack units are longitudinally aligned, the vertical angle members **15** may be placed side by side in adjoining pairs and suitably bolted or otherwise secured together with their horizontal splice plates **16** in registering relationship. This enables the units to be built up in sections of any desired length to support on each tier any desired number of barrels in multiples, in this instance, of five. The splice plates at the upper ends of each unit are connected with cross links **22** which serve to provide transverse connections between adjoining vertical angle members **15** and thus brace and reenforce the structure.

Formed between adjoining pairs of rack units are narrow aisles **23** termed "cat walks". These aisles are preferably merely of sufficient width to permit an attendant to walk therethrough for the purpose of inspecting barrel heads but are of insufficient width to permit of the withdrawal of barrels from the racks into said aisles for handling purposes. The handling of the barrels is effected

from the longitudinal ends of the rack units, which ends terminate contiguous to wider aisles **24** hereinafter termed run-ways. These run-ways are provided with suitable flooring **25** and are of such width as to permit of the transportation of barrels or kegs therethrough when rolled or transported on trucks so that the loading and unloading of each rack unit will be effected from the run-ways. To support the flooring **25**, channel beams **26** are employed which have their ends bolted or otherwise united with the angular uprights **15** through their splice plates **16**, the flooring **25** resting upon the upper flanges of the channel beams **26** and may be suitably secured thereto in any desired manner. The flooring platforms **27** of the cat walks **23** are supported by means of transversely extending angles **28** supported by and uniting adjoining pairs of splice plates **16**. The angles **28** cooperate with the horizontal and vertical diagonal **22** to form an efficient bracing system.

To connect the rack framework A with the frame structure of the walls B, the upright angle members **15**, disposed contiguous to the walls B, are connected at intervals with channel sections **29**, which project horizontally from the splice plates **16** toward the walls B. The outer ends of the channel sections **29** are connected with angle brackets **30**, which have their shorter legs fastened as at **31** to complemental angle brackets **32**, the latter being bolted or otherwise secured as at **33** to wall angles **34**. It will be understood, however, that other connections may be employed of a corresponding character for establishing a rigid union between the external walls of the building and the internal barrel rack framework.

In view of the foregoing, it will be seen that the present invention provides for a practical, economical and efficient rack structure for effecting the support of a large number of barrels under conditions of storage and that the invention is particularly applicable for use in distilleries producing alcoholic beverages, wherein it is necessary that such beverages shall be barreled and retained in storage for a period of several years. During this period of storage, the barrels are seldom moved from their original positions in the rack mechanism and therefore I prefer to provide the narrow aisleways **23** for the purpose of increasing the storage capacity of the system, rather than to widen such aisleways to render each stored barrel readily accessible independently of others on the same rack. However, it is within the scope of my invention to employ the wider aisles if the latter are desired.

It will be observed that the entire rack mechanism may be formed from structural steel members of standardized form, and by uniting the vertical angle members **15** by the splice arrangement disclosed so that said members will possess a height equivalent to that of one story of an ordinary building, convenience in manufacture and erection of the rack system is obtainable together with the added advantage of flexibility in adapting the system to buildings of various height or other dimensions. Most of the framework can be formed at the factory so that it will be merely necessary to assemble the same during the operation of building erection. The framework provides three distinct systems of bracing in three different planes, and will support not only the dead load of the barrels and their contents, but will also absorb any wind load on the exterior walls. By the use of the welded rack units, the number of bolts necessary for installation during erection work are reduced to a minimum, and lower building costs are thereby obtained.

What is claimed is:

1. A metallic barrel supporting unit comprising spaced upright corner members in the form of angle bars, vertically spaced substantially horizontally extending angle rails secured at their ends to the vertical angle bars, said angle rails being disposed in complemental pairs spaced transversely so that the substantially horizontally extending flanges thereof will receive and support the ends of the barrels positioned thereon, the vertical flanges of said angle rails serving as guides for engagement with the ends of said barrels, said corner members being spaced transversely to provide for the loading and unloading of barrels on said angle rails from the ends of the rack unit, and vertically and angularly extending braces arranged at the sides of said rack unit and secured to said angle rails and upright angle bars.

2. A metallic barrel storage rack comprising vertically extending pairs of front and rear corner posts, vertically spaced substantially horizontally extending angle rails secured at their ends to the corner posts, said rails being disposed in complemental pairs spaced transversely so that the substantially horizontally extending flanges thereof will receive and support the ends of the barrels positioned thereon, the front of said rack between said rails being entirely open and devoid of transverse members, and suspension braces directly connected with said corner posts and with intermediate portions of said angle rails, whereby to strengthen the load supporting properties of the angle rails between their points of connection with said corner posts.

3. A metallic barrel storage rack comprising vertically extending pairs of front and rear corner posts, vertically spaced substantially horizontally extending angle rails secured at their ends to the corner posts, said rails being disposed in complemental pairs spaced transversely so that the substantially horizontally extending flanges thereof will receive and support the ends of the barrels positioned thereon, and suspension braces directly connected with said corner posts and with intermediate portions of said angle rails, whereby to strengthen the load supporting properties of the angle rails between their points of connection with said corner posts.

4. A metallic barrel storage rack comprising vertically extending pairs of front and rear corner posts, vertically spaced substantially horizontally extending angle rails directly secured at their ends to the vertical corner posts, said angle rails being disposed in complemental pairs spaced transversely so that the substantially horizontally extending flanges thereof will receive and support the ends of the barrels positioned thereon, the vertical flanges of said angle rails serving as guides for engagement with the ends of said barrels, said corner posts being spaced transversely and the front of the rack being devoid of transverse bars to provide for the loading and unloading of barrels on said angle rails from the front end of said rack, and vertically and angularly extending braces directly connected with said corner posts and with intermediate portions of the vertical flanges of said angle rails, whereby to strengthen the load supporting properties of the angle rails between their points of connection with said corner posts.

HARRY R. ANSEL.