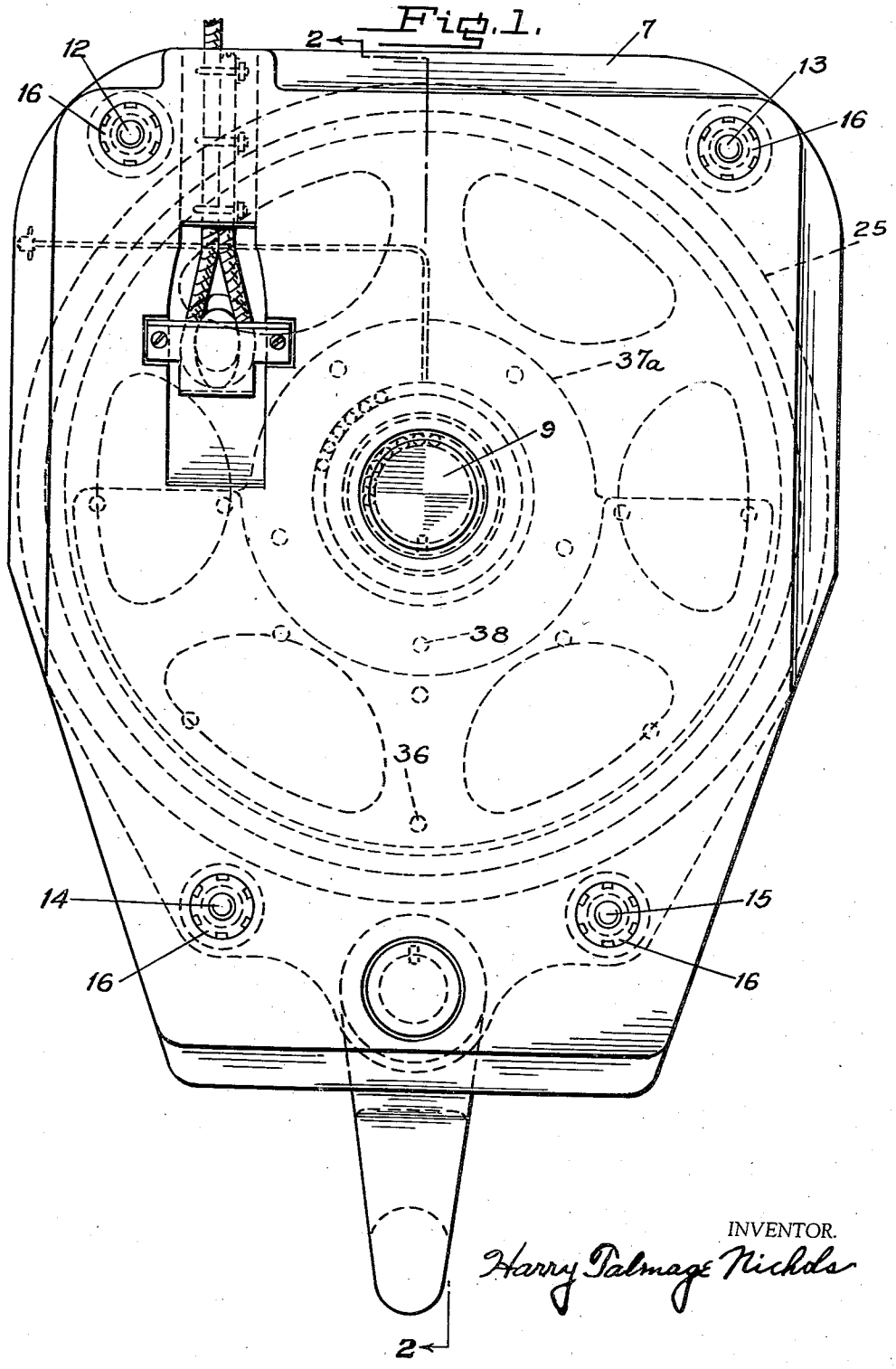
Nov. 21, 1939. H. T. NICHOLS 2,180,541

MULTIPLE SHEAVE BLOCK CONSTRUCTION

Original Filed Sept. 29, 1930 3 Sheets-Sheet 1

Fig. 1.




INVENTOR.

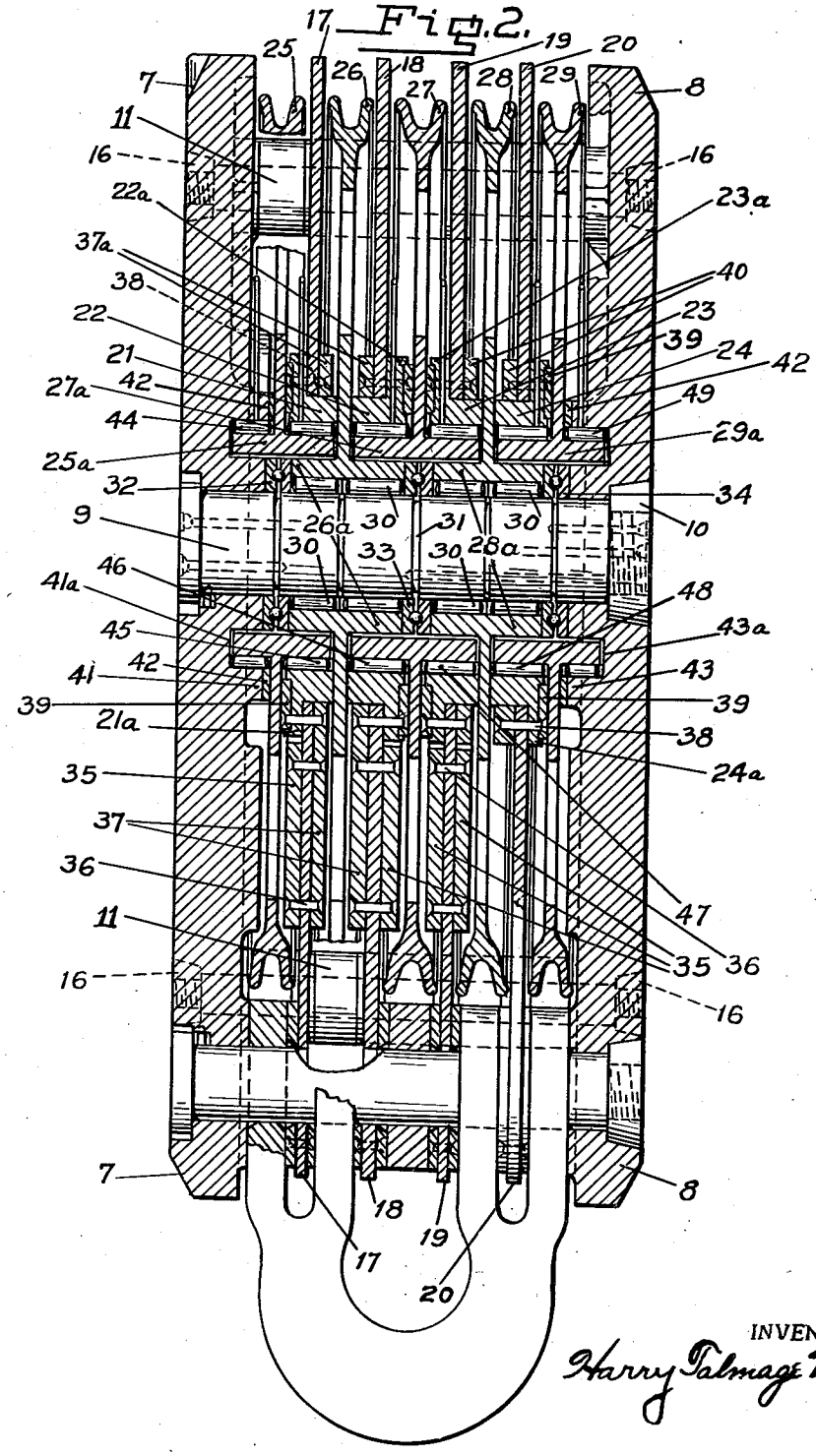
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MULTIPLE SHEAVE BLOCK CONSTRUCTION

Original Filed Sept. 29, 1930 3 Sheets-Sheet 2

Fig. 2.




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MULTIPLE SHEAVE BLOCK CONSTRUCTION

Original Filed Sept. 29, 1930 3 Sheets-Sheet 3

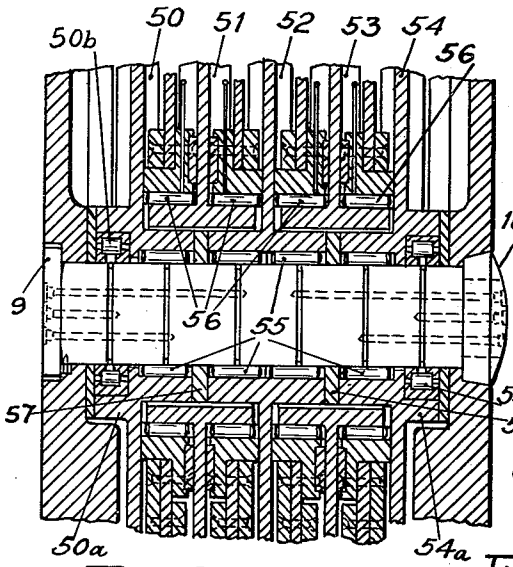



Fig. 3.

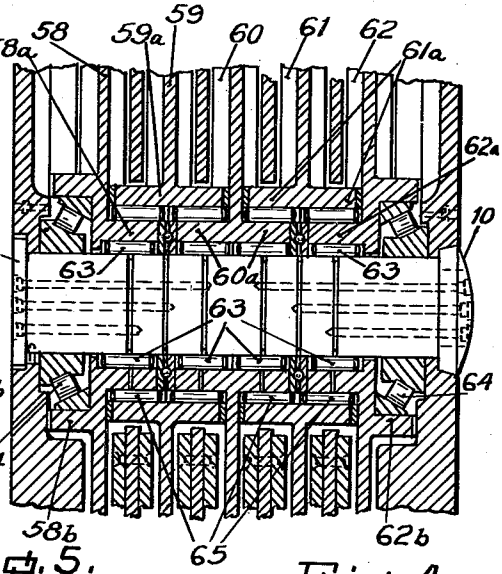
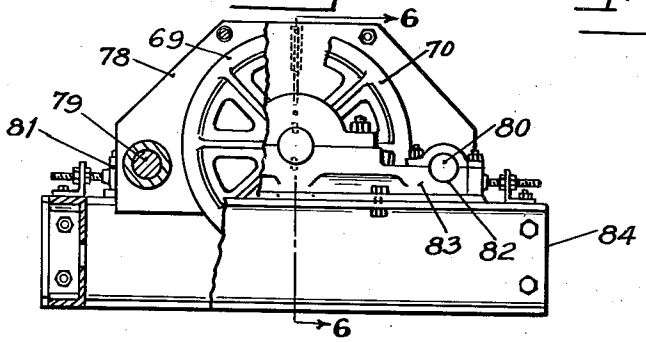



Fig. 4.

Fig. 5.



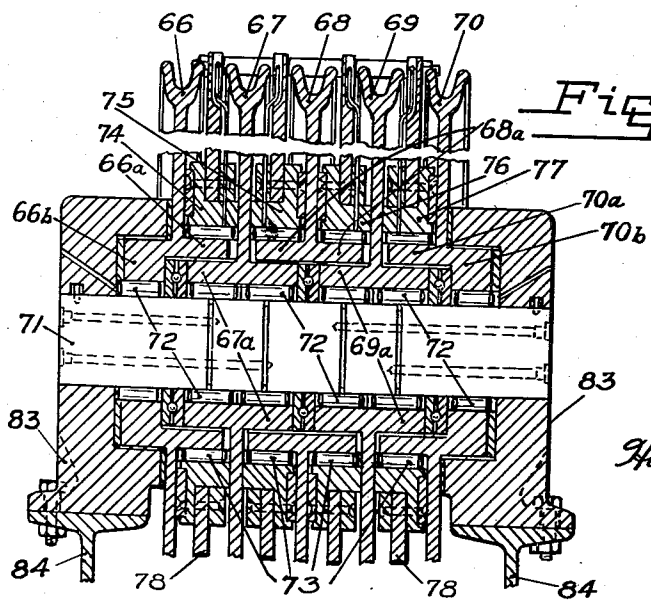




Fig. 6.

INVENTOR.

Harry Talmage Nichols

Patented Nov. 21, 1939

2,180,541

# UNITED STATES PATENT OFFICE

2,180,541

## MULTIPLE SHEAVE BLOCK CONSTRUCTION

Harry Talmage Nichols, Los Angeles, Calif.

Refiled for abandoned application Serial No. 485,275, September 29, 1930, renewed November 6, 1934. This application June 19, 1935, Serial No. 27,415

21 Claims. (Cl. 254—192)

My invention relates to multiple sheave block construction.

This present application is a re-filing of my original application Serial No. 485,275, which was filed September 29, 1930, was allowed November 10, 1933, was renewed November 6, 1934, was re-allowed November 16, 1934, and which due to my impoverished and destitute condition at the time became abandoned by reason of non-payment of the final fee on May 16, 1935.

The invention relates particularly to standing block units and running block units of compound pulleys which embody sheave members disposed in parallelism and it is applicable specially to traveling block and crown block construction for use in well drilling operations.

Both traveling blocks and the compound pulley sheave assemblies of crown blocks have previously suffered from the disadvantage of having inadequate bearing surface for the parallel sheave members thereof, owing to the desirability of maintaining the centers of the grooves of adjacent sheave members a minimum distance apart so as to minimize the fleeting angle of the compound pulley hoisting cable in passing progressively from a sheave of one block to a sheave of the other.

This inadequacy has been and is being accentuated from day to day by the tendency to increase the diameter of the sheave members to permit the use of larger diameter wire rope to meet the increasingly heavy duty to which these devices are being subjected, with the consequent increase in the lever action and power of the rim of these larger sheaves to act detrimentally against the bearings.

Another disadvantage of prior art constructions is that, owing to the staggered disposition of the sheaves, i. e., the disposition of the axes of adjacent sheaves in substantially different horizontal planes, the length of the portion of the traveling block framework which houses and supports the sheaves has, in proportion to the diametrical dimension of the supported sheaves, been unduly increased with a resultant undue increase in the overall length of the block, and in the case of crown blocks utilizing a like construction in their closely adjacent parallel compound pulley sheave members the height of such sheave assemblies has been unduly increased with a consequent undue increase of the height of the crown block structure.

The resultant disadvantages are: In crown blocks, the presentation of a greater surface area subject to the hazard of wind; and in traveling blocks, a decrease in the head room available for the safe operation thereof.

Another disadvantage of the staggered sheave construction, in well practice, results from the fact that in the routine drilling operation as practiced in a large percentage of well drilling rigs, the traveling block is diverted sidewise from its normal vertical path, particularly when attaching the "elevators" carried by it to columns of pipe which have been stood in the well derrick at one side of the well bore and at one end of the "rotary table" of the drilling machinery.

The disposition of the cylindrical supporting members of alternate sheaves in substantially different horizontal planes results in the traveling block being supported by the line parts of the compound pulley hoisting line from different horizontal points and the effect of this is to necessitate a considerably greater force to divert the traveling block in the desired direction than is the case with traveling block sheaves having their axes in horizontal alinement.

In other words, the staggered sheaves act against each other as levers to prevent the easy swinging in direction of their axes of the traveling block in which they are installed.

An object of this invention is to provide a construction for the sheave block units of a compound pulley embodying a number of features which cooperate to produce a decreased face width of the parallel sheave assemblies thereof, thereby decreasing the fleeting angle of the parts of the cable in passing from the sheaves of one of the units of the compound pulley to the sheaves of the other unit thereof, and to thus produce a structure more efficient for and better adapted to meet the conditions and requisites of well drilling operations.

Another object of this invention is to provide a novel type of bearing structure which is applicable either to a traveling block or a crown block and which provides a larger area of bearing surface for each parallel sheave thereof without the necessity of increasing the distance between the centers of the peripheral grooves of adjacent sheaves, it being apparent that this feature will also contribute to the reduction of the width of the traveling block in comparison with previously known traveling blocks capable of performing the same work.

Another object of my invention is to provide a novel bearing structure which affords a larger

area of support for each sheave member in assemblies of closely adjacent parallel sheaves which have their axes alined in the same horizontal plane, so that in a traveling block the length of the portion of the framework which houses and supports the sheaves may be restricted to a dimension substantially equal to the diametrical dimension of the supported sheaves, and so that in a crown block the height of the parallel sheave assembly may be restricted to a dimension substantially equal to the diametrical dimension of the sheaves thereof.

It will be seen that this feature contributes to the production of a traveling block of decreased length in comparison with previously known traveling blocks for use in well drilling operations, and it will also be apparent that valuable head room is gained by this decrease in length.

The value of this feature in the restriction of wind hazards in crown blocks will be obvious.

My invention contemplates the provision in parallel sheaves assemblies in the respective blocks of compound pulleys of pairs of rotatable cylindrical supporting members for rotatably supporting each sheave member thereof, with the units of these pairs of cylindrical supporting members extending axially from either side of each sheave, of which units those which extend from adjacent sides of adjacent sheaves are disposed in the same vertical planes and in telescopic relationship to each other, while the terminal units of such assemblies which extend from the outer sides of the outer sheaves thereof are non-telescoped relative to the other units thereof.

This telescopic disposition of the rotatable cylindrical supporting extensions projecting from the adjacent sides of adjacent sheaves enables me to obtain an increased area of bearing for each sheave member of the assembly.

Furthermore, my structure is such that the sheave members may have all of their axes in horizontal alignment so that the advantageous functions of such a structure may be maintained while the increased bearing surface is obtained.

This telescoped relation between the cylindrical supporting members of adjacent sheave members also ensures that the centers of the peripheral grooves of these sheave members may be maintained a minimum distance apart and that a minimum face width sheave assembly may be obtained.

I preferably mount the units of these pairs of cylindrical supporting extensions for rotation through the medium of anti-friction bearing units.

In some embodiments of this invention all of these anti-friction bearing units are carried by and supported from fixed, non-revoluble surfaces of parts of the block in which they are assembled, while in other embodiments of the invention a portion of the sheaves of the assembly have cylindrical supporting extensions which are mounted for rotation through the medium of anti-friction bearing units which are carried by and supported from fixed, non-revoluble surfaces of parts of the block in which they are assembled, and another portion of the sheaves of the assembly have cylindrical supporting extensions which are mounted for rotation through the medium of anti-friction bearing units which are carried by and supported from revoluble surfaces of cylindrical extensions of the first mentioned portions of the sheaves of the assembly.

Several embodiments of my invention are shown in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a view in side elevation of a traveling block constructed in accordance with my invention.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a sectional view of a modification of the form of bearing which is shown in Figure 2.

Figure 4 is a sectional view of another modification of my novel bearing structure.

Figure 5 is a view showing in side elevation and partly in section, a crown block with a still further modified form of bearing structure associated therewith;

Figure 6 is an enlarged vertical transverse section view taken on the line 6—6 of Figure 5.

In the drawings, with special reference to Figures 1 and 2, it will be seen that the traveling block there illustrated comprises outer plates 7 and 8 between which are designed to be mounted a plurality of sheaves.

These sheaves 25, 26, 27, 28 and 29 are preferably mounted upon roller bearings, some of which may be supported by a center shaft or pin 9, which latter may be provided with lubricating passages 31 such as are indicated on the drawings.

Disposed in between each sheave and the next adjacent sheave are plates which are substantially parallel with the outer plates 7 and 8 which latter are apertured to permit the passage of the center pin or shaft 9, and the pins 12, 13, 14 and 15 therethrough, the former being operatively secured by the threaded nut 10.

These inner plates which are respectively designated 17, 18, 19 and 20 and are apertured for the reception of the sleeves 21, 22, 23, and 24 and also are apertured to permit the passage of pins 12, 13, 14, and 15 therethrough.

These inner plates are held in assembled position and in properly spaced relation through the medium of spacing collars 11 which are carried upon the pins 12, 13, 14, and 15, which latter have their ends secured on the outer sides of the outer plates 7 and 8 by the nuts 16.

A form of bearing which I utilize in a traveling block and in a crown block has been illustrated in Figure 2 as applied to a traveling block structure.

It will be noted that the form of the sheaves 25, 27 and 29 is slightly different from the form of the sheaves 26 and 28.

For example, the sheaves 25, 27 and 29 are each provided with a pair of cylindrical supporting members 25*a*, 27*a*, and 29*a* respectively, one of which cylindrical members extends from either plane face side of its respective sheave, the units thereof being of larger diameter than the units of the pairs of cylindrical members 26*a* and 28*a*, which extend from either plane face side of the sheaves 26 and 28 respectively.

It will also be noted that each of these cylindrical members extend a substantial distance past the plane of the edge of the rim of the sheave which it supports, so that the dimension between the remote ends of each pair of them is several times greater than the width of the grooved face of the sheave from which they extend, thus ensuring an ample bearing area on either side thereof.

Furthermore, it will be seen that compactness of face width in the assembly of sheaves is achieved through the disposition of the cylindrical supporting members which extend from adjacent sides of adjacent sheaves in telescopic relation to each other.

The cylindrical extensions 26*a* and 28*a* are supported from their interiors on the center pin or axle 9 by means of independent roller bearing units 30, 30, 30 and 30.

Furthermore, the adjacent ends of the cylindrical extensions 26*a* and 28*a* are separated by an anti-friction thrust bearing structure 33 and their remote ends are separated from the side plates 7 and 8 of the traveling block by anti-friction thrust bearing means 32 and 34 respectively.

These anti-friction thrust bearings 32, 33 and 34 are of the well known ball and race type.

The cylindrical extensions 25*a*, 27*a* and 29*a* which are disposed in exterior, telescopic relation to the cylindrical extensions 26*a* and 28*a* are supported from their exteriors by the plates of the traveling block framework.

The sleeve members 21, 22, 23 and 24 carried by the inner plates 17, 18, 19 and 20 are each provided at one end with an integrally formed radial flange, respectively 21*a*, 22*a*, 23*a* and 24*a*. Each of these flanges when installed is in parallelism and intimate contact with a side of the plate which carries it.

On the inner plates 17, 18 and 19, the sleeve members 21, 22, and 23 are installed in conjunction with lading means for traveling block construction, for which I have a co-pending application for Letters Patent, Serial No. 485,276, filed September 29, 1930, now Patent No. 2,034,728, dated March 24, 1936.

This lading means, in this instance, comprises on plates 17 and 18, the permanently affixed lading formations 35 and 37 disposed below the axes of the sheaves and within the area circumscribed by the peripheries thereof.

These formations are secured to the plates that carry them by rivets 36.

The lading formations 37 have semi-circular extensions at the centers of their tops which form integral collars 37*a* that embrace the flangeless ends of the sleeves 21 and 22 which project into them.

The lading formations 35 at the centers of their tops each have a semi-circular section removed to allow the flanges 21*a* and 22*a* of the sleeves 21 and 22 to contact the sides of the supporting plates 17 and 18.

The integral collar formations 37*a* and the flanges of the sleeves 21*a* and 22*a* respectively, are secured to the plates which carry them by rivets 38 which rivets also secure thrust washers inset in the outer vertical faces of the sleeve flanges, which are preferably of bronze and which may be designated generally by the numeral 39.

On plates 19 and 20 the installation of the bearing supporting sleeves is somewhat different from that on plates 17 and 18.

On plate 19, both of the lading formations 35 have semi-circular sections removed at the centers of their tops, one to permit the flange 23*a* of the sleeve 23 to contact one side of the frame plate 19, and the other to permit the installation of the independent annular plate 40 for reception of the flangeless end of the sleeve 23.

The annular plate 40 and the flange 23*a* are secured to the plate 19 by rivets 38.

On plate 20 the installation of the sleeve 24 and the annular plate 40 is identical with the installation of the sleeve 23 and the annular plate 40 on plate 19, and as this frame plate 20 is devoid of lading formations it illustrates the installation of the bearing-supporting sleeve of my invention on a usual interior traveling block frame plate of straight, uniform section.

To afford adequate support for the terminal, non-telescoped, cylindrical sheave-supporting extensions of the assembly in this embodiment of my invention, the outer plates 7 and 8 of the traveling block are provided upon their inwardly disposed sides with bosses 41 and 43, respectively, having in their vertical faces annular grooves 41*a* and 43*a* which extend through them and into the normal cross sections of the plates 7 and 8.

The bosses 41 and 43 are provided on their vertical faces with thrust washers 42, which are preferably made of bronze.

In the assembly of my structure, the units of the pairs of cylindrical extensions 25*a*, 27*a* and 29*a* are exteriorly supported by the independent roller bearing units 44, 45, 46, 47, 48 and 49 which in turn are supported, some by the bore of the sleeves 21, 22, 23, and 24, and some by the annular grooves 41*a* and 43*a*.

Thus, the cylindrical extensions 25*a* are supported within the sleeve 21 and within the annular groove 41*a* by means of the independent roller bearing units 44, and 45. The cylindrical extensions 27*a* are supported within the two sleeve members 22 and 23 by means of the independent roller bearing units 46 and 47.

The cylindrical extensions 29*a* are supported within the sleeve 24 and the annular groove 43*a* by means of the independent roller bearing units 48 and 49.

Obviously, the sheaves 25, 27 and 29 are adequately braced against lateral movement by the thrust bearing washers 39 and 42, and lateral movement of the sheaves 26 and 28 is obviated by the anti-friction thrust bearings 32, 33 and 34.

It will be seen from this structure that each sheave member is carried upon a total bearing surface of greatly increased length and area, owing to the fact that my sets of cylindrical extensions are disposed in telescoping relations with each other.

Furthermore, this greatly increased bearing surface has been obtained while retaining a common axial center for the sheaves, thereby obviating any necessity for increasing the interior length of the traveling block to accommodate sheaves having their axial centers disposed in substantially different horizontal planes, and without increasing the width of the traveling block, both of which features are obviously of great importance.

In the modified form of bearing shown in Figure 3, the telescoped cylindrical supporting members of the sheave members 50, 52 and 54, which sheaves correspond in relative position in the assembly to the sheave members 25, 27, and 29 of the form shown in Figure 2, are each interiorly supported upon independent anti-friction bearing units 55 carried by the center pin or axle 9, instead of some of them being mounted within sleeves carried by the inner plates of the traveling block and some of them within annular grooves carried upon the inner faces of the outer plates thereof, as in Figure 2.

The sheaves 50 and 54 are provided on their outer plane face sides with offset enlarged terminal cylindrical extensions 50*a* and 54*a* and between these cylindrical extensions and the cen-

ter pin 9 are anti-friction bearings 50b and 54b.

The sheave members 51 and 53 which correspond with the sheave members 26 and 28 of Figure 2, are supported through the medium of anti-friction bearing units 56 within sleeves carried by the inner plates of the traveling block.

The structure of these sleeves and their related parts is substantially identical with the structure of the sleeves 21, 22, 23, and 24 of Figure 2 and their related parts.

The structure of this modified form of bearing is further distinguished from the form shown in Figure 2 by the provision of bronze thrust washers 57 which separate the adjacent ends of the cylindrical extensions of the sheave members 56 and 52, and 52 and 54, instead of anti-friction thrust bearings.

In operation of this structure shown in Figure 3, the sheave members 50, 52 and 54 are each supported by the pin 9 through the medium of independent anti-friction bearing units installed in the interior of their cylindrical extensions, while the sheaves 51 and 53 are supported within the sleeves carried by the inner plates of the traveling block through the medium of anti-friction bearing units arranged exteriorly of their cylindrical extensions.

In the form shown in Figure 4, the sheave members are designated 58, 59, 60, 61 and 62.

It will be noted that the rotatable cylindrical supporting extensions of the sheaves 58, 60 and 62 are mounted for rotation through the medium of anti-friction bearing units which are carried by and supported from fixed, non-revoluble surfaces, i. e., portions of the surface of the center pin 9, the units thereof 58a, 60a and 62a, which are telescopically disposed relative to other cylindrical extensions of other sheaves of the assembly, being mounted for rotation through the medium of anti-friction bearings designed to carry radial loads, which may be generally designated 63, while the terminal, non-telescoped units thereof 58b and 62b are mounted for rotation through the medium of anti-friction bearing units 64 which are of the tapered type and are designed to resist thrust as well as to carry radial loads.

It will be further noted with respect to this embodiment of my invention that the rotatable cylindrical supporting extensions 59a and 61a of the sheaves 59 and 61 are telescopically disposed relative to some of the cylindrical supporting extensions of the sheaves 58, 60, and 62, and that cylindrical supporting extensions of these sheaves 59 and 61 are mounted for rotation through the medium of anti-friction bearing units 65 which are carried by and supported from rotatable cylindrical extensions of the sheaves 58, 60 and 62.

Thus, Figure 4 of the drawings illustrates one combination of the essential characterizing elements of my invention which may, in different combinations thereof, be so embodied that some of the units of the pairs of rotatable cylindrical supporting extensions of a portion of the sheaves of an assembly are mounted for rotation through the medium of anti-friction bearing units which are carried by and supported from fixed, non-revoluble surfaces of parts of the block in which they are assembled, while other units of the pairs of rotatable cylindrical extensions of other sheaves of the assembly are mounted for rotation through the medium of anti-friction bearing units which are carried by and supported from revoluble surfaces of cylindrical extensions of the first mentioned portion of the sheaves of the assembly.

In the form of my bearing which is shown in Figures 5 and 6, the sheaves are designated 66, 67, 68, 69 and 70 and they are shown embodied in a crown block construction.

In this form, the sheave members 67 and 69 are directly supported upon the axle 71 through the medium of independent anti-friction bearings which may be generally designated 72 installed interiorly of their cylindrical extensions.

The cylindrical extensions of these sheaves 67 and 69 are designated 67a and 69a and they are telescoped within the cylindrical extensions 66a, 68a and 70a of the sheave members 66, 68 and 70.

The telescopically disposed cylindrical extensions 68a, 68a and 70a are each equipped with an independent anti-friction bearing unit 73, which latter are supported within sleeves 74, 75, 76 and 77, respectively, which are carried by beam plates which may be generally designated 78.

The terminal cylindrical extensions 66b and 70b of the assembly, extending from the outer sides of the sheaves 66 and 70, are, like the extensions 67a and 69a, supported from the shaft 71 through the medium of the anti-friction bearings 72 installed interiorly thereof.

By reference to Figure 5, it will be noted that the beam plates 78 are supported by pins 79 and 80. These pins are in turn carried in sockets 81 and 82 which form parts of the castings 83 mounted upon the base beams 84 of the crown block.

Thus it will be seen that the crown block structure is a unitary one and that the sheaves and the bearings therefor are all ultimately carried by the beams of this crown block.

The structure and manner of operation will be readily understood.

It will likewise be apparent that the other structures of bearings which I have described in connection with traveling block frame plate assemblies may be applied to crown block beam plate assemblies.

It will be seen from the above description that I have provided a novel type of bearing which is capable of application to crown blocks as well as to traveling blocks and which possesses important advantages in either application.

It will also be seen that the provision of the novel type of telescoped bearing structure makes possible the production of a traveling block with a relatively narrow face width and of unusual strength and efficiency.

It will also be understood that the bearing structure per se, whether applied to a traveling block or a crown block gives a greatly increased bearing surface for the sheaves, while permitting a compact arrangement of the sheaves in a lateral sense.

This greatly increased bearing surface also renders possible the use of larger sheaves and naturally prolongs the life of the bearings when utilized with sheaves of any size.

It will be understood that the various forms of bearing structure which I have illustrated and described herein may be applied to a conventional form of traveling block as well as to a traveling block having the various characteristics herein shown and which are described and claimed in my co-pending application for United States Letters Patent, Serial No. 485,276, filed September 29, 1930, now Patent No. 2,034,728, dated March 24, 1936.

Numerous other advantages will be obvious from the preceding description and claims which

follow, so that these advantages need not be specifically enumerated here.

I claim:

1. A sheave block including a plurality of rigidly connected spaced apart plates, sleeves carried by said plates, a set of sheaves each sheave member of which has cylindrical extensions formed on either side and at the axial center thereof and operatively supported within adjacent sleeves, and a second set of sheaves each sheave member of which has its web disposed to abut adjacent ends of cylindrical extensions of adjacent sheaves of the first said set of sheaves and has cylindrical extensions at its axial center rotatably contained within some of the first said cylindrical extensions of the first said set of sheaves for relatively independent rotation with respect thereto.

2. A sheave block including a plurality of rigidly connected spaced apart plates, sleeves carried by said plates, a set of sheaves each sheave member of which has cylindrical extensions formed on either side thereof at its axial center and operatively supported within said sleeves, and a second set of sheaves each sheave member of which has portions disposed to abut adjacent ends of cylindrical extensions of the first said set of sheaves and has cylindrical extensions at its axial center rotatably contained within cylindrical extensions of the first said set of sheaves for relatively independent rotation with respect thereto, and an axle carried by the plates and passing through the cylindrical portions of the said sets of sheaves.

3. A sheave block comprising a plurality of rigidly connected spaced apart plates, sleeves carried by said plates, a set of sheaves, each sheave member of which has cylindrical extensions formed on either side thereof at its axial center and operatively supported by said sleeves, a second set of sheaves, each sheave member of which has portions disposed to abut adjacent ends of cylindrical extensions of adjacent sheaves of the first said set of sheaves and has cylindrical extensions at its axial center rotatably contained within cylindrical extensions of the said first set of sheaves for relatively independent rotation with respect thereto, anti-friction bearings operatively co-acting with the first said cylindrical extensions of the first said sheaves, and anti-friction bearings operatively co-acting with said cylindrical extensions of the second said sheaves.

4. In a sheave block construction, a plurality of plates fixedly spaced apart from each other, certain of the plates having relatively concentrically related points of rotation around which relatively independent sets of sheaves are adapted to rotate, relatively independent sets of sheaves having cylindrical extensions at their axial centers, the extensions of one set telescoping the extensions of the other said set, means for supporting the extensions of one set from one of said points, and means for supporting the extension of the other of said sets from another of said points.

5. A sheave block assembly including a set of alined spaced apart fixed sleeves, a set of sheaves, a set of alined revoluble cylindrical members constituting rigidly fixed portions of the said sheaves which extend from the axial centers thereof and into said sleeves, a second set of sheaves and a second set of revoluble cylindrical members which constitute rigidly fixed portions of the second said sheaves and which extend from the axial centers thereof, the second said sheaves being in parallelism with the first said sheaves, some of the second said set of cylindrical members being interposed between some of the said sleeves and some of the first said set of cylindrical members in interlapping relation with the latter.

6. A sheave block assembly including a set of alined spaced apart fixed sleeves, a plurality of sheaves, a set of alined revoluble cylindrical members constituting rigidly fixed portions of the said sheaves which extend from the axial centers thereof, a second plurality of sheaves, a second set of revoluble cylindrical members which constitute rigidly fixed portions of the second said sheaves and which extend from the axial centers thereof, the second said sheaves being in parallelism with the first said sheaves, some of the said second set of cylindrical members being interposed between some of the said sleeves and some of the first said set of cylindrical members in interlapping relation therewith, anti-friction bearings between the sleeves and the second said set of cylindrical members, and anti-friction bearings arranged for rolling contact with the first said set of cylindrical members.

7. A sheave block assembly including a set of alined spaced apart fixed sleeves, a plurality of sheaves, a set of alined revoluble cylindrical members constituting rigidly fixed portions of the said sheaves which extend from the axial centers thereof, a second set of sheaves and a second set of revoluble cylindrical members which constitute rigidly fixed portions of the second said sheaves and which extend from the axial centers thereof, the second said sheaves being parallel with the first said sheaves, the second said set of cylindrical members being interposed between some of the said sleeves and some of the said first set of cylindrical members in interlapping relation therewith, and rigid plates disposed on either side of the sheaves of the respective sets, said plates carrying said sleeves.

8. In means in a sheave block assembly for supporting relatively independent sheaves whereby to permit relatively different speeds to be imparted thereto with respect to their supporting bearings, a plurality of sets of sheaves arranged in parallelism, internal anti-friction bearings for each sheave of one set and external anti-friction bearings for each sheave of the other set.

9. In means in a sheave block assembly for operatively supporting relatively independent sheaves whereby to permit relatively different speeds to be imparted thereto with respect to their supporting bearings, a plurality of sets of sheaves arranged in parallelism each sheave member of which has a cylindrical supporting member projecting axially from either side thereof, the adjacent cylindrical supporting members projecting from adjacent sides of adjacent sheaves being disposed in telescopic relation to each other, an anti-friction bearing unit for the rotatable support of each cylindrical extension of each sheave of each of the said sets, each telescopically disposed cylindrical extension of each sheave of each of the said sets having an anti-friction bearing unit supportively disposed interiorly thereof.

10. In means in a sheave block assembly for supporting relatively independent sheaves whereby to permit relatively different speeds to be imparted thereto with respect to their supporting bearings, a plurality of sets of revoluble sheave supporting means for supporting the sheaves for rotation, each sheave having a cylindrical extension on either side at its axial center, the cylindrical axial extensions of the sheaves of one set overlapping adjacent cylindrical axial exten-

sions of the sheaves of the other set, anti-friction bearing means for the sheaves of one set, and anti-friction bearing means for the sheaves of the other set, the latter being within and in vertical alinement with the former.

11. A sheave block assembly comprising a plurality of sheaves, each of said sheaves having axially disposed cylindrical members extending from either side thereof, the said cylindrical members which extend from either side of some of the sheaves being of a greater diameter than the said cylindrical members extending from either side of the other sheaves therein, anti-friction bearing means disposed to rotatably support those cylindrical members having the greatest diameter and anti-friction bearing means disposed to rotatably support those cylindrical members having the least diameter, the second said anti-friction bearing means being disposed within the said cylindrical members having the greatest diameter and in vertical planes co-incident with the vertical planes in which the first named anti-friction bearing means lie.

12. A sheave block having a plurality of parallel sheaves, cylindrical portions at the respective sides of each sheave, the cylindrical portions of some of the sheaves having rotatable telescopic connection with the cylindrical portions of adjacent sheaves, anti-friction bodies adapted to operatively co-act with and interiorly related to both of the cylindrical portions of some of the sheaves, and anti-friction bodies adapted to operatively co-act with and exteriorly related to both of the cylindrical portions of other of said sheaves.

13. In an assembly of the character described, a set of sheaves, each sheave member of which has a cylindrical extension formed on either side thereof at its axial center, a set of two sheaves, each of said last named sheaves having a hollow cylindrical extension formed on either side thereof at its axial center, each of the said cylindrical extensions of each of the said two sheaves exteriorly telescoping adjacent cylindrical extensions of the first said sheaves, and an independent bearing unit correlated with each of the said cylindrical extensions of each of the first and second said sheaves.

14. In an assembly of the character described, a sheave member having a cylindrical extension formed on either side thereof at its axial center, a sheave disposed on either side of the first said sheave, each of the last said sheaves having a hollow cylindrical extension formed on either side thereof at its axial center, one of the said cylindrical extensions of each of the last said two sheaves being disposed telescopically with respect to one of the cylindrical extensions of the first said sheave, anti-friction bearing means for rotatably supporting said cylindrical extensions of the said two sheaves, and anti-friction bearing means disposed internally of cylindrical extensions of the said two sheaves for rotatably supporting the cylindrical extensions of the first sheave.

15. In an assembly of the character described, a sheave member having a cylindrical extension formed on either side thereof at its axial center, a sheave disposed on either side of the first said sheave, each of the last said sheaves having cylindrical extensions formed on either side thereof at their axial centers, at least two of which extensions are hollow, so that each cylindrical member extending from a side of the first said sheave at its axial center may be telescoped within and operatively supported by bearing means disposed interiorly of a cylindrical extension of each of the second said sheaves, and the cylindrical extensions of the second said sheaves within which the cylindrical extensions of the first said sheave are operatively supported, may be operatively supported by bearing means disposed exteriorly theroef.

16. In an assembly of the character described, a sheave member having a cylindrical extension formed on either side thereof at its axial center, a sheave disposed on either side of the first said sheave, each of the last said sheaves having cylindrical extensions formed on either side thereof at their axial centers, at least two of which extensions are hollow, whereby each cylindrical member extending from a side of the first said sheave at its axial center may be telescoped within and operatively supported within a cylindrical extension of each of the second said sheaves, and means to permit the installation of independent bearing units correlated supportively with the cylindrical extensions of the respective sheaves for operatively supporting them.

17. A sheave block including a plurality of sheaves, each sheave having a cylindrical portion at each side and at its axial center, the cylindrical portions of alternate sheaves being disposed in interiorly telescoped relation to the cylindrical portions of the sheave disposed therebetween, thrust bearing means disposed between the interiorly telescoped ends of the said cylindrical portions of the said alternate sheaves, and radial anti-friction bearings correlated with the respective portions and concentrically related thereto.

18. In means for mounting the sheaves of relatively different sets of sheaves in close relative parallelism and for independent rotation about a common axis, mounting means, a plurality of sets of telescopically connected sheaves of corresponding peripheral diameters correlated with the mounting means for independent rotation of the sheaves around a common axis, plates embodied in the mounting means between which all of the sheaves are positioned, means correlated with the plates for maintaining telescopic relationship of the respective sets of sheaves so as to hold all of the said sheaves in close relative parallelism to each other, respective sets of anti-friction bodies concentrically related to said common axis of rotation and disposed to rotatably support the respective sets of sheaves, and thrust bearings concentrically related to said common axis of rotation separating one sheave from an adjacent sheave.

19. In an assembly of the character described, a sheave member having a hollow cylindrical supporting extension formed on either side thereof at its axial center, a sheave disposed on either side of the first said sheave, each of the last said sheaves having a cylindrical supporting extension disposed in interior telescoped relation to a cylindrical extension of the first said sheave, means to mount the said cylindrical extensions of each of the said sheaves for rotation, and thrust bearing means disposed between the adjacent ends of the said interiorly disposed telescoped cylindrical extensions.

20. A sheave block assembly comprising a plurality of sheaves, each of the said sheaves having axially disposed rotatable cylindrical members projecting from either side for the operative support thereof, the cylindrical members projecting from the adjacent sides of adjacent sheaves being

disposed in telescopic relation to each other, anti-friction bearing means for the operative support of each cylindrical member of each sheave of the said assembly, means in the said assembly for the operative support of the said anti-friction means including surfaces of fixed non-revoluble portions of the assembly and surfaces of revoluble portions of the assembly, some of the said sheaves having both of the cylindrical supporting members thereof rotatably carried by anti-friction bearing means supported from revoluble surfaces of portion of the assembly and others of the sheaves having at least one cylindrical supporting member rotatably carried by anti-friction bearing means supported from a fixed non-revoluble surface of a portion of the assembly.

21. A sheave block assembly comprising a plurality of sheaves adapted to be disposed in parallelism and in relatively close latitudinal relation to each other including outer sheaves and one or more intermediately disposed sheaves, each of the said sheaves having one or more cylindrical members constituting fixed portions thereof projecting axially therefrom for the rotatable support thereof, the cylindrical members projecting from adjacent sides of adjacent sheaves being disposed in telescopic relation to each other, anti-friction bearing means for the operative support of each of the said sheaves and including each of the said cylindrical supporting members, means in the said assembly including fixed non-revoluble surfaces and revoluble surfaces thereof for the operative support of the said anti-friction bearing means, some of the sheaves of the said assembly having two cylindrical supporting members each carried by an anti-friction bearing means supported from revoluble surfaces and other of the said sheaves having at least one cylindrical supporting member carried by anti-friction bearing means supported from a fixed non-revoluble surface.

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