

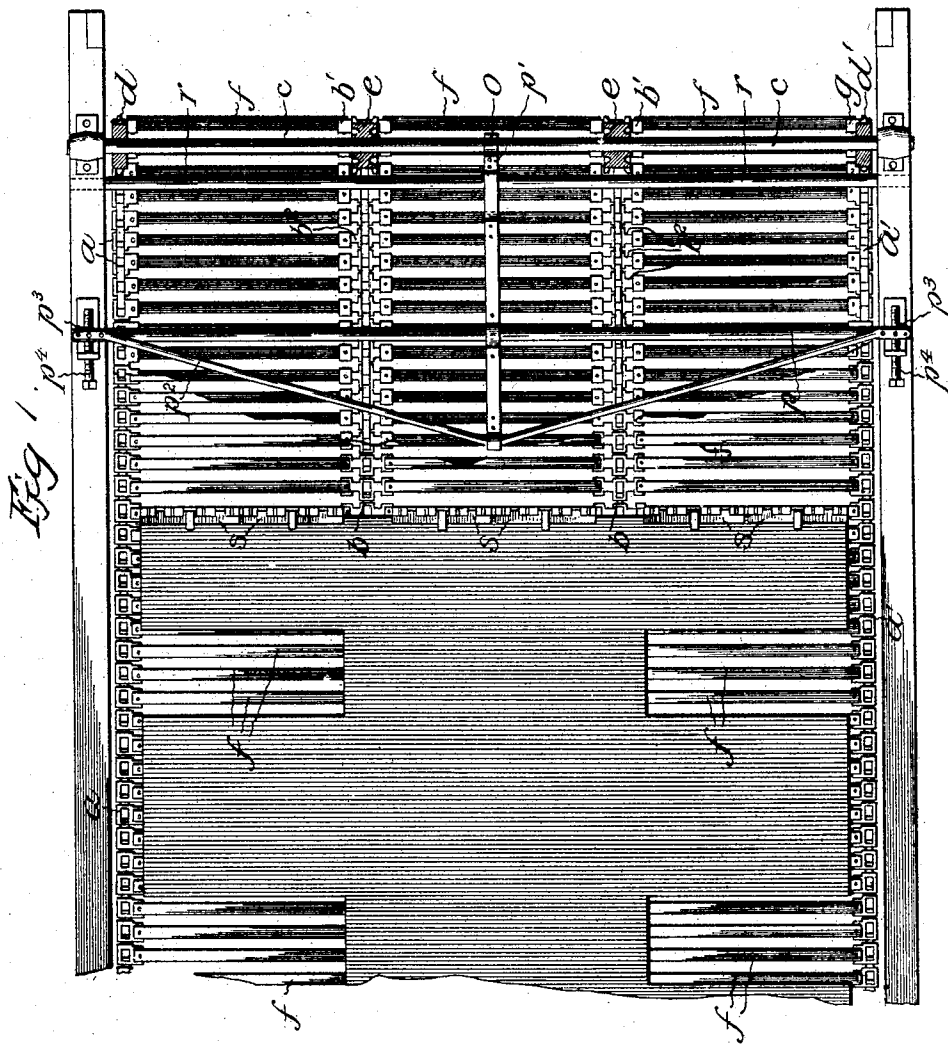
No. 796,947.

PATENTED AUG. 8, 1905.

E. A. THOMAS.
CONVEYER.

APPLICATION FILED JAN. 7, 1905.

5 SHEETS—SHEET 1.



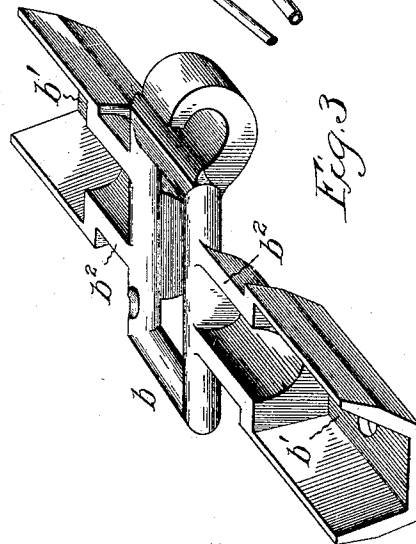
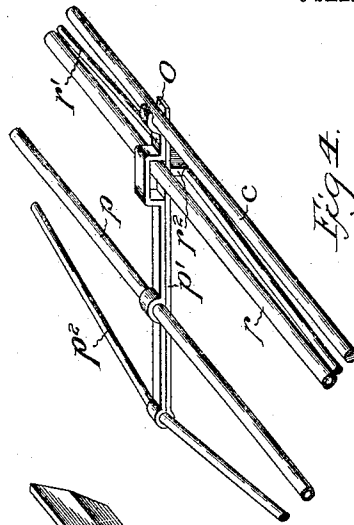
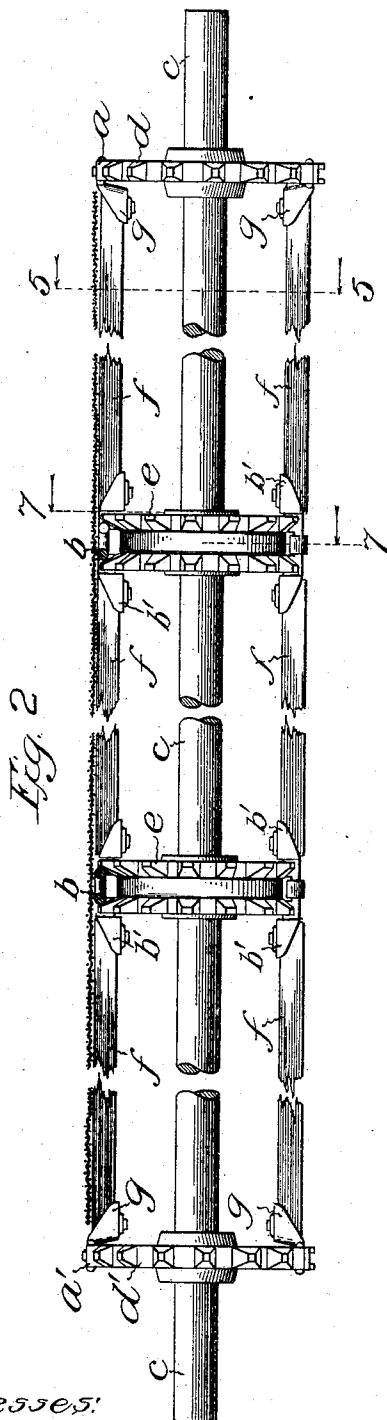
Witnesses:
Ed. C. Brown
Irving Mac Donald.

Inventor:
Eugene A. Thomas.
By Myron H. Beale
Att'y

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CONVEYER.

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5 SHEETS—SHEET 2.

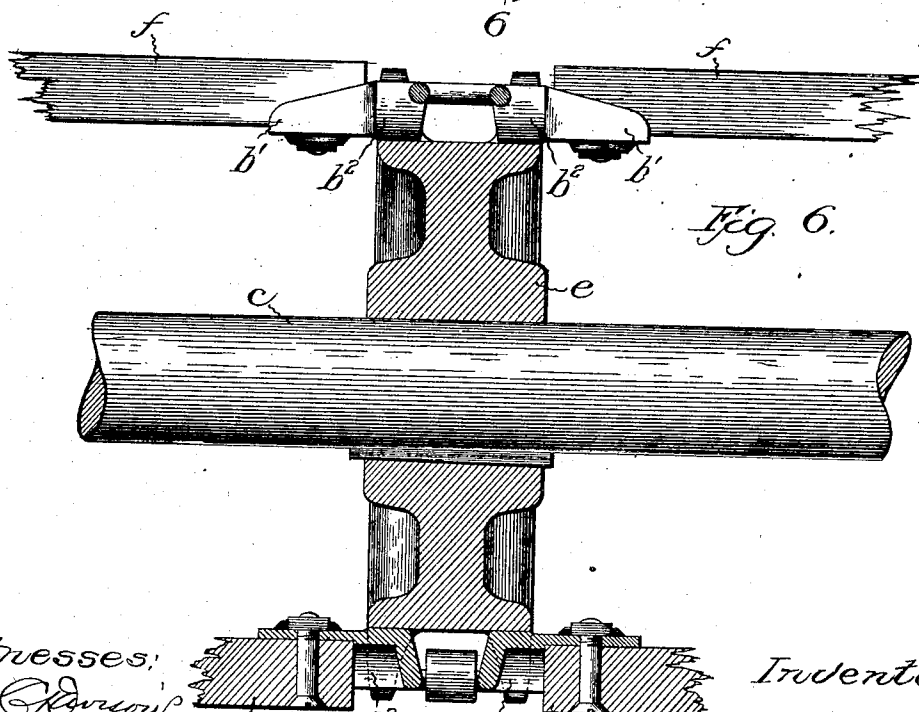
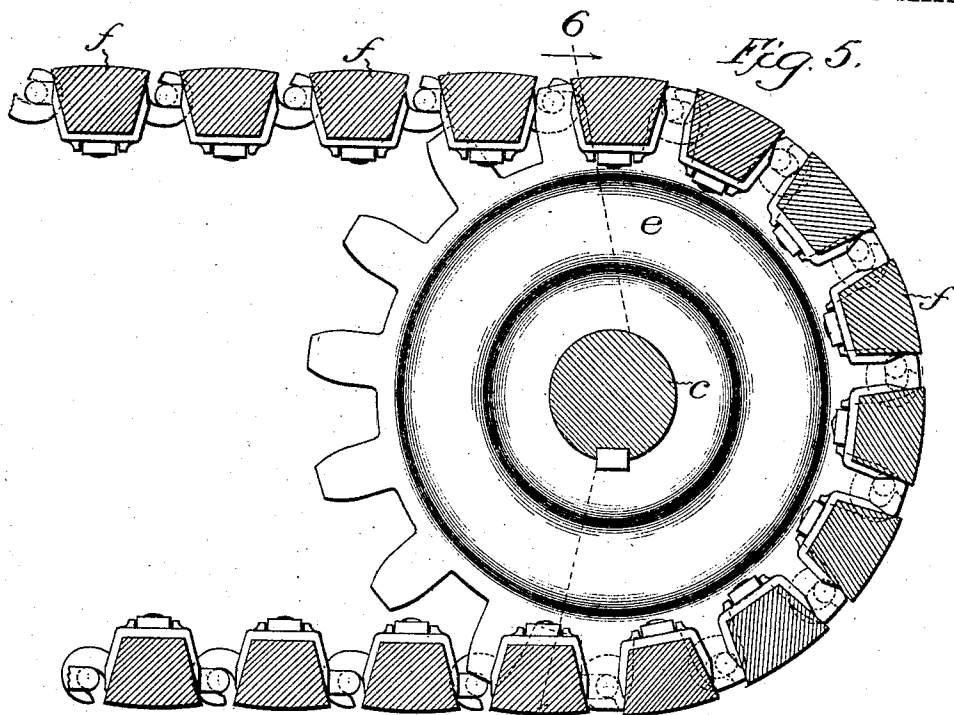


Witnesses:
Geo. C. Darrow
Irving Mac Donald

Inventor:
Eugene A. Thomas:
By Myron H. Beach
Atty

E. A. THOMAS.
CONVEYER.
APPLICATION FILED JAN. 7, 1905.

5 SHEETS—SHEET 3.



Witnesses:
Ed. C. Brown

Irving Mac Donald.

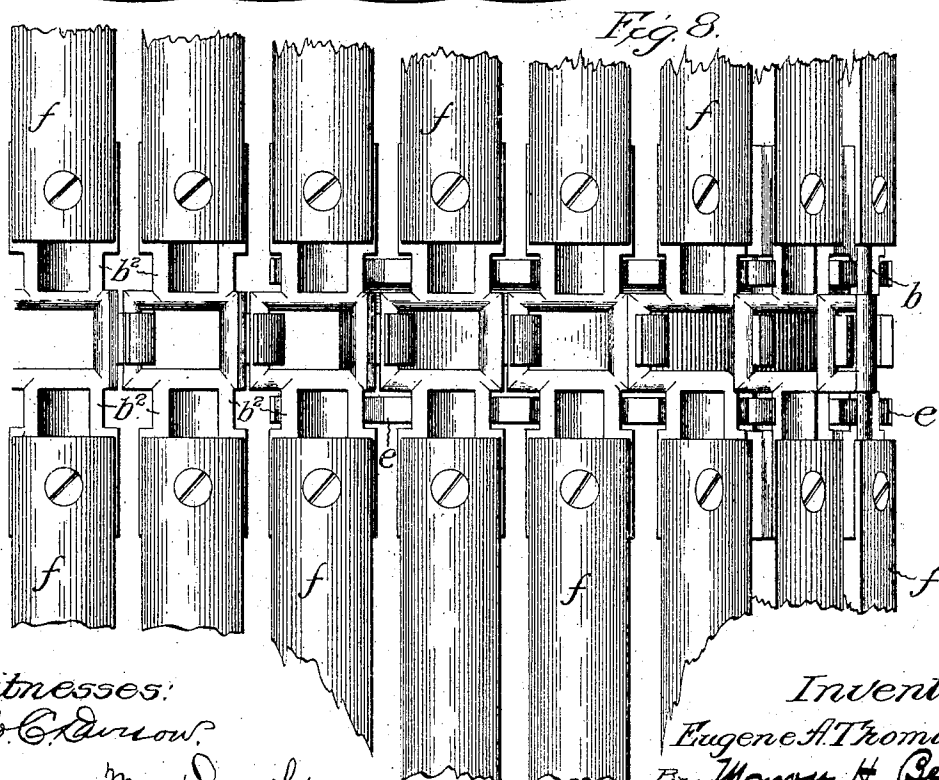
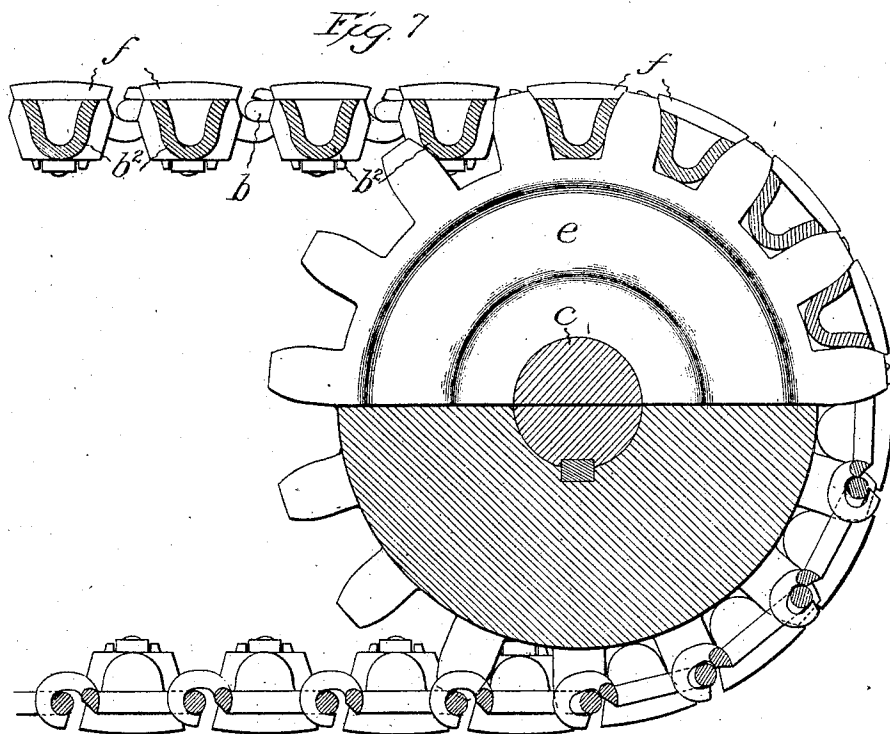
Inventor.

Eugene A. Thomas
By Myron H. Beale
Atty

E. A. THOMAS.
CONVEYER.

APPLICATION FILED JAN. 7, 1905.

5 SHEETS—SHEET 4.



Witnesses:

Ed. C. Brown.

Irving MacDonald.

Inventor:

Eugene A. Thomas.

By *Wm. H. Read*
Att'y

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5 SHEETS—SHEET 5.

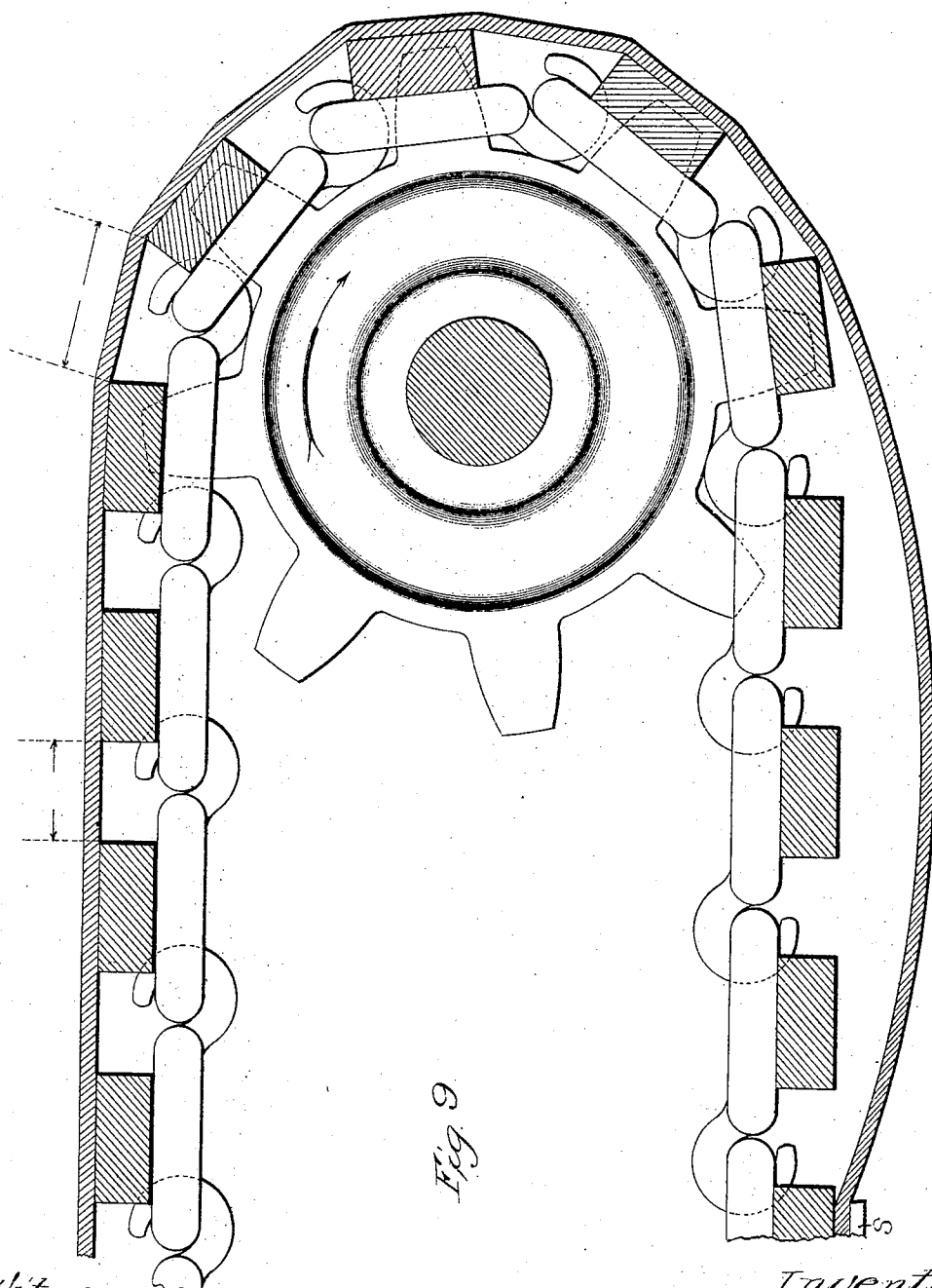


Fig. 9

Witnesses:
Geo. C. Harrison,
Irving MacDonald.

Inventor:
Eugene A. Thomas,
By Wynne H. Beach
Atty

UNITED STATES PATENT OFFICE.

EUGENE A. THOMAS, OF CHICAGO, ILLINOIS.

CONVEYER.

No. 796,947.

Specification of Letters Patent.

Patented Aug. 8, 1905.

Application filed January 7, 1905. Serial No. 240,011.

To all whom it may concern:

Be it known that I, EUGENE A. THOMAS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Conveyers, of which the following is a full, clear, concise, and exact description.

My invention relates to conveyers, and more particularly to apparatus by which fabrics may be supported and carried as is required, for example, in certain forms of carpet-cleaning machines, although it will be useful for other purposes.

I have invented a carpet-cleaning machine in which the carpet is supported upon and attached to a carrier of the broad endless-belt type, such carrier being composed of transverse slats mounted upon the links of parallel sprocket-chains, said chains passing over pairs of sprocket-wheels mounted upon shafts, which are suitably driven to move the carrier. In such a machine the surface of the carrier must be flat to permit the cleaning devices to be brought into contact with all parts of the fabric as it is moved along, so that the work of cleaning may be thorough and rapid, and this flat surface is preferably obtained by constructing the body of the carrier of transverse slats supported upon and attached to sprocket-chains, as described. Where the carpet or other fabric to be cleaned is of considerable breadth, it is necessary that the carrier should be correspondingly broad, and to prevent sagging of the slats in the center the carrier must be supported along the central portion as well as at the sides. It is therefore advantageous to construct the slats in several sections supported and united at the intermediate joints by the links of intermediate sprocket-chains, which pass over and are supported by sprocket-wheels. In this manner the width of the carrier may be indefinitely increased; but in constructions heretofore proposed there has been the serious difficulty that the carpets would be torn in passing over the intermediate sprocket-wheels. If the outer surface of the carrier is on a line with the pitch-line of the sprocket-wheel, the teeth of the sprocket-wheel must necessarily project above the surface of the carrier, and in the case of sprockets supporting the central portion of the conveyer the teeth of such intermediate sprocket-wheels will fray and injure the carpet. In the first attempt to avoid this I mounted the slats upon the

sprocket-chains in such a manner that the surface of the carrier was built up to the level of the top of the intermediate sprocket-teeth; but with this construction the surface distance between each slat and its neighbors is increased as the carrier turns in passing around the sprocket-wheel. The carpet must be attached to the carrier in order that it may be dragged along, and as it is tightly engaged behind by the cleaning devices the result of increasing the surface-space and tension at the turn is to drag the carpet through faster than the main supporting-body of the carrier can carry it, so that the carpet is unduly stretched and sometimes ripped and torn. This increase in the surface distance between corresponding points on adjacent slats while traversing the sprockets on the turn of the carrier can be prevented by mounting the slats so that their outer surfaces are in the same plane as the pitch-line of the intermediate chains; but this is objectionable, since the hinges or knuckle-joints of the links of such chains project above the surface of the slats and the carpet or other fabric is subjected to practically the same harmful stretching at such points. If the slats are mounted approximately in the same plane as the outer surfaces or tops of the knuckle connections or hinges uniting the links of the intermediate chains, the undesirable projections before mentioned are obviated, but the fabric will still be stretched to an undesirable extent, due to the slight increase in surface distance between the adjacent slats as they turn around the sprockets at the end of the carrier. Finally, I have found that by mounting the slats as last described, or so that their upper or exterior surfaces lie above the pivotal connections or knuckle-joints of the links of the intermediate chain or chains, employing an intermediate sprocket or sprockets having a pitch slightly less than the pitch of said chains, and constructing the links of said intermediate chains so as to have a corresponding lost motion, the difficulties are entirely removed, since with this arrangement and construction the links in turning over the sprocket-wheel will be drawn closer together, as permitted by the looseness or lost motion in the chain, in such a manner as to regulate and maintain constant the distance between adjacent slats at the surfaces thereof when the carrier turns around the sprocket-wheels; and the teeth of the sprockets need not project above the surface of the slats. Where wide carriers are em-

ployed, the end shafts must necessarily be of considerable length, and a difficulty heretofore encountered has been that the shafts are liable to sag because of the weight of the carrier and the pull exerted thereby. In order to overcome this objection, I provide intermediate bearings for the end shafts, which are supported by means of trusses hereinafter described, so as to maintain the shafts in proper position.

My invention further contemplates an improved carrier-chain, which will be particularly adapted for use as an intermediate chain to support the central portion of the carrier—that is to say, to unite the slat-sections forming one breadth of the carrier with the extensions thereof or slat-sections forming the neighboring breadth, while constituting a movable support therefor adapted to mesh with the teeth of the sprocket-wheel which carries and drives the same. For this purpose I construct the links of the intermediate chain with brackets or sockets adapted to receive the slats or other pieces to be supported, and the link-frame which carries the two brackets is provided with a shoulder or shoulders formed to fit between or mesh with the teeth of a carrying sprocket-wheel. Preferably each link is constructed with two such shoulders, one on each side thereof, and a twin sprocket-wheel is provided, having two parallel sets of teeth at the sides thereof, so that such sprocket-wheel forms a wide substantial support for the chain.

My invention also contemplates certain details of construction of the carrier which will be hereinafter described.

I will describe in detail a carrier embodying my invention by reference to the accompanying drawings, wherein—

Figure 1 is a partial plan view of the conveyor, a part of the upper lap of the endless carrier-belt being broken away to disclose the truss-supports for the end shaft. Fig. 2 is a sectional end view on a somewhat larger scale. Fig. 3 is a detail perspective view of one of the middle lengths. Fig. 4 is a fragmentary perspective view of the trusses for bracing the end shaft over which the carrier-belt turns. Fig. 5 is a sectional elevation, on a larger scale, of a part of the carrier at the turn, taken on line 5 5 of Fig. 2. Fig. 6 is a sectional end view on line 6 6 of Fig. 5. Fig. 7 is a sectional elevation of part of the carrier at the turn, taken on line 7 7 of Fig. 2. Fig. 8 is a detail plan view of a portion of the carrier at the turn, showing the middle links with the ends of the slats supported thereby; and Fig. 9 is a diagrammatic view showing the stretching action where the surfaces of the slats are considerably above and beyond the pitch of the chain and where no lost motion is provided for in the chain.

The same letters of reference are used to designate the same parts wherever shown.

The carrier shown in the drawings, which

is of the endless-belt type, is provided with two outer or side chains *a a'* and two intermediate chains *b b'*, carried upon sprockets secured to a pair of end shafts. For the sake of convenience I have shown but one of the end shafts *c*. This shaft carries two sprocket-wheels *d d'* for the side chains and a pair of intermediate sprocket-wheels *e e'* for the intermediate chains. The slats may be of short lengths. I have shown three rows of slats *f*, and these are supported by said chains, forming, in effect, a single row of long slats supported at intermediate points to prevent sagging and to avoid the disadvantages of using thick and heavy slats. Each of the links of the outer or side chains is provided with a carrying member, bracket, or socket *g*, preferably formed integrally therewith, said bracket being adapted to receive the end of a slat and to support the same in such manner that the outer surface of such slat lies in practically the same plane as that of the centers of the knuckle-joints or hinges of the said side chain. The teeth of the outer or side sprockets would of course project above the upper surfaces of the slats; but since such chains or sprockets are at the lateral edges of the carrier the carpet or other fabric does not rest upon them, so this is permissible. The distance between any two adjacent slats at the ends supported by the side chains will not vary as the chain turns over the sprocket-wheel, because the upper or outer surface of each slat is in the same plane as the centers of the hinge connections of the links.

The intermediate chains *b b'* are arranged to unite the slat-sections, which form one breadth of the carrier, with the extensions thereof or slat-sections forming the adjoining breadth, and these chains in turn are supported and driven by the intermediate sprocket-wheels *e e'*. These intermediate sprocket wheels and chains are so arranged that the teeth will not project above the surface of the carrier or interfere with the carpet in any way, and the chains and sprockets are specially constructed and adapted to each other, as hereinafter described, so that there will be no increase in the surface distance between the slats as the carrier turns over the sprocket-wheels.

The chain and sprocket illustrated in Fig. 9 show clearly the stretching action produced where ordinary intermediate chains and sprockets are employed to support the slats and when their surfaces lie at a considerable distance above or beyond the centers of the hinges or knuckle-joints of the links. The fabric is attached at its ends to the carrier by clamps *s*, such as shown in Fig. 1, and as the slats pass around the wheel in the direction indicated by the arrow the distance between peripheral centers of adjacent slats is greatly increased, thereby stretching the fabric upon the upper side of the carrier and tearing the same and causing the fabric after pass-

ing around the end of the carrier to sag, as shown. Furthermore, since the carrier is usually given a reciprocating movement in the reverse movement the fabric will be made very loose at the top and will project above or between the slats in folds or creases and interfere with the proper operation of the cleaning devices.

In my construction each link of the intermediate chain is provided with brackets, sockets, or carrying members $b' b'$ upon the sides thereof adapted to receive the ends of adjacent slat-sections, the link serving to support and unite these two sections in such a manner as to form, in effect, a continuous slat. Each link is hinged or jointed to its neighbors, but in such a way as to have a definite lost motion or "take-up"—that is to say, so that the links may be drawn closer together when the carrier turns around the sprocket-wheels $e e$, which support and drive the said intermediate chains $b b$. Said sprocket-wheels $e e$ are adapted to mesh with the links of said chains, but have a pitch less than the normal pitch of said chains—that is to say, the distances between the teeth of the sprocket at the pitch-line thereof are slightly less than the normal distances between the centers of the links. This difference, however, is compensated for by the take-up in the chain—that is, by the extent to which adjoining links may be drawn toward each other—due to the looseness of the hinge-joints.

The frames of the links $b b$ may be constructed in any suitable way to mesh with the sprockets; but preferably the necks $b^2 b^2$ of the slat-carrying brackets which form shoulders on the sides of each link are formed to fit snugly in the spaces between the teeth of the twin or parallel sprocket-wheels $e e$. Thus the chain instead of being supported only upon the narrow edge of a single ordinary sprocket whose teeth enter the open links thereof is supported on both sides of each link by the two sets of teeth of the twin sprocket-wheels which mesh with the lateral shoulders $b^2 b^2$. With this construction as the carrier-chain turns over the sprocket-wheels the shoulders $b^2 b^2$ of the links settle snugly into place in the spaces between the sprocket-teeth, and so are not only drawn together to take up the lost motion in the chain, but are firmly supported, the sections of each slat being maintained in proper alinement with each other and parallel to neighboring slats. The driving power is thus applied evenly and to the best advantage.

The central parts of each link-frame may be constructed in an open form, and where the carrier is simply to be supported upon an idler sprocket-wheel without turning over the wheel a single wheel may be employed with teeth adapted to enter the open frames of the links in the ordinary manner. I prefer, how-

ever, to employ twin sprocket-wheels throughout for the intermediate chains.

Where endless carriers of considerable width are employed, such as herein described, the shafts supporting the sprocket-wheels over which the carrier-chains pass are apt to spring or sag in the center because of their weight and also on account of the strain of the carrier-belt. In a carpet-cleaning machine where the whole width of the carpet should be in uniform contact with the cleaning jets and brushes this is a serious difficulty. One feature of my invention consists in a combination of trusses for supporting the shafts in question at points intermediate their ends. The end shaft may be provided with one or more intermediate bearings o in suitable rigid supports which are maintained between the upper and lower laps of the carrier-belt, said supports being mounted at their ends in the side frame of the machine. In the form shown the intermediate bearing o for said end shaft is provided at the end of the cross-bar or strut p' of the horizontal truss-frame p , which is braced at the rear by a tension-rod p^2 . Said truss-frame is supported at its ends in mountings $p^3 p^3$, which preferably may be adjusted longitudinally along the side sills of the machine by means of thrust-screws $p^4 p^4$. The horizontal truss-frame p is intended to take the strain due to the backward pull of the conveyer, and to prevent the shaft from sagging because of its weight and the weight which it carries I provide a vertical truss-frame which consists of a rod r , supporting the strut p' of the horizontal frame, and a tension rod or brace r' below said rod r and connected therewith by a vertical strut r^2 , said rods r and r' being supported in the side sills of the frame.

It will be evident that my invention is capable of modification without departing from the general principles herein set forth, and I do not desire to be understood as limiting myself to the precise construction shown in the drawings; but

I claim—

1. The combination with a carrier-chain, of a sprocket-wheel around which said chain is passed, the pitch of the sprocket being slightly less than the pitch of the chain, the links of said chain being constructed and connected in such a manner as to have a corresponding lost motion which is taken up as the carrier turns over the sprocket.

2. A carrier-chain having loosely-connected links, in combination with a sprocket-wheel around which said chain is passed, the teeth of said sprocket-wheel meshing with said chain, but being proportioned to draw the links of the chain together and take up the lost motion as the chain is passing around the sprocket; whereby the surface distance between adjacent links is maintained constant.

3. A carrier-chain having lateral projections

or shoulders $b^2 b^2$, said shoulders being formed to mesh with the teeth of a sprocket-wheel, substantially as set forth.

4. A carrier-chain comprising open links hinged or jointed to each other, supporting-brackets formed upon the sides of said open links, said brackets having shoulder portions uniting the same with the open links, said shoulder portions being formed to mesh with the teeth of twin sprocket-wheels, substantially as set forth.

5. A carrier-chain comprising a series of links hinged together, said links having shoulders upon the sides thereof adapted to support carrier members, in combination with a twin sprocket having parallel sets of teeth meshing with the shoulders of said chain.

6. A chain adapted to support carrier members upon each side thereof, said chain comprising oppositely-facing supporting-brackets united by link-frames which are hinged together, said link-frames being adapted to mesh with a sprocket-wheel.

7. The combination with a carrier-chain, of slats carried by the links of said chain, the surfaces of the slats being above the pitch-line of the chain, the links of said chain being constructed and connected to have a lost motion, in combination with a carrying sprocket-wheel over which the carrier-chain is passed, said sprocket-wheel having teeth adapted to mesh with said chain without projecting above the surface of the slats, the pitch of said sprocket being less than the pitch of the chain, whereby the links of the chain are drawn closer together in turning over the sprocket-wheel to maintain constant the surface distance between points on adjacent slats.

8. The combination with a carrier-chain, and slats attached to the links thereof, the peripheral surfaces of said slats being above the pivotal connections of said links, of a sprocket-wheel over which said carrier-chain is adapted to turn, said sprocket-wheel having teeth adapted to mesh with the chain, without projecting above the surface of said slats, the links of said chain being constructed and connected to have a lost motion, and the teeth of the sprocket being constructed to take up said lost motion as the carrier-chain turns over said sprocket, whereby the surface distance between corresponding points on adjacent slats is maintained constant.

9. The combination with a carrier-chain provided with brackets upon the sides of the links thereof, of slats supported by said brackets, the surfaces of said slats being above the pitch-line of the chain, each bracket having a shoulder portion b^3 uniting the same with the frame of the link, and twin sprocket-wheels supporting and driving said chain, said sprocket-wheels having a pitch less than the pitch of the chain, the shoulders on said links being formed to mesh with the teeth of said twin sprocket-wheels.

10. A carrier-chain composed of links hinged together, said links having brackets upon the sides thereof, and shoulder portions $b^2 b^2$ upon the link-frames uniting said brackets, adapted to mesh with the teeth of the sprocket-wheel.

11. A carrier-chain comprising a plurality of links hinged together, each link having a main frame or open link, and bracket portions upon the sides of said links united therewith by necks or shoulder portions $b^2 b^2$, in combination with a driving sprocket-wheel having two parallel sets of teeth upon the sides thereof adapted to mesh with the shoulders upon the sides of said links, the open links being adapted to mesh with the teeth of a single sprocket-wheel.

12. In a conveyer, the combination with a pair of outer or side chains and an intermediate chain, of slats in sections extending between and supported by said chains to form a carrier-belt, the surfaces of the slats being substantially flush with the top of the intermediate chain, and substantially in the plane of the pitch-lines of the side chains, a shaft carrying outer sprocket-wheels for said side chains and an intermediate sprocket-wheel for said intermediate chain, said intermediate chain being constructed to have lost motion, and the intermediate sprocket-wheel having a smaller pitch, so as to take up said lost motion in the part of said chain which is in engagement with the sprocket-wheel; whereby the distance between adjacent slats at the upper surface of the conveyer is maintained substantially constant.

13. The combination with a carrier-belt passing around an end shaft, of bearings for said shaft at the sides of the carrier, an intermediate bearing for said shaft at the middle part thereof to prevent the shaft from springing, and a support for said intermediate bearing maintained between the upper and lower laps of the carrier-belt and supported from the sides thereof.

14. The combination with a carrier-belt passing around an end shaft, of bearings for said shaft at the sides of the carrier, a horizontal truss-frame extending across between the upper and lower laps of the carrier-belt and having exterior supports at the sides of said belt, a supplemental truss-frame at an angle to said first-mentioned truss-frame, also crossing between the upper and lower laps of said belt, and an intermediate bearing for said shaft supported or braced by both of said truss-frames.

In witness whereof I hereunto subscribe my name this 3d day of January, A. D. 1905.

EUGENE A. THOMAS.

Witnesses:

W. W. LEACH,
DE WITT C. TANNER.