

W. J. BELCHER.
 DRIVE CHAIN.
 APPLICATION FILED JAN. 31, 1911.

1,020,180.

Patented Mar. 12, 1912.

Fig. 6. Fig. 1.

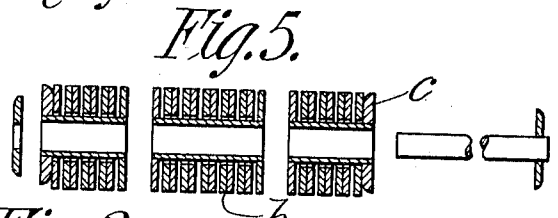
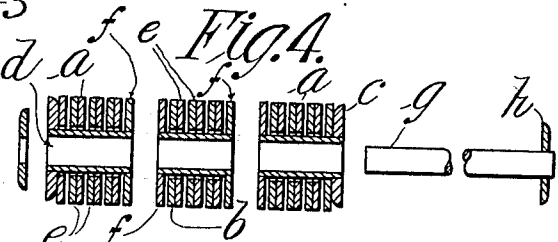
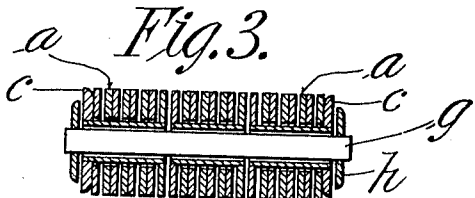
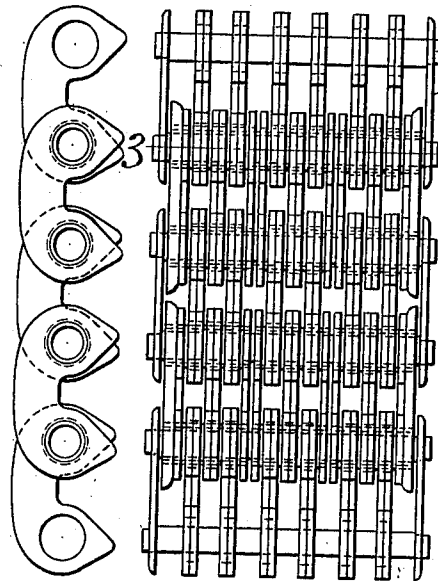
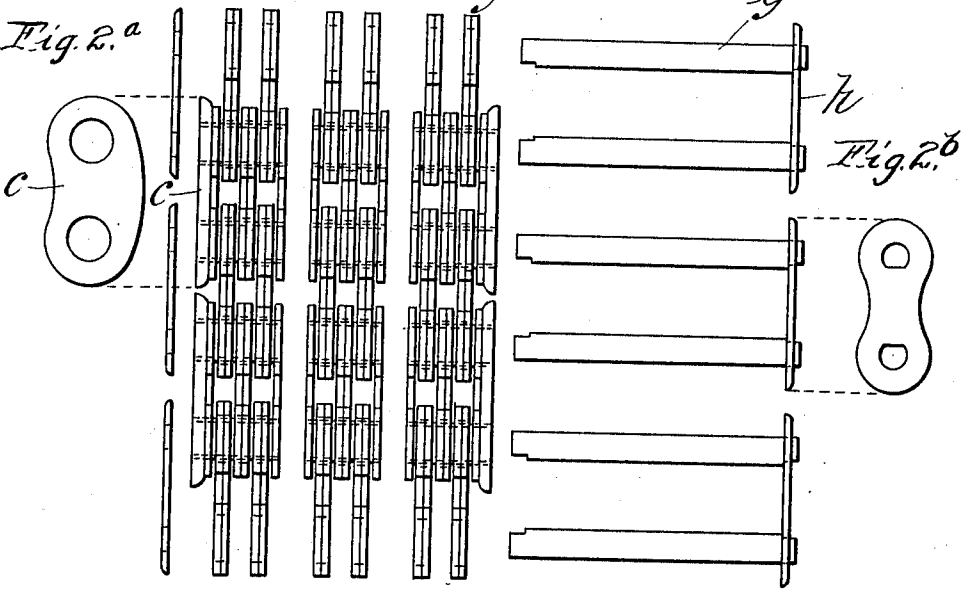


Fig. 2.



WITNESSES:

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Fig. 7.



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UNITED STATES PATENT OFFICE.

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DRIVE-CHAIN.

1,020,180.

Specification of Letters Patent. Patented Mar. 12, 1912.

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To all whom it may concern:

Be it known that I, WARREN J. BELCHER, a citizen of the United States of America, residing at Hartford, in the county of Hartford and State of Connecticut, have invented new and useful Improvements in Drive-Chains, of which the following is a specification.

This invention relates to drive-chains and particularly to an improvement in the manufacture of the chains, whereby great economies are effected, all as fully described and claimed in the following specification.

As is well known, the use of drive-chains for the transmission of power has been rapidly extended within recent times, and under constantly increasing demands for new uses drive-chains are now made of dimensions unheard of a few years ago. A manufacturer of these chains must, at the present time, be prepared to supply chains running from a quarter inch up to six inches in width and even wider than this. Of course the manufacturer must carry made up stock, and taking into consideration the great range of pitch for the chains of each width (this increase of width advancing by eighths or quarters of an inch) it is obvious that to carry a stock of chains to meet all possible demands of the trade puts a great expense upon the manufacturer.

The object of the present invention is to relieve the manufacturer of this financial burden by making it unnecessary for him to carry the enormous stocks heretofore required; and, further to facilitate the construction of all chains above a certain width, as well as to improve the construction of the chain, whereby a better and smoother running chain is produced.

It should be stated here that the particular type of chain most benefited by the present invention is that type which comprises links made up of link members mounted on sleeves through which pins extend on which the bushings fit loosely, these pins being preferably connected to plates at opposite sides of the chain.

The essential feature of the invention lies in the manufacture of a chain made up of independent chain-units which, when placed side by side, may constitute a chain of any desired width, it being necessary only to provide pins for the bushings or sleeves of sufficient length to extend through the

various units and far enough beyond the sides of the chain to be secured in position in the well known manner. If, therefore, a manufacturer carries in stock chain-units, say of one inch, one-half inch, and one-quarter of an inch in width, for each change of pitch he can, at very short notice, make up a chain of any desired width by assembling the various units required for such width and pinning the same together in the usual way,—each chain unit comprising the requisite number of link members mounted upon a sleeve or bushing, these members being retained in place by making the outside members to fit the end of the bushing tightly enough to hold the group of members on each bushing.

Heretofore it has been customary, as shown in my prior Letters Patent of the United States issued March 29, 1910, under number 953,114, to make a two-part bushing for certain chains, but in practice it has been found that these bushings or sleeves can not be commercially produced to exceed a certain length, for the reason that the holes through which the pins extend would not be in such close alinement as to permit the pins to pass through them without binding. Hence it has become necessary to provide more than two bushings when the chain exceeds a certain width. Furthermore, in making the wider chains by the method now in general use, that is building them up piece by piece, entails great labor cost, as compared with the unit system forming the subject of the present application.

The invention is fully illustrated in the accompanying drawings, in which,—

Figure 1 is a plan view of a chain made up by the assembling together of three units of the same width, all shown in their assembled relation. Fig. 2 is a plan view of the same with the chain units, shown in separated relation. Fig. 2^a is a view in side elevation of one of the side plates, shown projected from Fig. 2. Fig. 2^b is a similar view of one of the bolt connecting plates, shown projected from Fig. 2. Fig. 3 is a cross sectional view of the chain taken on line 3—3, Fig. 1. Fig. 4 is a similar view to Fig. 3 but showing the units constituting the chain in separated relation. Fig. 5 is a cross sectional view of a chain having two side units, as in Fig. 4, and a wider unit between the side units, all shown in separated relation.

rated relation, as in Fig. 4. Fig. 6 is a side elevation of the central chain-unit of either Figs. 2, 3, 4 or 5. Fig. 7 is a plan view of a washer which may be used to hold the link members in place on a bushing, or to receive the end of a pin which extends through the bushings.

Referring to the drawings, *a* indicates, as a whole, the chain units which constitute the opposite borders of the drive-chain, and *b* the intermediate chain unit. These differ only in that those chain-units which constitute the borders of the chain are generally provided with side plates *c*, the form of which (as shown in plan in Fig. 2^a) is such as to hold the chain in place on a sprocket-wheel, as well known in this art. These side plates have a driving fit on the ends of the sleeve or bushing *d* which constitute the pivot elements for the individual chains, referred to above as the chain units.

The link members *e*, loosely fitting said bushing *d*, are then placed on the latter and that one of said link members indicated by *f*, located at the end of the bushing opposite the side plates *c* is also made to have a driving fit over the end of said bushing, whereby those link members loosely fitting the bushing may be retained in their proper position by means of the link member *f* and the side plates *c*.

If desired, the ends of the bushings may be upset over the plates or link members to more securely lock these parts together.

In the case of the intermediate chain units *b*, these are made up in precisely the same manner as the unit just described, except that one of the link members *f* is driven onto each end of the bushing, the side plates on these units being unnecessary.

In the drawings, the link members *e* are shown as extending in pairs from one bushing to another alternately in opposite directions, but this arrangement of links is purely arbitrary and they may be grouped together in different ways, but in all cases, of course, they must extend from one bushing to another to constitute a chain.

When the various units have been assembled to make a chain of the desired width, pins *g* are passed through the bushing and the connecting plates *h* are fitted over the ends of these pins which are then upset to tightly unite them to the plates, all of which is common in this art.

The side plates *c* and the plates *h*, as well, are not essential to the construction so far as the invention itself is concerned, for it would be entirely possible to so securely attach link members *f* to each end of the bushings of each unit to make an operative chain. In this case the pins *g* could be secured in position in the bushings by using a washer, such as is shown in Fig. 7, on the end of each pin instead of one of the plates *h*. The

preferred construction is, however, that shown in the other figures of the drawing, since it follows well known and accepted methods of construction, but these changes are referred to for the purpose of emphasizing the essential feature of the invention which consists, as stated, in making up a chain which consists of units which are multiples of the various commercial widths of chains, whereby by assembling these units of various widths, a chain of any desirable width may be built up in a very short time, and when completed have the appearance of a chain as at present generally constructed.

There is another and very great advantage in the manufacture of the chain by the assemblage of relatively narrow units, as described herein, and that is that it is commercially impracticable to make the sleeves or bushings *d* to exceed a certain length for the reason that these bushings must be made cheaply, and up to a certain length they may be made on automatic machinery, but beyond a certain length it is not commercially possible to drill them so accurately that two long bushings, for example, will align with sufficient exactness to permit the pin *g* to pass through the bushings without binding at some point; but when the bushings are made in short lengths, even though the hole therethrough shall be slightly out of line, the short lengths will accommodate themselves in such manner to the pin that even though a very wide chain be built up the pin will pass through the bushings readily and without binding.

It is of course understood that it is necessary to make these bushings from solid stock bored out, as they have to be hardened subsequently, and therefore it is not practicable to use a drawn bushing which, while it might be made in greater lengths with perfect accuracy, could not be made either as cheaply or of the requisite quality of steel for hardening. It is therefore seen that when chains are made by the method generally practiced at present, the manufacturer would be obliged to keep in stock chains representing every commercial width in each pitch; whereas, by means of the method of manufacture shown and described herein, it is only necessary for the manufacturer to keep in stock interchangeable units of such widths as are multiples of the commercial widths of chain, together with a stock for each of these widths from which units a chain of any desired width may be built up in a few moments. On the other hand, the time required to build up a wide chain by placing on the pins the proper bushings and upon the bushings the properly disposed individual link members, would be very much greater than the time required to build up a chain from units as described, even taking into consideration the

time required to make the units, since the latter, being comparatively narrow and the operator having to deal with one bushing only, can be very quickly assembled and fastened together by securing a side plate or a link member to each bushing as the chain is built up, means being easily provided whereby this may be done where it is a question of having only a single bushing instead of several bushings being placed end to end. And, as stated, there is the added very great advantage of being able to cheaply subdivide the bushings for a very wide chain into relatively short lengths.

From the foregoing description it is clear that a distinguishing feature of the present invention resides in the construction of individual chains and chain elements in such a manner that the same may be carried in stock as independent units, so that by assembling the units, in suitable number, a chain of the desired width can be produced. In this connection it should be noted that the term "chain unit" as employed herein, is intended to be employed as an equivalent of the expression "unit chain" meaning a complete individual chain consisting of link members and pivot elements therefor, and it is these individual unit chains that are assembled and connected together in side by side relation to form the drive chain of any prescribed size.

What I claim, is:—

1. A drive chain formed of a plurality of complete and operative unit-chains, each of which consists of fastened link members and pivot elements, and means for connecting the unit-chains at the pivot joints in parallel and operative relation.

2. A drive chain formed of a plurality of individual complete and operative unit-chains each consisting of fastened link members and pivot elements, separate side plates for the built-up chain, and means for con-

necting the unit-chains at the pivot joints and for securing in place the side plates.

3. A drive chain formed of independent complete and operative unit-chains, each unit-chain including sleeves and link members connecting the same, said sleeves including means for holding the link members thereon, and means for connecting the unit-chains in parallel and operative relation.

4. A drive chain formed of independent bands each of which is a complete operative chain and includes sleeves and link plates connecting them, said sleeves including means for holding the link plates thereon, and other means for connecting the chain bands in parallel and operative relation.

5. A drive chain comprising a plurality of independent complete and operative unit-chains each of which consists of sleeves and link members fastened thereon, the outside unit-chains having side plates, said side plates receiving the ends of the sleeves, and means to secure said unit-chains in parallel and operative relation comprising pins extending through the sleeves of the different unit-chains the entire width of the completed chain and side plates.

6. A drive-chain comprising a number of independent complete and operative unit-chains assembled side by side, each unit-chain comprising a plurality of link members and sleeves on which the ends of said members are mounted, the members located at the ends of the sleeves being secured thereto, and the members located between said fixed members being loose on the sleeves, and means to secure said unit-chains together in parallel and operative relation.

WARREN J. BELCHER.

Witnesses:

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HARRY W. BOWEN.