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(54) RESILIENT TRACK

(54) SURFACE PORTANTE ELASTIQUE

(57) Abstract:

Flexible caterpillars with detachable elements and positive drive are already known; however, the known caterpillars of that kind do not possess the first condition to be fulfilled in order to attain high speeds, namely, the necessary continuousness and uniformity or homogeneousness of the track with respect to the rollers and to the ground. It is easy to understand that this not being obtained, the carrying rollers cannot have the necessary smoothness of running as the lack of evenness or homogeneousness of the tracks impart them oscillations and vibrations which preclude any speedy running.

On the other hand, the known caterpillars with positive drive comprise metal parts hinged to one another in the fashion of transmission chains or, again, metal teeth of the rack type.

In both cases the driving system acts at the same time as a guide for the band.

One is aware of the objectionability of articulations in metal caterpillars. One is likewise aware that in order to secure the driving of an endless band by means of prong sets the prongs must be of suitable contour and sufficiently small dimensions to avoid highly objectionable friction as well as the consequences of an always possible elongation. Now it is acknowledged that in order to be efficient on all grounds the guiding of a flexible band cannot indulge with the small dimension prongs of the driving systems as used.

This invention has for its object a metallo-plastic flexible caterpillar in which the above mentioned inconveniences are done away with.

Such caterpillar comprises a ground engaging removable element track and a positive drive obtained by novel arrangements which are independent from the guiding means.

The appended drawing shows by way of example some possible embodiments of this invention.

Fig. 1 shows in elevational view the general arrangement of a caterpillar with two fragmentary cross sectional views taken on lines A-B and C-D of Fig.2.

Fig. 2 is a cross sectional view.

Fig. 3 is a plan view on the outer side corresponding to Figs. 1 and 2.

Fig. 4 is a fragmentary cross sectional view of an alternative for such device.

Fig. 5 is a fragmentary cross sectional view of another alternative for such device.

Fig. 6 is a plan view on the outer side corresponding to Fig. 4.

Fig. 7 is a plan view similar to Fig. 6 but corresponding to Fig. 5.

Figs. 8, 9, 10 and 11 are elevational, cross sectional and plan views of an embodiment of the driving means for the caterpillar providing the subject of this invention.

The devices as shown in Figs. 1 to 7 will be described first.

The core of the caterpillar is provided by an endless band 1 which is flat on both faces thereof and made of such suitably resistant flexible matter as leather, braid, rubber lined fabric and the like.

Mounted upon the inner face of such band 1 in the middle and along the whole length thereof are blocks 2 (Figs. 1 to 7) which, in the positive drive caterpillar, provide the guiding thereof exclusively. The base of these guiding blocks is hollowed out lengthwise thereof to a radius equal to that of the smaller of both pulleys supporting the endless belt so that the running of the belt thereon may not be interfered with by the same.

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Applied on the other face of the belt, that is, on that which faces the ground, are metal plates 3 arranged side by side and nearly contacting one another. Such plates 3 are formed with ribs 4 of different heigths which impart them the necessary resistance; said ribs are also useful as caulks in soft ground.

Yielding pads 5 made of a suitable material are clamped at the base and on two sides thereof between said ribs 4. Such yielding pads which are arranged so as to nearly touch one another all along the band are what forms the continuous track on hard ground such as roads for instance.

In order to provide for a better adhesion with the ground the yielding pads 5 may be arranged in staggered order (Figs. 2 and 3) but with a certain amount of overlap lengthwise of the band, providing such arrangement is not prejudicial to the continuousness of rolling on the ground.

The guiding blocks 2, plates 3 and yielding pads 5 are secured upon the flexible band 1 by means of a bolt 6 (Figs. 1 and 2.) It follows that guiding blocks, plates, yielding pads and clamping bolts are in equal numbers on the endless band.

Provided on both sides of guiding blocks 2 (figs. 2, 3, 4, 5, 6 and 7) is a set of prongs 7 by means of which the driving of the endless band is provided for. Such prongs 7 are secured (rivetted or bolted) upon the metal plates 3 and project through the endless band through suitable apertures, as may be seen at b in Fig. 1 and in Figs. 2 and 4). Prongs 7 and bolt 6 are located on one line parallel with the axes of the pulleys carrying the endless band. The portions of these prongs which slightly project from the inner face of the band core are engaged into apertures 8 of the driving pulley 9 (Fig. 1) to insure the positive drive of the whole system. The form of these prongs 7 may be either cylindrical as shown in Figs. 1, 2, 5 and 7 or rectangular as shown at 7' in Figs. 4 and 6.

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The alternative according to Fig. 5 shows in cross sectional view an endless band in which the length of the plates is greater than the breadth of belt 1. Such arrangement makes it possible to provide endless bands with very large bearing surface while the dimensions of the flexible belt remain comparatively small.

The other alternative shown in Fig. 4 is based on the same principle as above, the only difference being that the driving prongs are secured at the free end of the plate which, in the case of Fig.5, is conveniently shaped therefor. Evidently, prongs 7 might as well be secured at the end of plate 3, Fig. 4, outside of the belt without departing from the scope of the invention.

It may be seen that:-

1.- The endless band is driven by sets of very low prongs, thus giving the least possible amount of friction, such prongs being independent from the guiding system the dimensions of which are sufficient to allow it to efficiently perform its duty on all grounds.

2.- Both prongs 7 on each plate which project through the endless band are arranged on either side of guiding block 2 and on a line at right angles to the longitudinal axis of the band, that is, parallel with the axes of the caterpillar carrying pulleys; the connecting bolt 6 is likewise located on the same line.

By such arrangement the endless band retains its whole flexibility while running on the pulleys, inasmuch as the rigid plates are located outside of the band and secured upon the latter by members lying on one line parallel with the axes of the pulleys around which they run.

3.- The driving effort taken up by prongs 7 is transmitted by the latter, in the case of Figs. 1, 2, 3 and 5, directly to the endless band without any intermediate member.

4.- The driving of the band is completed by bolts 6 connecting all the members of the caterpillar with one another, which, together with the sets of prongs 7, insures a most regular tension of the belt on the whole breadth thereof.

5.- The continuousness of the track with respect to the rollers is insured, inasmuch as on account of the plates being arranged very close to one another, the endless band will not sink when run over by the rollers.

6.- The continuousness of running on the ground is insured, as the yielding pads 5 are likewise arranged very close to one another.

7.- All the members are detachable and connected together by one single bolt, the driving prongs being integral with plates 3 upon which they are permanently secured.

8.- On hard ground only the narrow yielding pads 5 bear upon the ground; the only duty of plates 3 is to carry the rollers which, in some respect, run over void space. The ribs 4 of the plates provide for the necessary stiffness and serve as bearing points for the base of the pads in the direction of movement.

9.- The staggered arrangement of the yielding pads 5 provides for a better adhesion with all grounds without being prejudicial to the continuousness of running on the ground, inasmuch as the set-off of one pad with respect to its neighbours in the direction of running is not a complete one, there remaining an amount of overlap sufficient to insure the continuousness of running.

10.- When running on soft ground the yielding pads 5 sink into and plates 3 bear upon the ground, the ribs 4 then come automatically into operation to act as adhesion caulks.

11.- In the case of caterpillars with very large bearing surface, plates 3 may be made longer than the breadth of the belt; the driving prongs may then be fitted upon the overhanging portion.

All the peculiarities of the band providing the subject matter of this invention may likewise be applied to non positive drive caterpillars. In that case it is evident that the driving prongs are done away with; such driving may then be obtained by means of guiding blocks of known types.

Figures 8, 9, 10 and 11 show a peculiar constitution of the band proper together with the driving means thereof and the plates carrying the running pads.

1 designates the flexible band which may be either rubber lined fabric or flexible metal ribbon or cables with or without a rubber sheath, or any other means.

Provided on the inner side of the band is a thickened portion 16 which forms a track for the vehicle carrying rollers; as shown more particularly in the cross sectional view, Fig. 9, such thickened portion does not extend the whole breadth of the band but is limited to the breadth of the carrying rollers 17. A special track is thus provided, the eventual wear of which will not extend as far as the core itself of the band.

The driving takes place as follows:-

The prongs are provided here by small independent blocks 7 made of a suitable material such as steel, wood, hard rubber and the like. Such blocks are secured upon the endless band by means of bolts 18 projecting through said band and plates 19 (Figs. 9 and 10) upon which the head or nut of the bolt is adapted to bear.

It must be noted that, as in the case of Figs. 1 to 7, each plate carries two prongs, one at either end thereof; such prongs are arranged in alinement with the central bolt by means of which the guiding block is secured .

It needs not be mentioned that the prongs must be suitably shaped in order to afford the correct meshing thereof with the driving pulley intended therefor.

Plates 19 carry, in the case of Figs. 1 and 2, two flanges engaging the edges of the endless band; same is thus secured against any displacement crosswise of the plates. In the case of Fig. 13 the flange by which the band is secured laterally is done away with; said flange however is turned outwardly at 20, that is, on the side opposite to the band, thus backing the ribs of plates 19; the band is thus made free laterally.

Having thus described my invention, I claim:-

1. An endless flexible metallo-plastic positively driven band for use in connection with caterpillar vehicles, characterized by a belt of suitable resistance provided on one face thereof with guiding blocks and on either side thereof with positive drive prongs which are independent from the guiding means and project from the face of the roller track and, on the other face, with ribbed metal plates arranged so as to nearly touch one another, same carrying on one side thereof the driving prong set and on the other detachable yielding pads providing a ground engaging continuous central track, each guiding block being provided with a member by which it is secured upon the plate and which is common to the securing means for the related pad, said member being alined with related prong set at the same distance from each of said prongs and parallel with the axes of the belt carrying pulleys.

2. An endless band according to (1) characterized in that the yielding pads are hollowed out to receive the member by which they are secured upon their plates, and that such pads which are by far narrower than their supports are arranged in staggered order in the longitudinal direction but with a certain amount of overlap which provides for the continuousness of the track with respect to the ground.

3. An endless band according to (1) characterized in that it comprizes a thickened central portion providing a track for the rollers, same being located inwards of the band, extending the whole length thereof and being narrower than the latter, the securing means for the prong set being provided by bolts projecting through both the related plate and the band, the plates having terminal flanges projecting in the direction opposite to the band as a backing for the ribs of said plates.

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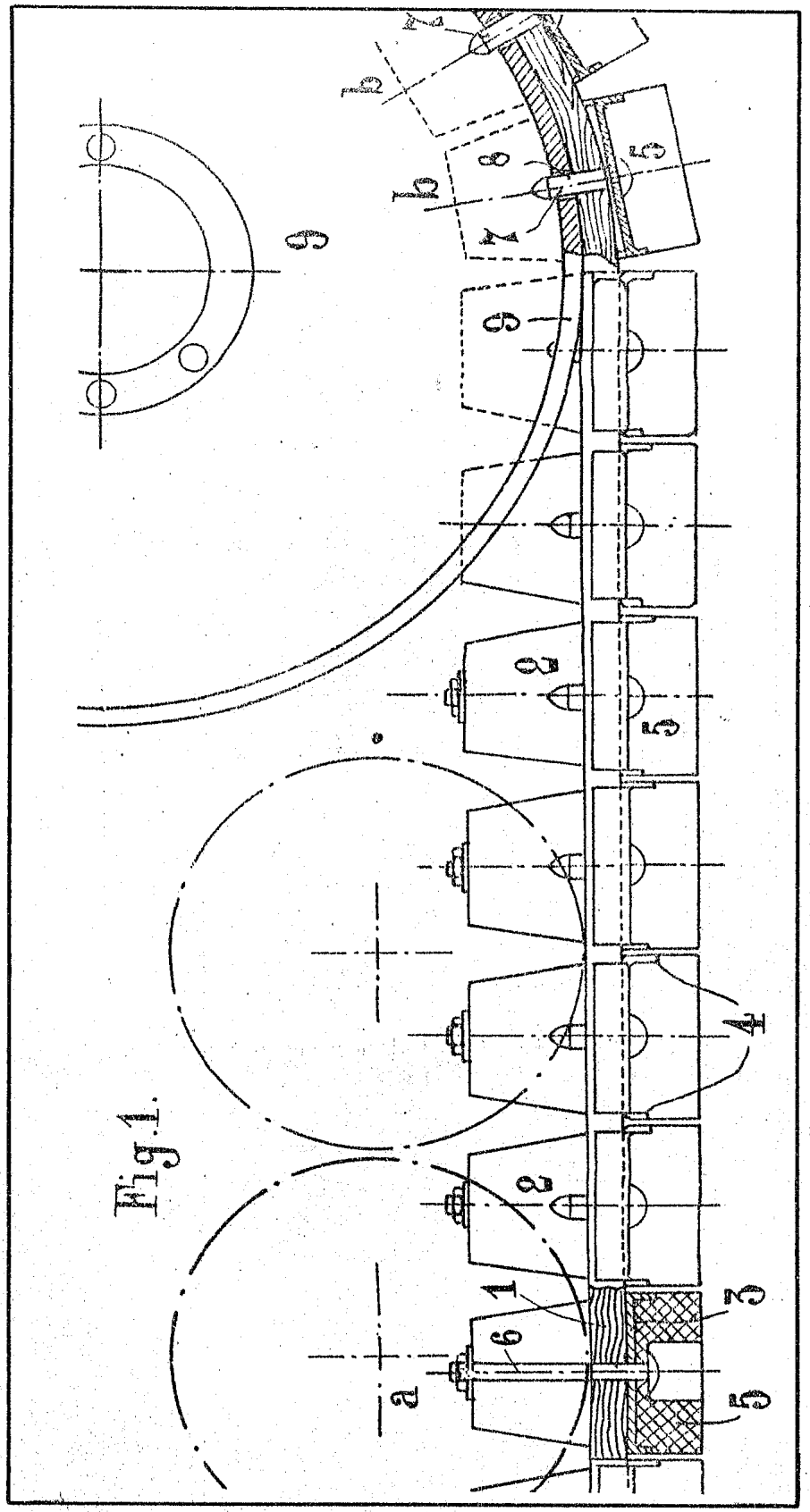

Fig. 1.

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Fig.2.

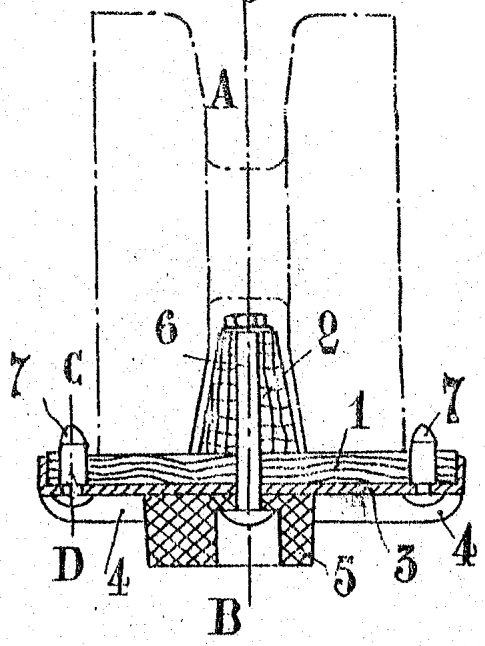

Fig.5.

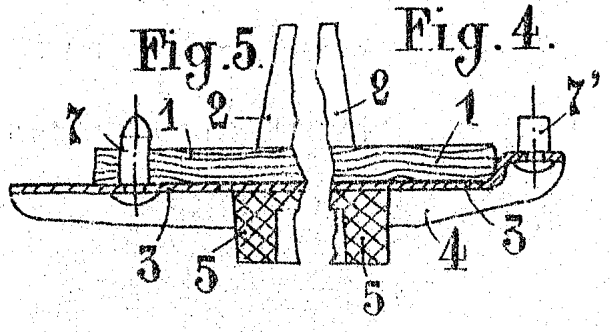

Fig.4.

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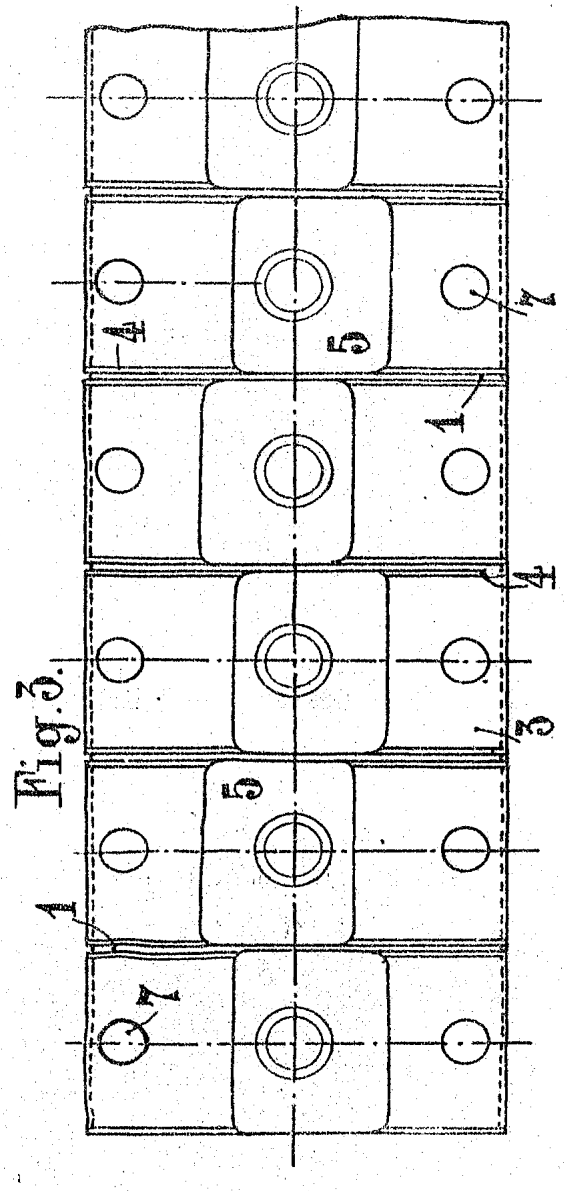

Fig.3.

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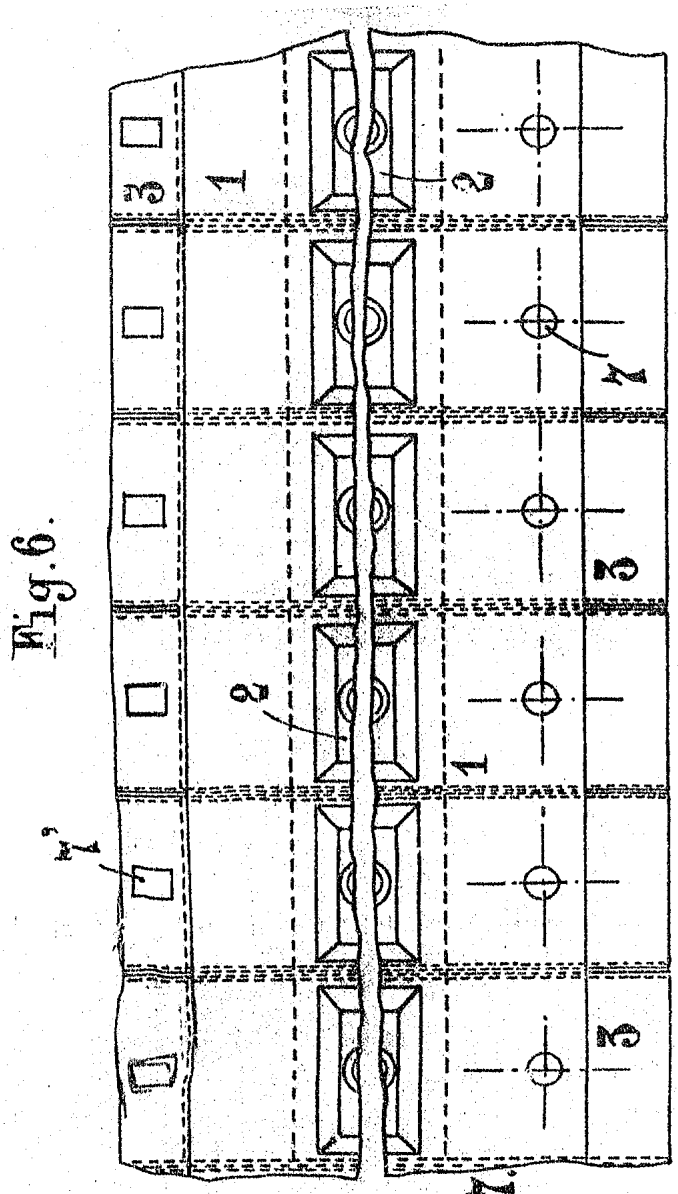

Fig.6.

Fig.7.

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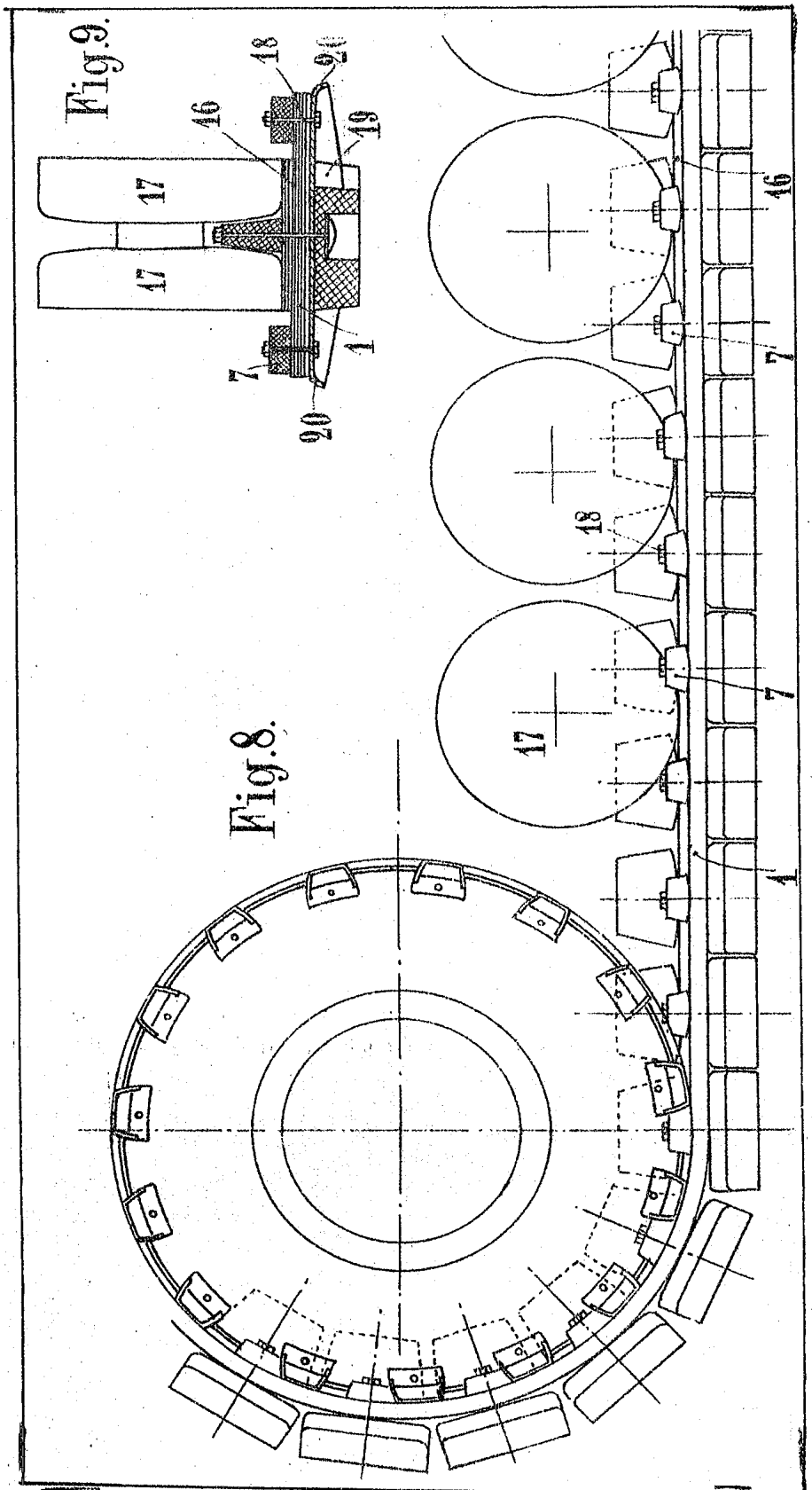

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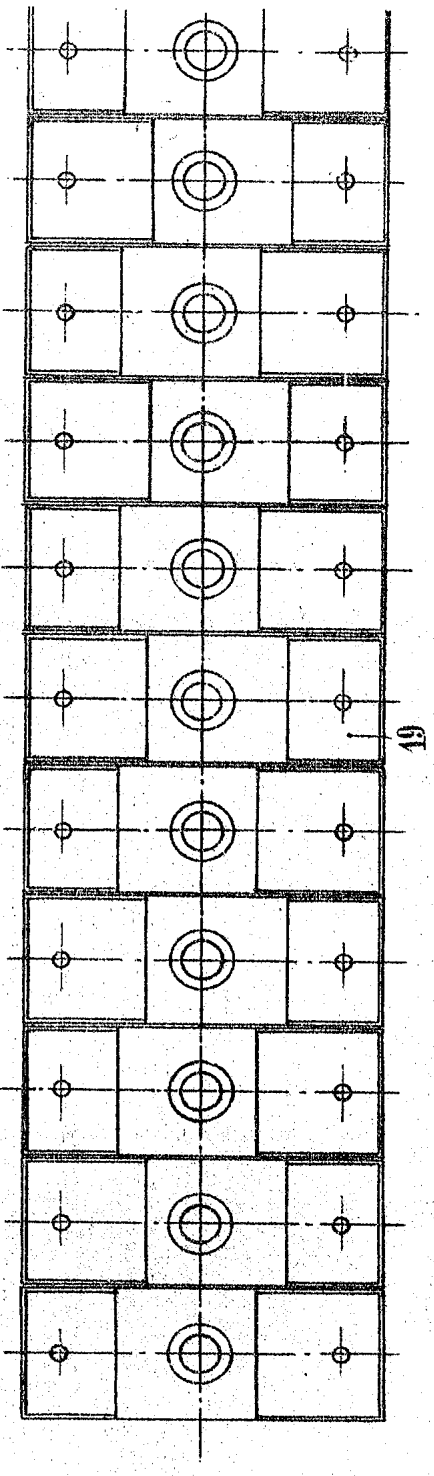

Fig.10.

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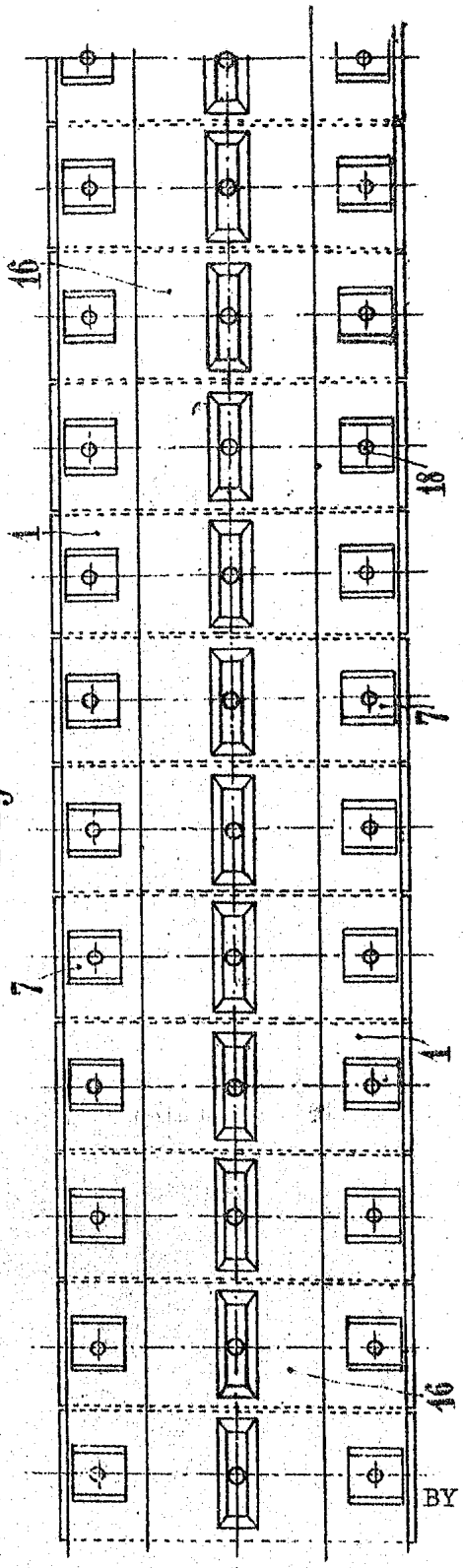

Fig.11.

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