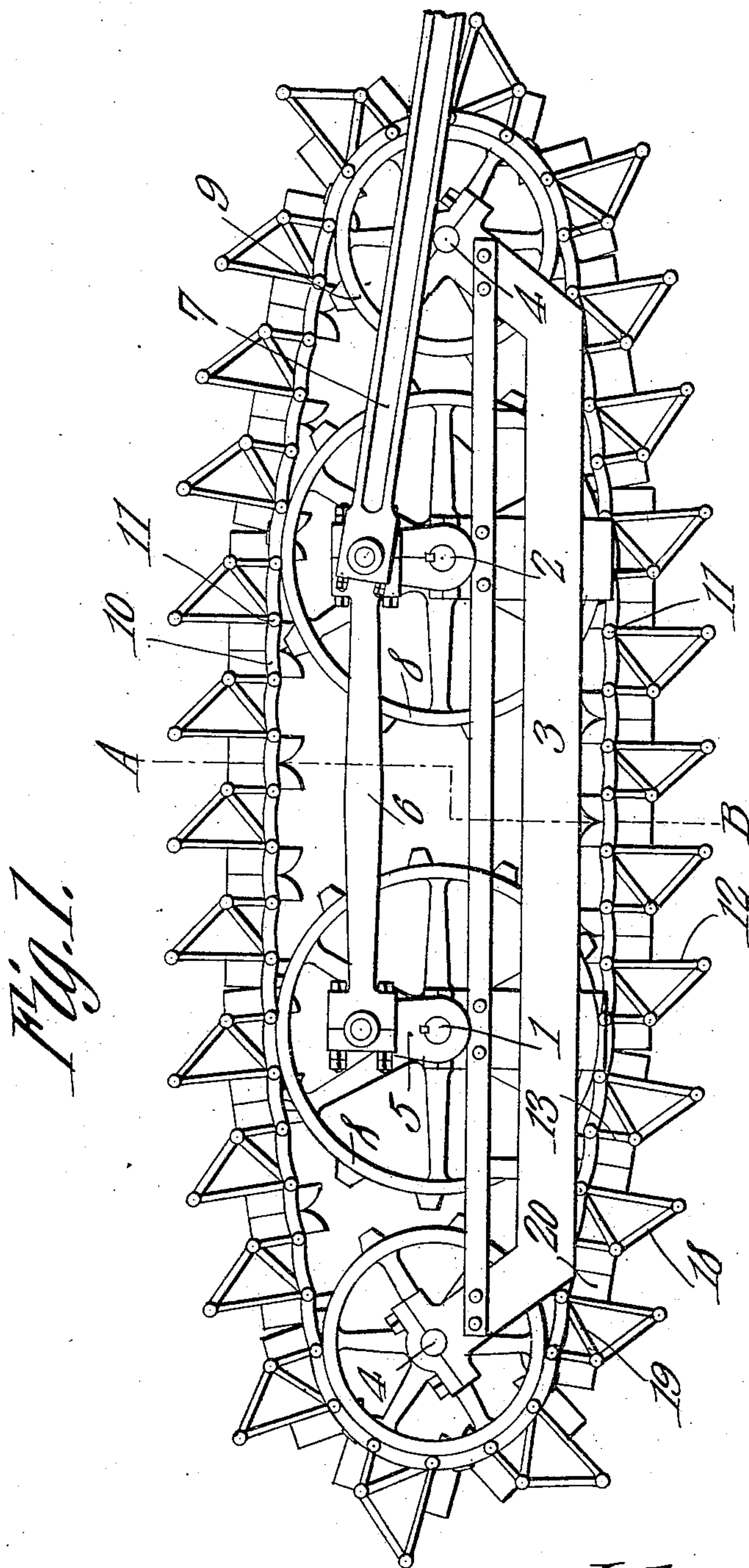


J. S. ORR.  
CHAIN PROPELLER.  
APPLICATION FILED SEPT. 14, 1908.

936,349.

Patented Oct. 12, 1909.

3 SHEETS—SHEET 1.



Witnesses  
*E. J. Bennett.*  
*F. J. Chapman*

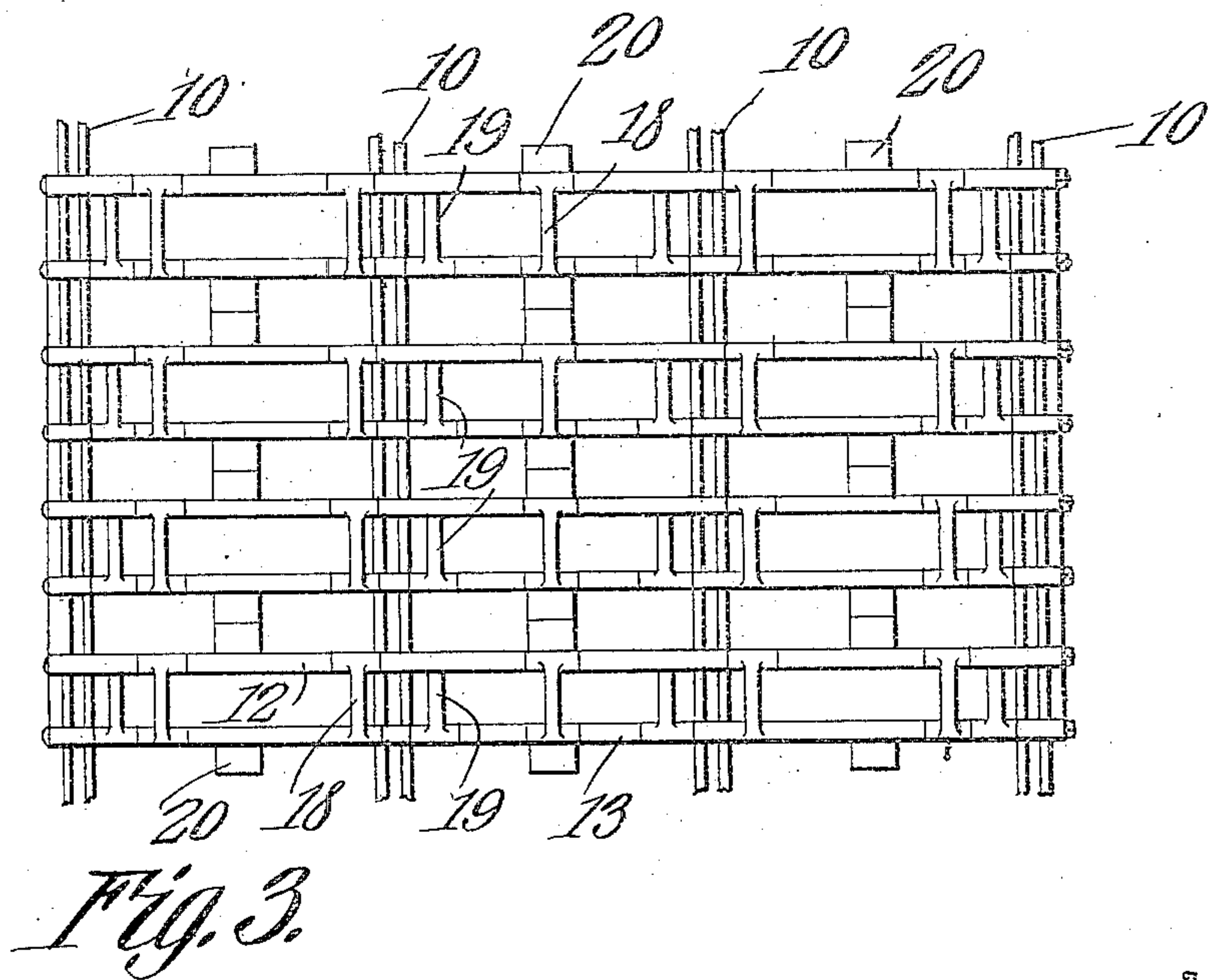
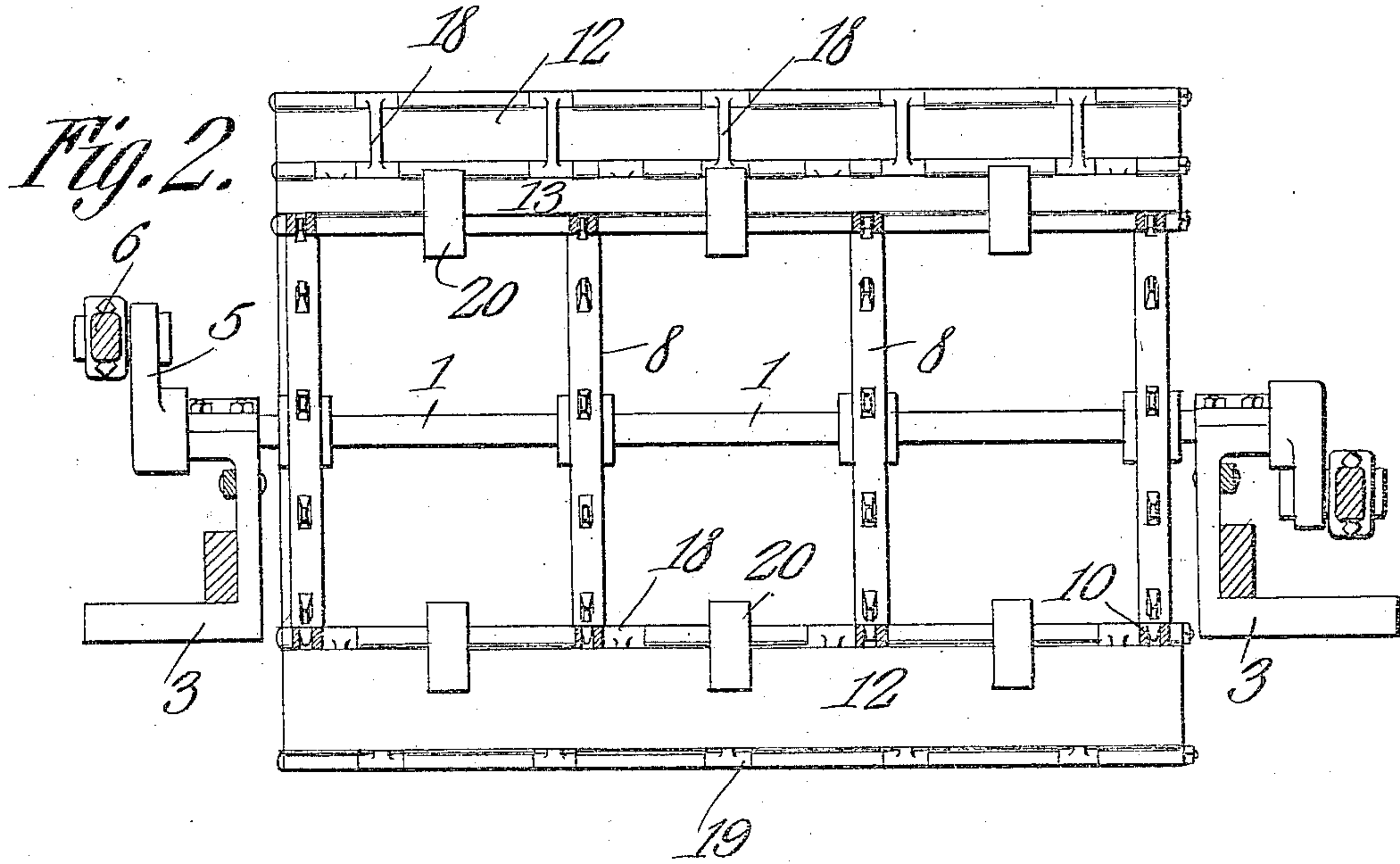
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3 SHEETS—SHEET 2.



Witnesses

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By

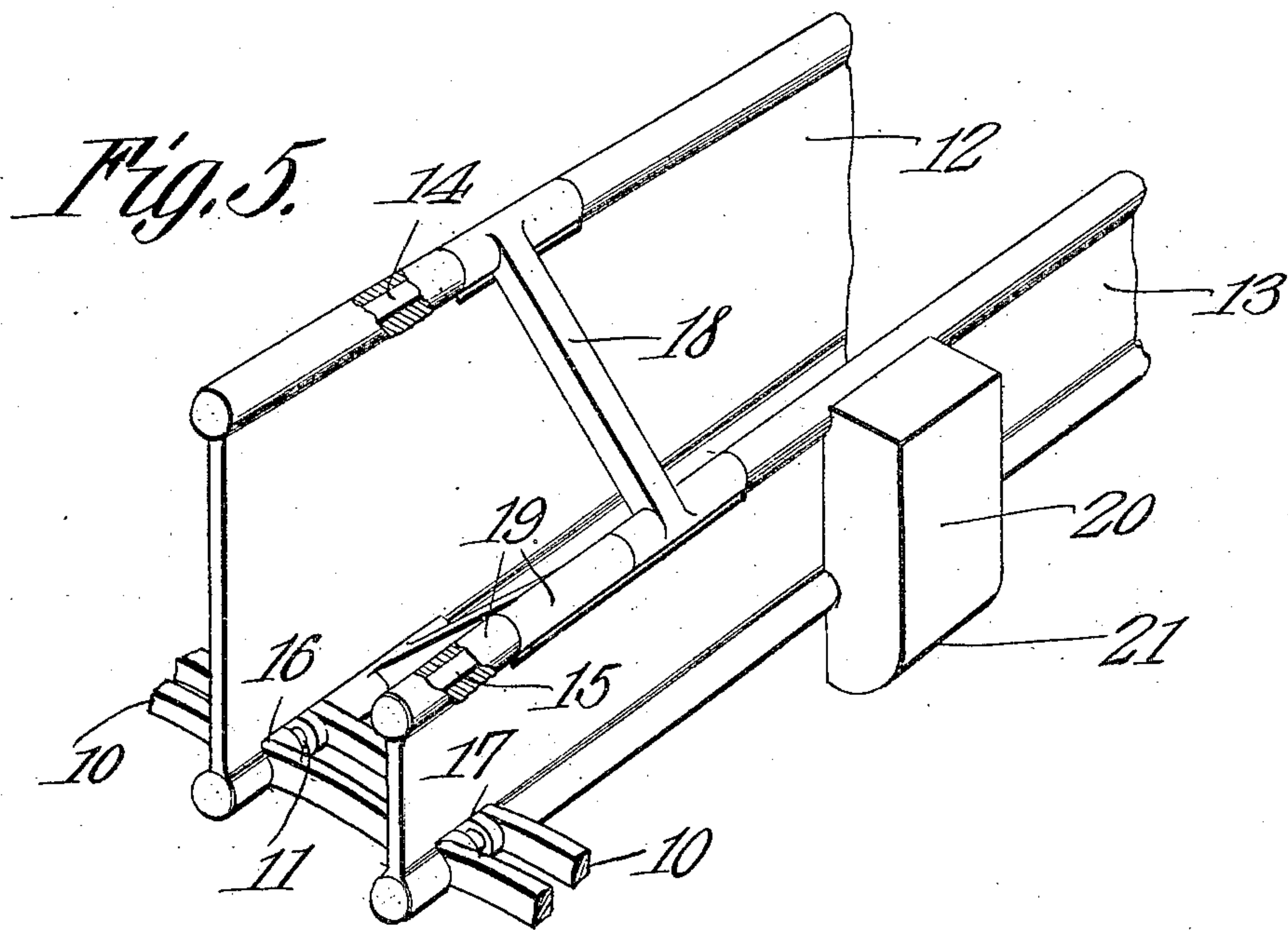
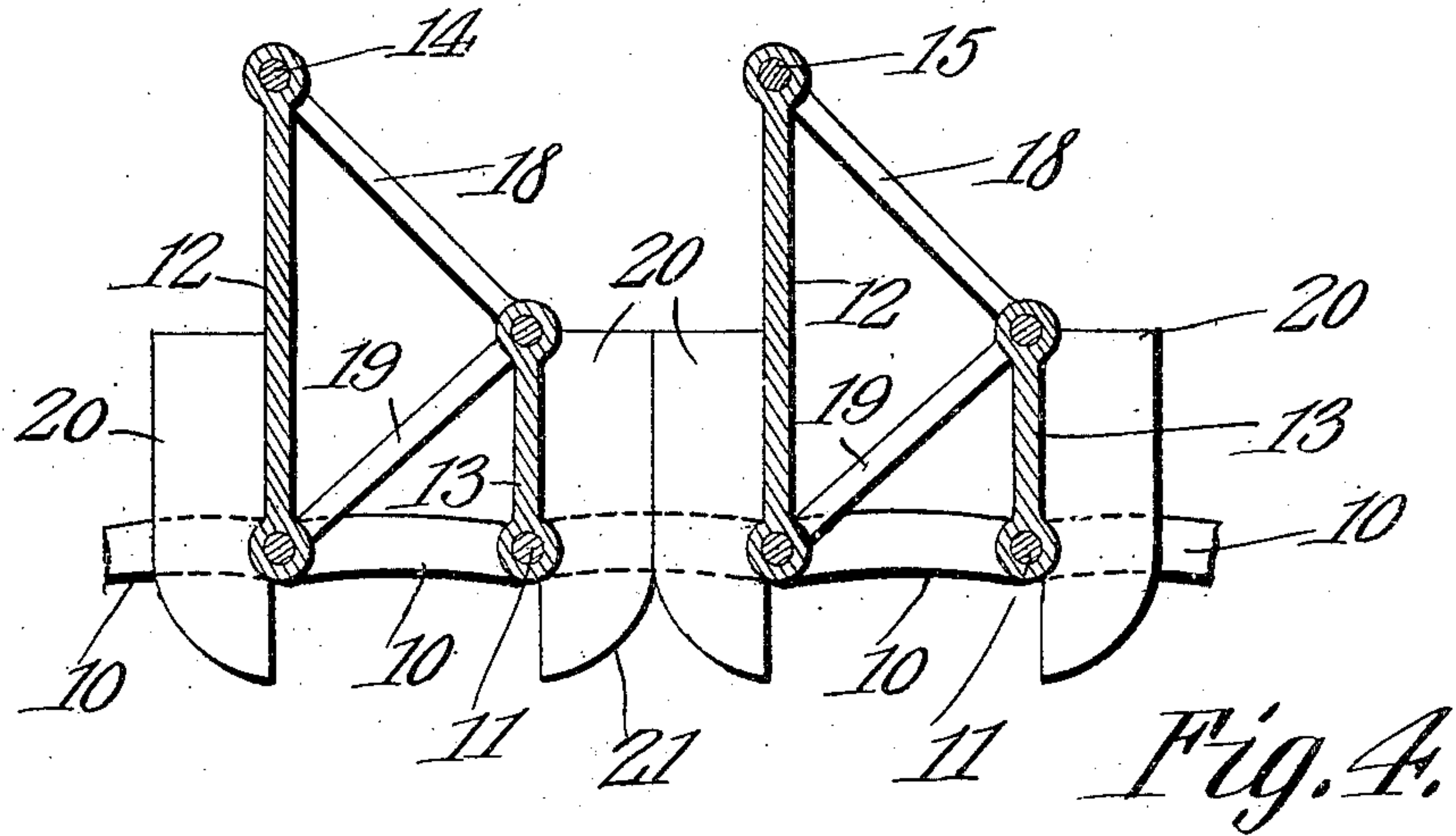
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3 SHEETS—SHEET 3.



Witnesses

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# UNITED STATES PATENT OFFICE.

JOHN S. ORR, OF AUGUSTA, KENTUCKY.

## CHAIN PROPELLER.

936,349.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed September 14, 1908. Serial No. 452,990.

*To all whom it may concern:*

Be it known that I, JOHN S. ORR, a citizen of the United States, residing at Augusta, in the county of Bracken and State of Kentucky, have invented a new and useful Chain Propeller, of which the following is a specification.

This invention has reference to improvements in propellers of the paddle wheel type and its object is to produce a paddle wheel propeller wherein the blades will remain in operative engagement with the water through a materially greater portion of their travel than is the case with ordinary paddle wheels of the circular type.

In accordance with the present invention the blades or buckets are carried upon continuous flexible members which pass around spaced carriers so that the diameter of the propeller is much greater in the direction of the length of the boat than is the height of the propeller. The blades or buckets are mounted upon a sprocket chain carrier passing around sprocket wheels mounted upon power shafts to which power is imparted directly from the piston rods of an engine by means of suitable pitmen. In order to avoid as much as possible the lifting action of the buckets at the end of the stroke as they leave the water the guiding wheels may be comparatively small or the sprocket chain may be carried over idlers beyond the driving wheels so that the power stroke of the buckets is approximately horizontal for a distance long compared to the movement of the paddles or buckets on entering or leaving the water.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a side elevation of a propeller or paddle wheel constructed in accordance with the present invention. Fig. 2 is a cross section on the line A—B of Fig. 1. Fig. 3 is a plan view of a portion of the structure shown in Fig. 1. Fig. 4 is a detail sectional view on a larger scale of a pair of adjacent buckets or paddles, and Fig. 5 is a perspective view of a portion of a bucket or paddle.

Referring to the drawings, there are shown two power shafts 1 and 2 spaced apart for a desired distance and mounted upon suitable bearings in a frame 3 which in turn is

mounted on or formed part of the frame of a suitable vessel, the latter however not being shown in the drawings. The frame 3 extends beyond each of the shafts 1 and 2 and there carries other shafts 4 mounted in suitable journal bearings on the frame 3.

At one or both ends of the power shafts 1 and 2 are cranks 5 and the cranks at the like ends of the shafts 1 and 2 are joined by a connecting rod 6, and power is transmitted to the cranks by means of a pitman 7 which may come directly from the piston rod of the engine. When the pitmen are connected to both ends of the shafts 1 and 2 then the cranks are suitably displaced to prevent dead centers.

Each shaft 1 and 2 carries a number of sprocket wheels 8, four being shown in Fig. 2, but it will be understood that a greater or less number may be employed as may be found desirable. A like number of sprocket wheels 9 are carried by the end shafts 4, but it will be understood that these end shafts and sprocket wheels may be omitted if desired, although as will presently appear, these end sprocket wheels and shafts, which are not power shafts and wheels but idler wheels are under some circumstances advantageous.

Each line of sprocket wheels carries an endless sprocket chain 10 and the links of these chains are joined together by common pivot bolts 11, that is each pivot bolt extends entirely across the series of four or more or less chains so that the said chains become practically one chain with the links spaced apart laterally.

The chains 10 carry the buckets or paddles, the structure of which is best shown in Figs. 4 and 5. Each paddle or bucket consists of a wide blade 12 and a narrow blade 13 extending entirely across the series of chains 10 and parallel one to the other. The blade 12 is made of sufficient thickness for the purposes of the invention and along its edges are formed eyes, the eyes along one edge receiving the bolts 11 and along the other edge receiving other bolts or rods 14. The narrow blade 13 is formed like the blade 12, with one edge receiving a rod or bolt 11 and the other edge receiving a rod 15. The inner edge of the blade 12, that is the edge connected directly to the chain 10 is recessed as shown at 16 for the links of the chain to be engaged by the bolts or rods



11 and the like edge of each narrow blade 13 is recessed as shown at 17 for the same purpose.

The outer edge of the blade 12 is recessed at intervals for the reception of the corresponding eye end of a bar 18, the other end of which is also formed into an eye to seat in a like recess in the outer edge of the blade 13. The eyes of the bars 18 are traversed by the rods 14 and 15 respectively. The inner edge of the blade 12 is recessed to receive the eye end of another bar 19 and the other end of this bar is formed with an eye seated in a suitable recess in the outer edge of the blade 13 where it is traversed by the rod 15.

The two blades 12 and 13 are thus held in parallelism by a truss structure made up of the bars 18 and 19 and the links of the chains 10, there being a suitable number of bars 18 and 19 provided along the length of the blades to make them duly strong.

The blades 12 are carried by the like ends of alternate links and the blades 13 are carried by the like ends of other alternate links so that each paddle or bucket is separated by the length of a link and in order to stiffen these structures against movement away from their perpendicular relation to the chain support when traveling against the resistance of the water, there are introduced between the front faces of each blade 12 and the adjacent rear face of each blade 13 pairs of coacting blocks 20, the inner ends of which are curved as indicated at 21 so that these portions of the blocks may have a rolling movement one on the other.

If a structure such as shown in Fig. 1 be applied to a vessel and the shafts 1 and 2 as viewed in Fig. 1 be caused to rotate counter-clockwise then the upper run of the blades or paddles will move toward the left and the lower run will move toward the right as viewed in Fig. 1. Considering the structure as partially immersed in water so that the lower run of paddles is acting on the water then the vessel will move toward the left as viewed in Fig. 1 due to the reaction of the paddles upon the water.

The active run of the paddles or buckets will be determined by the distance between the shafts 1 and 2 if no idlers 9 be used, but if the idler sprockets 9 be employed then the active run of the buckets is correspondingly increased and the comparatively inefficient buckets which are entering or leaving the water represent but a very small portion of the efficient run of the buckets. But a small portion of the movement of the buckets within the water is lost on entering and leaving the water and consequently nearly all the active movement of the buckets is utilized. For this reason the efficiency of the structure is high as compared with the ordinary rotary paddle wheels. As the buckets pass around the sprocket wheels

their outer ends are separated but the inner ends maintain their proper relation because of the rolling action of the blocks 20 one upon another at the curved sections 21.

It will, of course, be understood that the invention is not confined to the exact structure shown and described, and minor changes in the form, proportion and arrangement of the parts may be made, so long as the salient features of the invention are retained.

What is claimed is:—

1. In a propeller or paddle wheel structure, power shafts spaced apart, sprocket wheels mounted thereon in spaced relation, sprocket chains one for each longitudinal series of sprocket wheels, pivot rods or bolts for the links of the sprocket chains, each rod or bolt being common to all the chains, and buckets or paddle blades mounted on the common pivot rods or bolts.

2. In a propeller or paddle wheel structure, power shafts spaced apart, sprocket wheels mounted thereon in spaced relation, sprocket chains, one for each longitudinal series of sprocket wheels, pivot rods or bolts for the links of the sprocket chains common to all the chains, buckets or paddles carried by the common pivot rods or bolts, said paddles each being composed of a blade transverse to the line of travel, another blade also transverse to the line of travel and spaced from the first blade, and bracing connections between the blades.

3. In a propeller or paddle wheel structure, power shafts spaced apart, sprocket wheels mounted thereon, in spaced relation, sprocket chains, one for each longitudinal series of sprocket wheels, pivot rods or bolts for the links of the sprocket chains common to all the chains, and buckets or paddles carried by the common pivot rods or bolts, said paddles each being composed of a blade transverse to the line of travel, another blade also transverse to the line of travel and spaced from the first blade, and bracing connections between the blades consisting of bars connecting the outer edges of the blades and other bars connecting the inner edge of the first named blade with the outer edge of the second named blade.

4. In a propeller or paddle wheel structure, buckets or paddles each composed of a blade transverse to the line of travel, another blade also transverse to the line of travel and spaced from the first named blade, and bracing links connected at the ends to respective blades and holding the two blades of each paddle or bucket in fixed relation one to the other at all times.

5. In a propeller or paddle wheel structure, buckets or paddles each composed of a wide blade transverse to the line of travel, another narrower blade of the same length as the wide blade and also transverse to the



line of travel, said narrow blade being spaced from the wide blade, and bracing connections between the blades.

5 6. In a propeller or paddle wheel structure, buckets or paddles each composed of a wide blade transverse to the line of travel, another narrower blade also transverse to the line of travel and equal in length to the wide blade and spaced therefrom, and bracing connections between the blades consisting of bars connecting the outer edge of the wide blade to the outer edge of the narrow blade and other bars connecting the inner edge of the wide blade to the outer edge of the narrow blade.

15 7. In a propeller or paddle wheel structure, buckets or paddles each composed of wide blades and narrow blades spaced apart and braced together and spacing blocks between the wide blade of one paddle and the narrow blade of the next adjacent paddle.

20 8. In a propeller or paddle wheel structure,

buckets or paddles each composed of wide and narrow blades spaced apart and braced together and spacing blocks between the buckets or paddles, said blocks having the end remote from the active ends of the blades curved apart. 25

9. In a propeller or paddle wheel structure, paddles or buckets each composed of wide and narrow blades spaced apart and connected together by braces, spacing blocks between the respective paddles or blades, and sprocket chains carrying the buckets or paddles and having pivot rods or bolts also carrying the wide and narrow blades of the buckets or paddles. 30 35

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOHN S. ORR.

Witnesses:

LEO G. O'NEILL,  
W. C. SADLER.