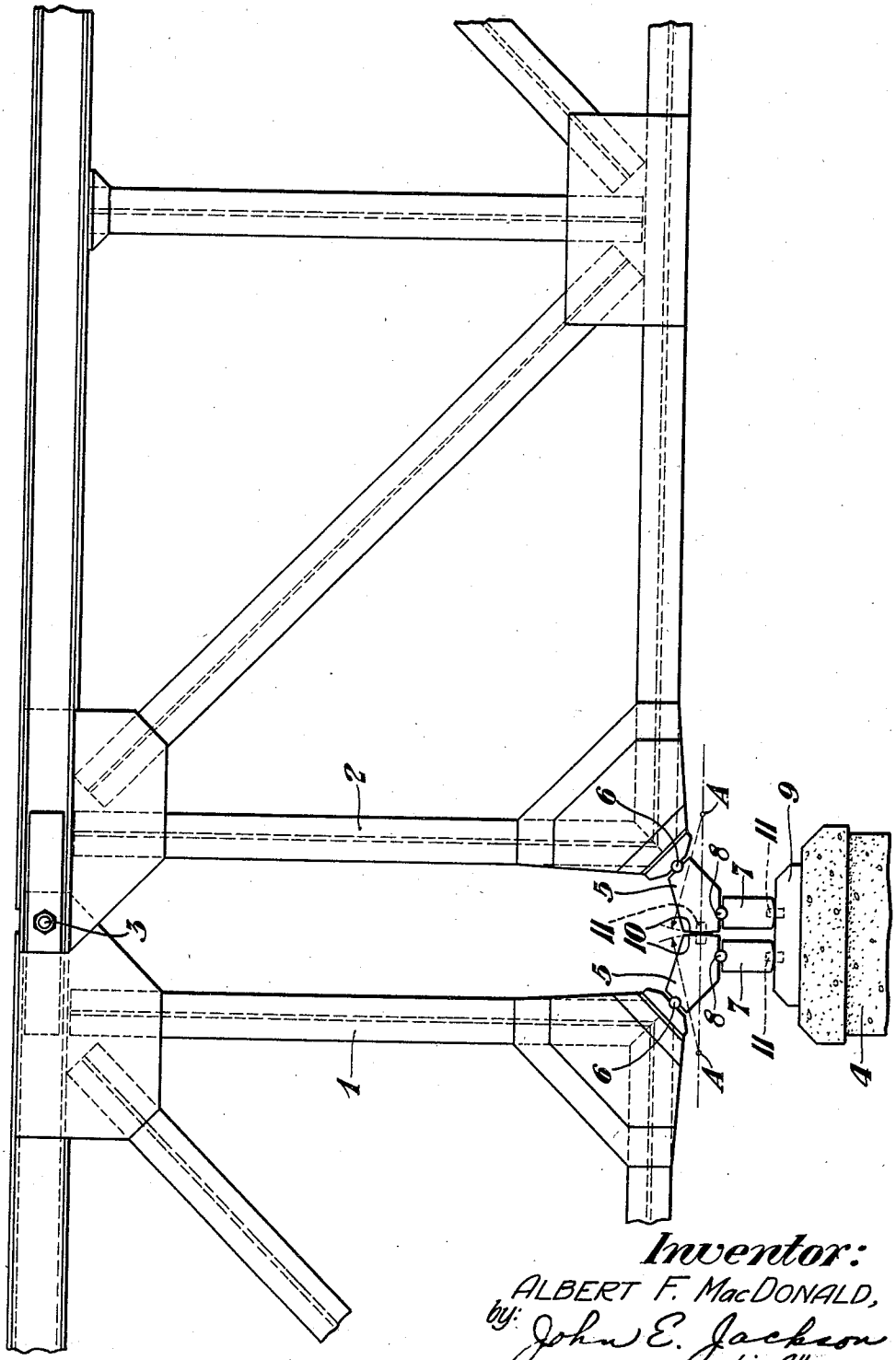
April 28, 1942. A. F. MacDONALD 2,281,364

MOMENT DISTRIBUTING BEARING

Filed July 16, 1940



Inventor:
ALBERT F. MacDONALD,
by: John E. Jackson
his Attorney.

Patented Apr. 28, 1942 2,281,364

UNITED STATES PATENT OFFICE

2,281,364

MOMENT DISTRIBUTING BEARING

Albert F. MacDonald, Leetsdale, Pa.

Application July 16, 1940, Serial No. 345,802

1 Claim. (Cl. 14—16)

This invention is a moment distributing bearing for a continuous structure having at least two spans with adjacent ends pivoted together adjacent their tops over a support adjacent their bottoms. An example of such a structure is a continuous bridge having at least two spans pivoted together near their tops and with their lower portions resting on the moment distributing bearing supported by an intermediate pier.

A specific example of the invention is illustrated by the accompanying drawing showing in elevation adjacent bridge span ends using a moment distributing bearing as described and which embodies the principles of the present invention.

More specifically, this drawing shows bridge span ends 1 and 2 having their tops pivoted together at 3 above a pier 4 beneath their bottom ends. The bearing comprises lever members 5 oppositely declining from the span ends with the upper ends of these levers pivoted to these ends at their lowermost corners as at 6. Wheel members 7 are journaled at the lower ends of the lever members 5 as at 8, and the pier 4 carries a horizontal plate 9 on which these wheel members 7 ride.

The lever members 5 have parts integral therewith providing curved surfaces 10 which cooperate to carry the horizontal component of the pier reaction transmitted from the pier to the bridge span ends 1 and 2 by way of the wheel members 7 and the lever members 5. These curved surfaces 10 are illustrated as cylindrical, directly interbearing and rocking on one another about the axes indicated at A, these axes being below the pivotal points of the upper ends of the lever members 5, these being the points 6, and the radii of the cylindrical surfaces 10 exceeding the distances between the pivotal points of the lever members 5, these being the points 6 and 8.

The magnitude of the moment carried at the pier 4, this being an intermediate pier, is regulated by a predetermined geometrical relation between the vertical distances from the pivotal points 6 of the levers 5 to a horizontal line drawn through the axes A of the cylindrical surfaces 10, the arrangement being such that these axes A are in horizontal alignment with the point of contact between the cylindrical surfaces 10, and the horizontal distance between the pivotal points 6 and 8 of the lever members 5.

It is apparent that the bearing may be considered as a form of toggle. Because of the curved surfaces 10, the intensity of the horizontal force is very slightly effected by deflection of the bridge spans or by unequal pier settlements since the vertical distance between the pivotal points 6 and the horizontal line through the axes A and the point where the cylindrical surfaces 10 interbear, will be very slightly affected by angular rotation of the lever members 5 about the pivotal points 6.

To avoid complications, the wheel members 7 are actually in the form of wheel segments that rock on the plate 9. The members 5 have been described as lever members but they might also be called rocker members because they rock on each other by way of their interbearing surfaces 10 while they are turning or levering about their pivotal point 6, the wheel segments 7 rocking with the lever members 5 during this action.

Transverse forces due to wind or other causes may be carried through the bearing from the bridge span ends to the pier 4 by providing the curved surfaces of the bearing with dowel pins 11 which prevent transverse shifting of these parts. Transverse shifting of the pivot pins necessarily used to effect the pivotal connections may be prevented by providing these pins with shouldered or flanged ends for carrying thrust.

I claim:

A moment distributing bearing for a continuous structure having at least two spans with the bottoms of adjacent ends of the spans positioned over a common support and the tops of the ends pivoted together, said bearing including the combination of opposite lever members, the upper end of one member being pivoted to one of the bottoms and the other member being similarly pivoted to the other of the bottoms, the members being declined towards each other and terminating in curved surfaces which rockably abut each other; wheel members rockably engaging the support; the lower end of each lever member having a pivotal connection with the upper end of one of the wheel members and being positioned between the curved surface and the upper pivot of the respective lever member; and the point of abutment between the curved surfaces being positioned between a line connecting the upper pivots and a line connecting the lower pivots of the lever members for transmitting horizontal components between the ends and the support.

ALBERT F. MACDONALD.