

(No Model.)

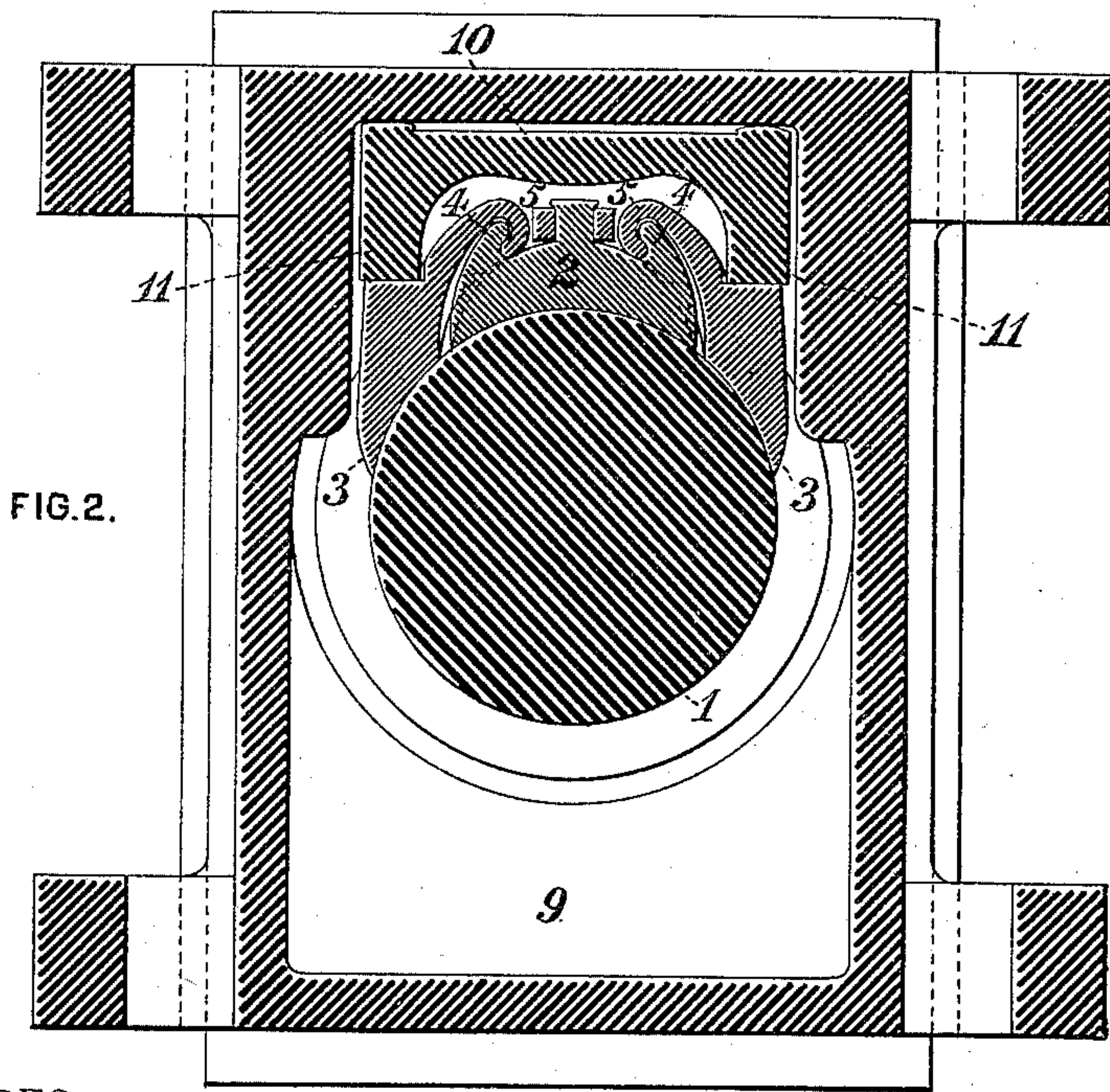
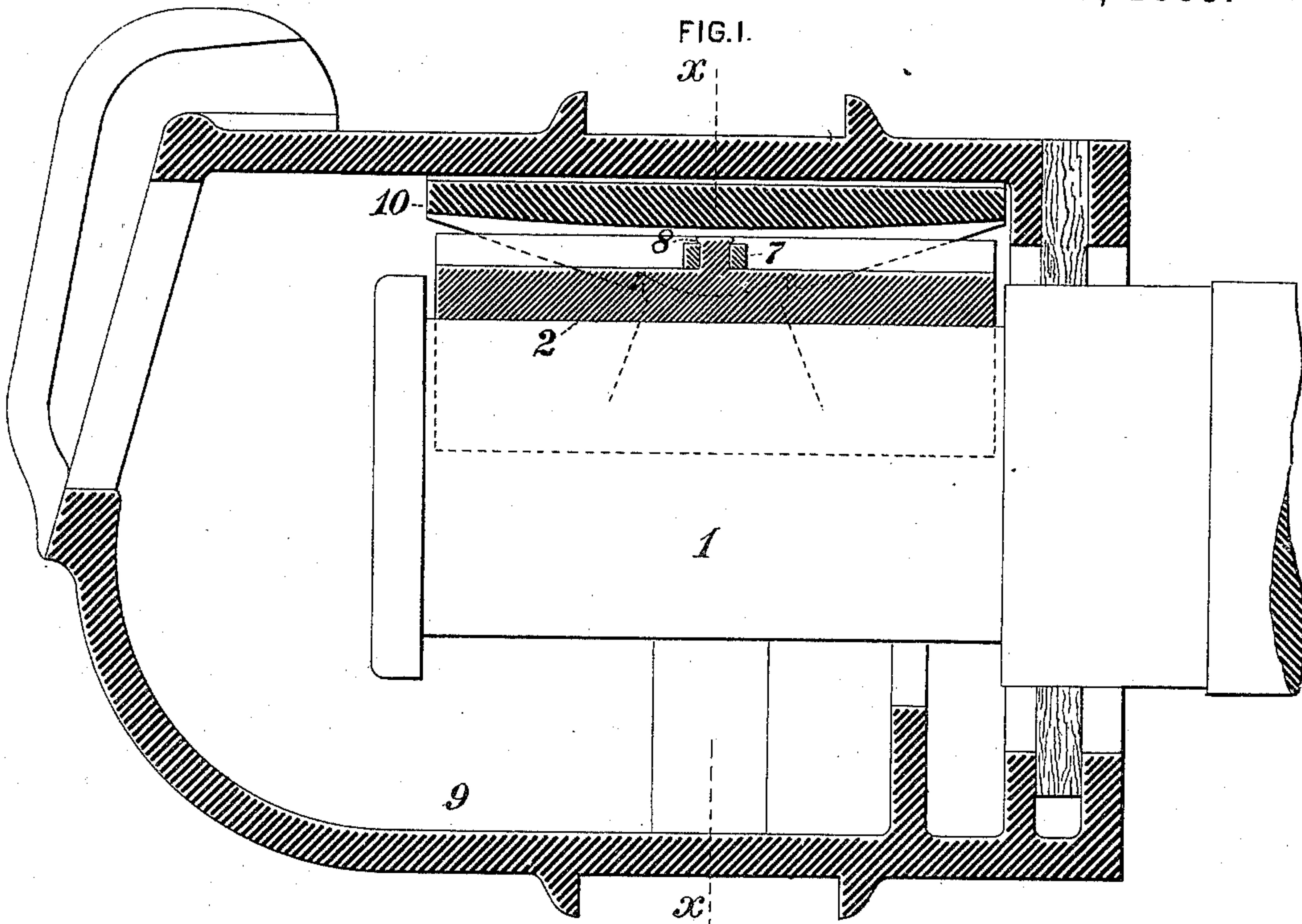
2 Sheets—Sheet 1.

F. W. JOHNSTONE.

JOURNAL BEARING.

No. 312,860.

Patented Feb. 24, 1885.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

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FIG. 3.

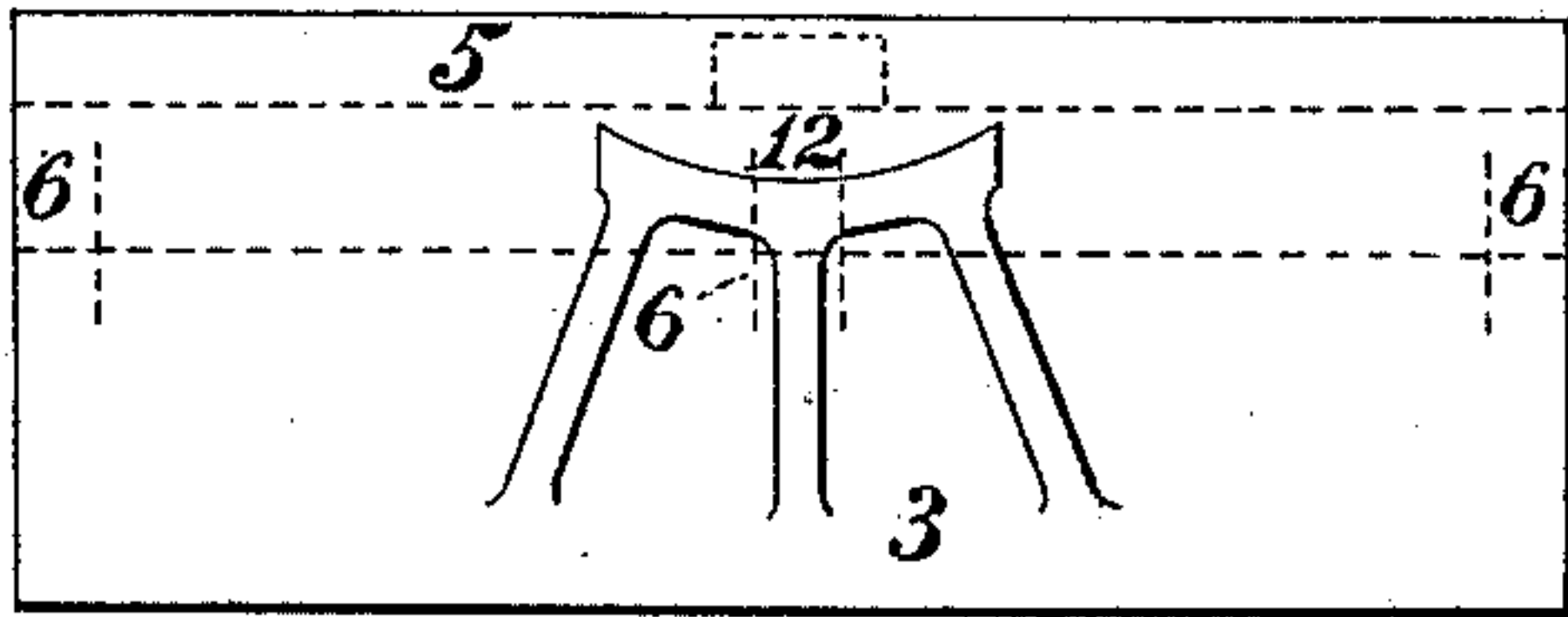


FIG. 4.

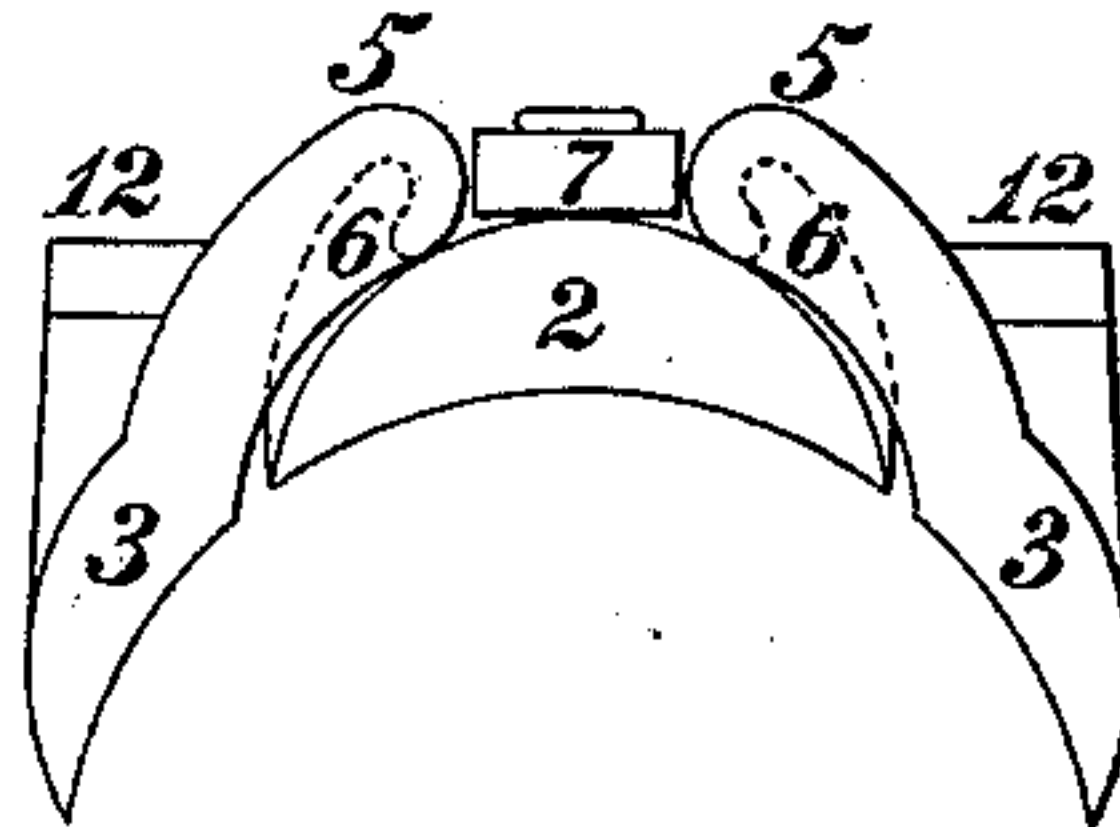


FIG. 7.

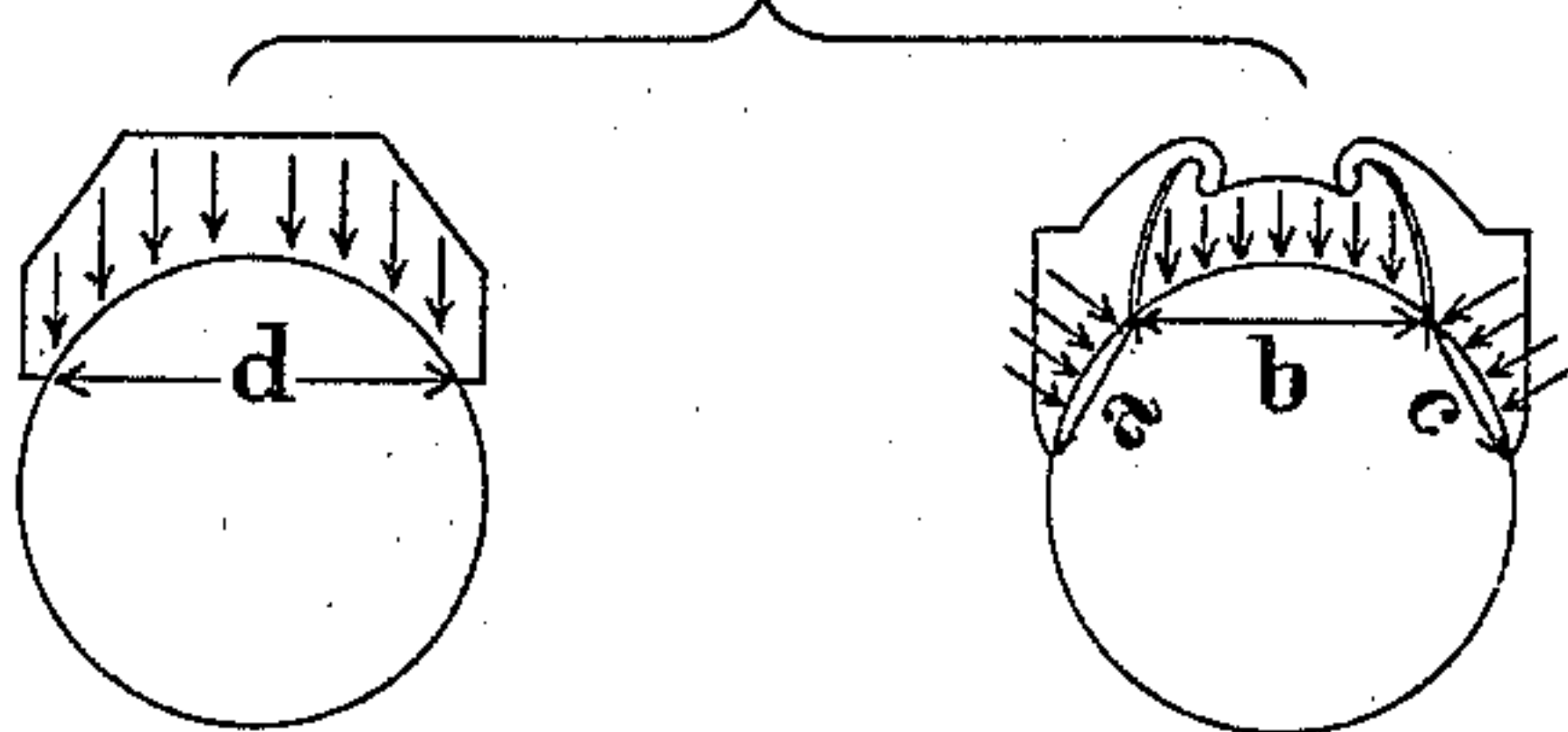


FIG. 5.

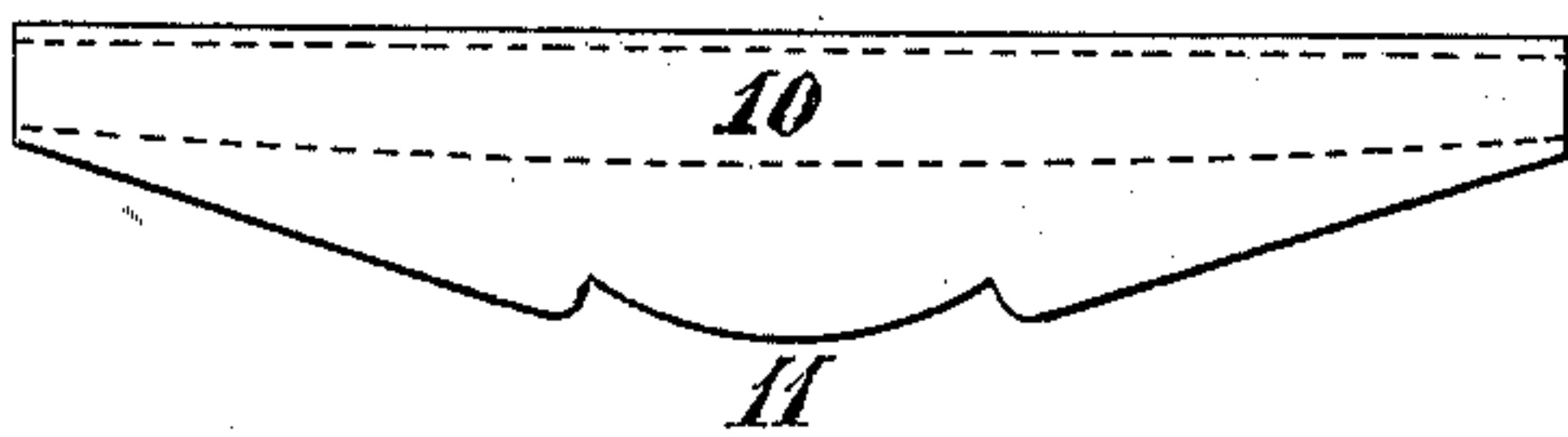
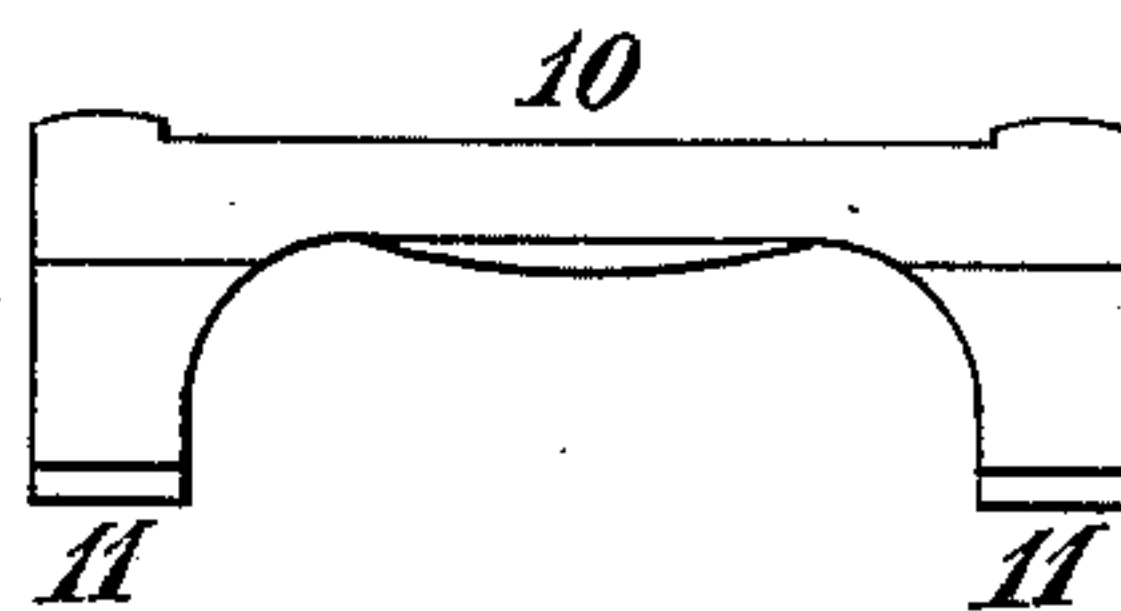


FIG. 6.



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# UNITED STATES PATENT OFFICE.

FRANCIS W. JOHNSTONE, OF MEXICO, MEXICO.

## JOURNAL-BEARING.

SPECIFICATION forming part of Letters Patent No. 312,860, dated February 24, 1885.

Application filed November 14, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, FRANCIS W. JOHNSTONE, a citizen of the United States, residing at the city of Mexico, in the State and Republic of Mexico, have invented certain new and useful Improvements in Journal-Bearings, of which improvements the following is a specification.

The object of my invention is to obviate undue friction and consequent heating and wear of the journal-bearings and journals of railroad rolling-stock by providing an increased area of effective bearing-surface relatively to that heretofore obtained with journals of determined dimensions, and to render such increase available in connection with the ordinary standard journals and journal bearings and boxes without involving the necessity of modifying in any particular the construction or dimensions thereof. To this end my invention, generally stated, consists in a journal-bearing composed of two or more separate sections hinged or pivoted together in planes parallel with the axis of the journal, so as to effect the separate distribution of the load supported upon different portions of the periphery of the journal; also, in the combination of a supporting box or pedestal and a longitudinally-articulated sectional journal-bearing fitted therein with the capacity of swiveling movement transversely to the axial or longitudinal plane of the bearing. The improvements claimed are hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a longitudinal central section through a car-axle box, illustrating the application of my invention; Fig. 2, a transverse section through the same at the line *xx* of Fig. 1; Fig. 3, a side view in elevation of the journal-bearing; Fig. 4, an end view of the same; Fig. 5, a side view in elevation of the journal-bearing key; Fig. 6, an end view of the same, and Fig. 7 a diagram illustrative of the difference in the application of pressure as between a bearing of the ordinary construction and one in accordance with my invention.

A natural result of the requirements imposed by increased tonnage on transportation upon railroads has been to institute a constantly-growing tendency to increase in weight and

capacity of the rolling-stock employed, and it is apparently well established by the practice of the trunk-lines of the United States that the economical transportation of freight is materially promoted by the use of cars of as great a carrying capacity as practicable, hauled in trains of practically as great a length as is within the limit of strength of the couplings, correspondingly-heavy engines and tenders being required and employed for the purpose. Under such circumstances, and with the existing conditions of limitation as to location and dimensions of journals and bearings, the pressure upon the former becomes so excessive that even with proper care and supervision injurious heating and wear of these parts is of frequent occurrence. Further enlargement of bearing-surfaces would not prove generally acceptable by reason of the extended use of established standards, and in the provision of improved appliances for the reduction or prevention of the objectionable results above referred to it is desirable, if not essential, to render them of general acceptability, that they should be capable of application to existing standard axles and boxes without alteration of the latter or interference with their operative relation and connection to other members of the car or engine in which they are employed. My invention, which is designed to comply with the above requirements, and has been found in practice to satisfactorily answer the demands of heavy service, is simple and economical in construction and effective and durable in its practical operation.

To carry out my invention I provide a journal-bearing, of brass or other suitable metal or composition, which is composed of a series of separate sections articulated or coupled one to the other by pivotal connections in planes parallel to the axial line of the journal 1, on which the bearing is to be fitted. In the instance shown the bearing consists of a main or center section, 2, and two lateral or wing sections, 3 3, each of said sections being faced off on its inner surface in correspondence with the curvature of the periphery of the journal 1. A longitudinal tongue or rib, 4, having a segmental or rounded outer face, is formed upon each side of the center section, 2, and



each of the tongues 4 is engaged by an upwardly-projecting lip or socket, 5, formed upon the back of one of the wing-sections 3, at the inner side thereof, said sockets being formed with longitudinal recesses corresponding with the curved outer portions of the tongues 4 of the center section. The main and wing sections are thus coupled by hinge-connections, permitting a limited degree of independent relative circumferential movement upon the journal, and the pressure of the weight carried by the bearing is independently imparted to the journal upon three separate areas of contact with the periphery thereof. As a result of such construction the application of pressure to the journal is effected in substantially perpendicular direction to the chords  $a b c$ , subtending the arcs of contact in transverse section of the sections of the bearing with the journal, as indicated by the right-hand diagram of Fig. 7, in lieu of being perpendicular to the corresponding chord,  $d$ , of the integral journal-bearing in ordinary use, as indicated by the left-hand diagram of the same figure. The effective bearing-surface will be represented in the first case by the sum of the chords  $a b c$  multiplied by the length of the bearing, and in the second by the chord  $d$  multiplied by said length. Assuming the length of the arc of contact to be the same in both cases, the sum of the cords  $a b c$  will be greater than the chord  $d$ ; but a further increase is obtainable under my construction, inasmuch as the hinged connection of the wing-sections with the center section enables the former to be effectively extended for such length around the journal as to provide a longer line of circumferential contact than would be effective if embodied in a bearing formed in a single piece. The longitudinal open spaces between the adjacent sides of the sections perform an additional useful function by acting as channels for the distribution of the supply of lubricating material to the journal, access of the same being afforded throughout the length of the journal and on opposite sides of its vertical axial plane.

It will be obvious that longitudinal hinge-bolts passing through eyes in the main and wing sections could be substituted, if desired, as an equivalent for the tongue-and-socket connection of the sections described and shown; but I deem the latter construction preferable in point of economy, strength, and durability.

Longitudinal displacement of the sections 2 3 is prevented by tenons 6, formed on the sockets 5 of the wing-sections and fitting freely in corresponding recesses or mortises in the sides of the center section, and the degree of upward movement of the side sections upon the tongues of the center section is limited so as to prevent the disengagement of the sections in service by a stop-block, 7, secured upon an upwardly-projecting stem, 8, on the back of the center section.

The journal 1 rotates in a journal-box, 9,

which, as shown, is of the ordinary construction, the bearing being adaptable to the box known as the "master car-builders' standard," or to any other of the well-known forms in common use.

To enable the proper relation of the bearing and journal to be maintained under vertical end movements of the axle, the pressure of the weight supported by the box is transmitted to the bearing through a hinged or pivotal connection transversely to the axial line of the journal, the preferred form of the same, as herein illustrated, being as follows: A journal-bearing key, 10, is, as in the usual constructions, interposed between the bearing and the top of the box; but in lieu of abutting against the bearing by a plane surface or surfaces, as heretofore, the key 10 is provided with a pair of downwardly-projecting segmental-faced rockers, 11, located at the center of its sides, said rockers fitting in correspondingly-curved rocker-bearings 12 formed on the wing-sections 3 exterior to their sockets 5, the body of the key extending above and entirely clear of the remaining portions of the bearing. It will be seen that by this construction a swiveling movement of the journal and bearing is permitted relatively to the box, and vertical movements of the journal are thereby caused to induce coincident movements of the bearing without affecting the normal relation of the bearing and journal or preventing the proper application thereto of the weight carried by the box.

While I have found the rocker construction above described to be a convenient and desirable one, I do not limit myself thereto, as any suitable hinge or pivot connection between the bearing and its box or pedestal adapted to admit movement of the former about a line transverse to the axis of the journal would be the mechanical equivalent of said rockers and bearing, and may be substituted therefor without departing from the spirit of my invention.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, in a journal-bearing, of two or more separate and independent sections, and hinge-connections by which said sections are coupled one to another in planes longitudinal to the bearing, substantially as set forth.

2. The combination of a supporting-box or pedestal, a longitudinally-articulated sectional journal-bearing, and a hinged or pivotal connection through which the pressure of the weight sustained by the box or pedestal is transmitted to the journal-bearing in a plane transverse thereto, substantially as set forth.

3. The combination, in a journal-bearing, of a center section having a tongue or rib on each of its sides, which is rounded or segmental on its outer face, and two lateral or wing sections each having a lip or socket engaging one of the tongues of the center section, substantially as set forth.



4. The combination, in a journal-bearing, of  
a center section having a segmental-faced  
tongue or rib on each of its sides, said tongues  
being transversely recessed or mortised, a pair  
5 of lateral or wing sections having lips or sock-  
ets engaging the tongues of the center section,  
and tenons fitting the recesses thereof, and a  
stop fixed to the center section and adapted  
to limit the degree of movement of the sockets  
10 upon the tongues, substantially as set forth.

5. The combination of a longitudinally-ar-  
ticulated sectional journal-bearing having a  
segmental rocker bearing on each of its outer  
sections, and a journal-bearing key having  
15 upon each of its sides a downwardly-project-

ing segmental-faced rocker fitting one of the  
bearings of the journal-sections, substantially  
as set forth.

6. The combination of a journal, a longitudi-  
nally-articulated sectional journal-bearing fit- 20  
ting thereon, a journal-bearing key supported  
by lateral rockers bearing on sockets in the  
outer sections of the journal-bearing, and a  
journal-box supported on the upper face of the  
journal-bearing key, substantially as set forth.

FRANCIS W. JOHNSTONE.

Witnesses:

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JOHN STROTHER.