A. & H. F. SNYDER.

Turn-Tables.

No. 133,388. Patented Nov. 26, 1872.

Fig: 1,

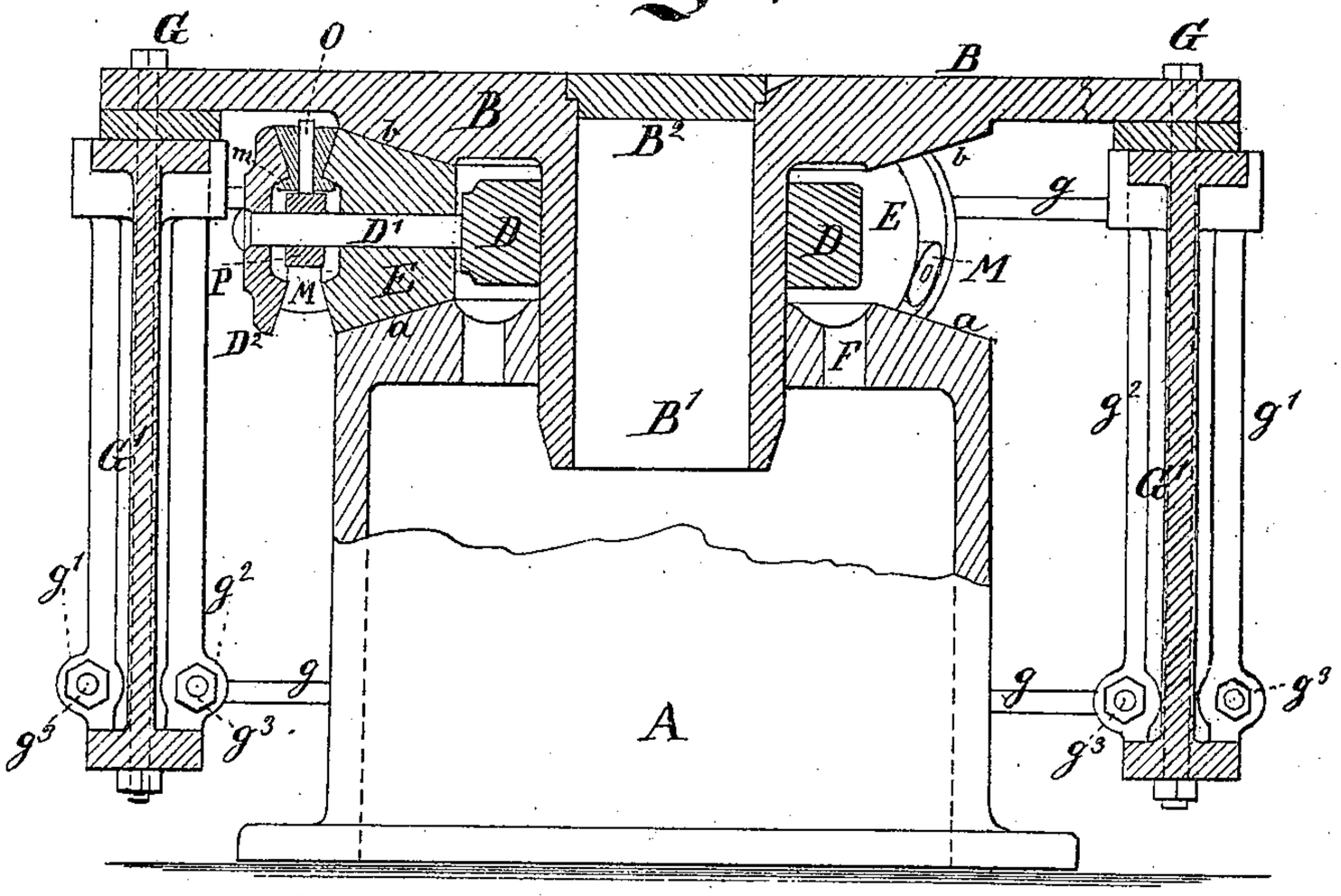


Fig: 2,

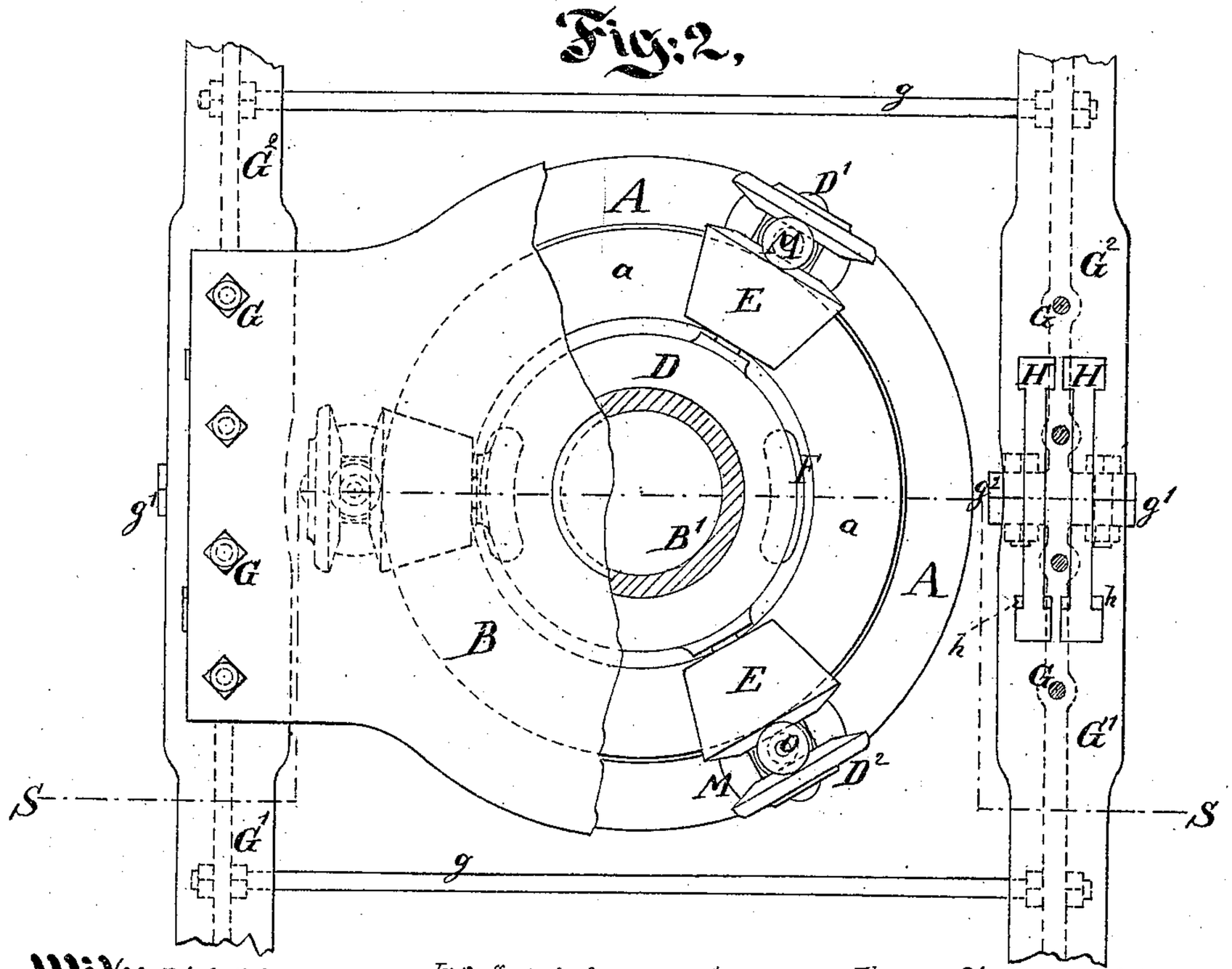
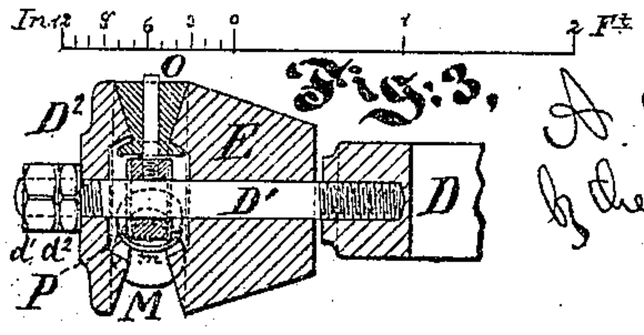


Fig: 3,



Witnesses:

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UNITED STATES PATENT OFFICE.

ANTES SNYDER, OF FREEPORT, AND HENRY F. SNYDER, OF WILLIAMSPORT, PENNSYLVANIA.

IMPROVEMENT IN TURN-TABLES.

Specification forming part of Letters Patent No. **133,388**, dated November 26, 1872.

To all whom it may concern:

Be it known that we, ANTES SNYDER, of Freeport, Armstrong county, State of Pennsylvania, and HENRY F. SNYDER, of Williamsport, Lycoming county, same State, have invented a certain Improvement in Turn-Tables, applicable also to turn-bridges, of which the following is a specification:

The invention relates to improved means for reducing the friction and wear; an improved construction whereby access is easily obtained through the center to examine, lubricate, and adjust or repair the work; an improved construction and arrangement of the parts through which the load is transmitted to the center and bearing portion; and means for equalizing the load on rolls of somewhat different sizes.

The following is a description of what we consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a cross-section through the center of the structure. On the left side the plane of section passes centrally through one of the main bearing-rolls and also through one of the subsidiary or secondary rolls, which form an important feature of our invention. Fig. 2 is a plan view, representing the same parts. The upper portion is represented as broken away on the right-hand side to better show the construction below. The figures represent the novel parts. The cross-ties and rails may be mounted thereon at any desired elevation above the upper surface. Fig. 3 is a cross-section corresponding to a portion of Fig. 1, but with some modifications of detail, which form an important part of our invention. The end of the arm or axis on which the main roll turns is provided with a nut and jam-nut instead of being simply headed, as in Figs. 1 and 2. These nuts allow us to set the rolls out and in a little; and the parts are so proportioned that the flange on the small end of each of the secondary rolls bears against the main roll, but does not bear against the fixed piece exterior thereto.

Similar letters of reference indicate corresponding parts in all the figures.

A is a fixed central casting mounted on a firm foundation of masonry. B^1 is a hollow central pivot turning loosely within a corresponding hole in the center of A. Its upper portion is extended horizontally, as indicated by B, and forms the main turning central portion of the turn-table. The stout longitudinal beams which form the main body are attached as will be explained further on. The upper surface of the fixed casting A is conical near its periphery, as indicated by *a*. The corresponding under surface of the revolving part B is correspondingly conical, as indicated by *b*. These surfaces *a* and *b* are smoothly finished, and form bearings for corresponding conical rolls, which receive the weight of the load and traverse around as the turn-table is changed in position. These rolls are marked E, and are referred to above as the main bearing-rolls or main rolls. We have represented only three. There may be any greater number desired; an increase of the number up to any point less than absolute contact of the rolls with each other will increase the efficiency of the rolls and tend to prevent accidents by dividing the strain. The rolls E are mounted on cylindrical radial arms D^1, extending out from a freely revolving ring, D, which is centered by and turns freely around on the massive hollow pivot B^1. As the turn-table B is turned, and the rollers E traverse in one direction or the other, the ring D with its arms D^1 revolve, and serve to keep the rollers E exactly in the right positions. Under heavy strains the rolls E E tend to work outward, or away from the axis of motion in the center of the pivot B^1. It may not be necessary to dissect the causes which induce this tendency, but its existence has long been known. It is customary to guard against it by mounting a stout flange on the inner end of each roll E and allowing it to grind against the inner edge of the bearings *a b*. Such a construction and mode of working induces great friction, which our invention obviates. We allow each of the arms D^1 to extend out a considerable distance beyond the outer end of the corresponding roll E, and mount thereon a fixed piece, D^2, as shown. Near the periphery the inner face of each of these pieces D^2 is turned conical, and the corresponding outer face or end of each roll E is made correspondingly conical. The tendency of each roll E to move outward in

traversing around is resisted by a secondary series of conical rolls, marked M, mounted severally on arms O fixed in a freely-revolving secondary ring, P. These secondary rolls V revolve around in one direction or the other, according as the main rolls E are turned, and receive the outward strain in such a manner as to reduce the friction almost to nothing. There is a tendency of these secondary rolls M to move outward or away from the centers of the arms D^1. This force might be resisted by a corresponding third set of rolls, and so on indefinitely, but we do not consider it necessary to refine thus far in practice. We provide the inner ends of each of the secondary rolls M with broad flanges *m*, and correspondingly recess the ends of the rolls E and the inner faces of the pieces D^2 to allow these flanges to traverse around. There is a grinding friction between the flanges *m* and the conical bearings on which the rollers M traverse, but it is insignificant compared with the great friction due to these parts when such are relied on to resist directly the strain due to the outward tendency of the main rolls E. The interior of the hollow pivot B^1 is covered by a removable cap, B^2. On removing this a man can readily descend through the pivot B^1 into the hollow interior of the casting A. In the upper surface of this casting there are considerable holes, as indicated by F F, through which the man can work to examine and lubricate the working surfaces. The secondary rolls and their bearings are obviously accessible with great facility from the exterior.

Although the drawing shows but three rolls, E, with their connections, it is common in this class of work to employ a much larger number. A turn-table is hardly adequate to support the heavy strains to which it is subjected without at least six, which, it will be understood, are mounted on a correspondingly-increased number of arms, D^1.

Our invention provides for adjusting these rolls outward and inward, at pleasure, by means of the nut and jam-nut d^1 d^2, as shown in Fig. 3. It is evident that, by reason of the conical form of the roll E, and the resulting tendency of the roll to slip outward on the inclined rails, any end play which is provided will be all taken up on the outer side, and, in short, that the head D^2 will always press tightly against these nuts, and that the intermediate rollers M will press tightly against the head D^2, and the conical rollers E will press tightly against the rollers M. When, in setting up the turn-table or bridge, as the case may be, it is found by any suitable test that one roller bears more or less than its share of the load, the nuts d^1 d^2 are set up or relaxed so as to hold the conical roller E nearer to or further from the center of the whole structure. The effect of turning up the nuts d^1 d^2 and driving the conical rollers E inward is to take a larger share of the load, and a reverse effect follows the slackening or moving outward of the nuts. The two nuts d^1 d^2 allow of extremely delicate adjustment, and, on being set against each other with great force will retain their places firmly for an indefinite period. The ordinary arrangements for mounting conical rolls, allowing no such adjustments, are liable to throw too great a share of the load upon one or two of the rolls, the evils of which, in unequal wear and even crushing of the metal so as to flatten the heaviest loaded roll or indent the rails above or below in any soft places, are liable to be serious. It is impossible by any ordinary means to cast large conical rolls of a uniform size and of perfectly conical form.

It is practically very difficult with ordinary tools, or by any means known to us, to turn or grind the surfaces of a series of conical rolls so as to make a considerable number exactly alike in size and form. Our provision for setting the rolls E outward and inward a little on the arms D^1 avoids the necessity for uniformity of size, and requires no exact uniformity in the taper or degree of coning. We devote much attention to getting an exactly uniform taper on our rolls E.

The evil referred to, resulting from a want of exact uniformity of size of the roll, is not felt to any serious extent when only three rolls are employed in a series, because the work may then tilt a little to adapt itself to the conditions. This is the case with our secondary rolls M. There being but three, the broad conical disk on the head D^2 may tilt a little to adapt itself to any want of uniformity, and the action will be approximately perfect even when the sizes are quite different.

Turning now to the mode of transmitting the load to the casting B, it will be observed the left side of Fig. 2 shows the casting B extended outward and provided with a series of stout vertical bolts, G. These bolts support the weight, and the bolts are so constructed and arranged that they descend through deep holes cored all the way down through the longitudinal castings or beams G^1 G^2. These latter may extend out as far as desired, and they correspond in form and function to the ordinary longitudinal beams of turn-tables and analogous structures, being braced across at intervals by transverse braces *g*. The construction at and near the center only is peculiar. The inner abutting ends are provided with flanges or lugs both on their outer and inner faces, as shown by g^1 g^2. Through these are inserted fastening-bolts g^3, which serve to keep the parts G^1 G^2 in the right position relatively to each other. It will be obvious that the strain on these abutting edges is, like the transverse strain on any part of a beam, compressive at one edge and tensile at the other. The lower edges of the beams G^1 G^2 are pressed together. To resist this force it is simply necessary that the castings shall be of sufficient thickness, and sound, and be afforded a firm bearing one against the other. The strain at the upper edges is tensile. To resist this we provide peculiar ties and keys. The castings

G^1 G^2 are widened to allow room for the ties. They are cast with longitudinal recesses extending across the joint into each casting, and the end is T-shaped to allow the letting in of stout bolts H with T-shaped heads. There may be two of these tie-bolts in the upper edge of each, or one alone, or three, or a greater number. We believe two will be usually the preferable number. The bearing for the under face of the head of each should be made very square and perfect. To provide for taking up the slack, and to allow the bolts to be put in and taken out with facility, we provide key-seats under the heads at one end and drive down keys of a rectangular section. In Fig. 2, H H represent the T-headed tie-bolts, and *h h* the keys which tighten them.

We claim as our invention—

1. The secondary friction-rolls M, mounted and arranged to operate relatively to the main rolls E, and guiding-arms D^1, as and for the purposes herein specified.

2. The hollow center B^1 of the main revolving casting B, constructed and arranged to operate as represented relatively to the main casting A with its holes F, and the supporting-rolls E and their connections, as specified.

3. In combination with the conical rolls D traveling between correspondingly conical surfaces, the adjusting means d^1 d^2, for adjusting the rolls radially so as to compensate for inequalities in the sizes, as specified.

In testimony whereof we have hereunto set our hands this 29th day of February, 1872, in the presence of two subscribing witnesses.

ANTES SNYDER.
HENRY F. SNYDER.

Witnesses:
T. C. ROGERS,
H. D. HEISER.