R. A. FRENCH & L. T. GIRDLER.

RAILWAY DRAFT GEAR.

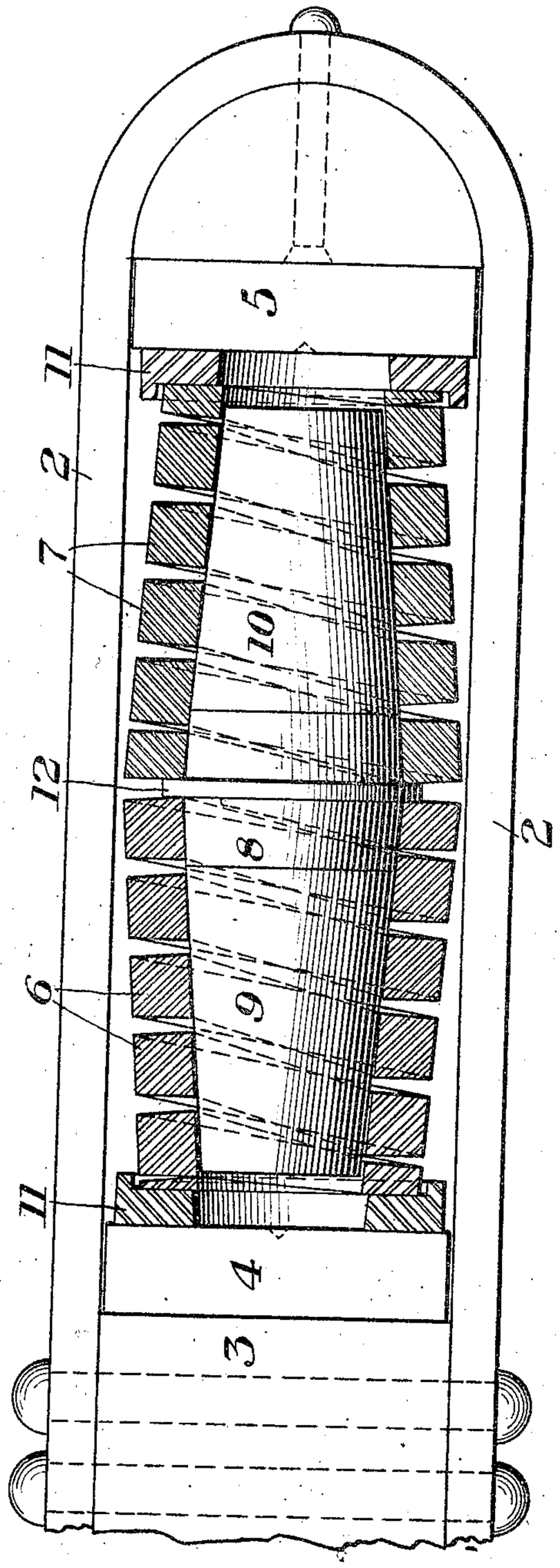
APPLICATION FILED OCT. 24, 1906.

944,327.

Patented Dec. 28, 1909

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

R. A. Balderson

W. W. Swartz

INVENTORS.

Roy A. French

Louis T. Girdler

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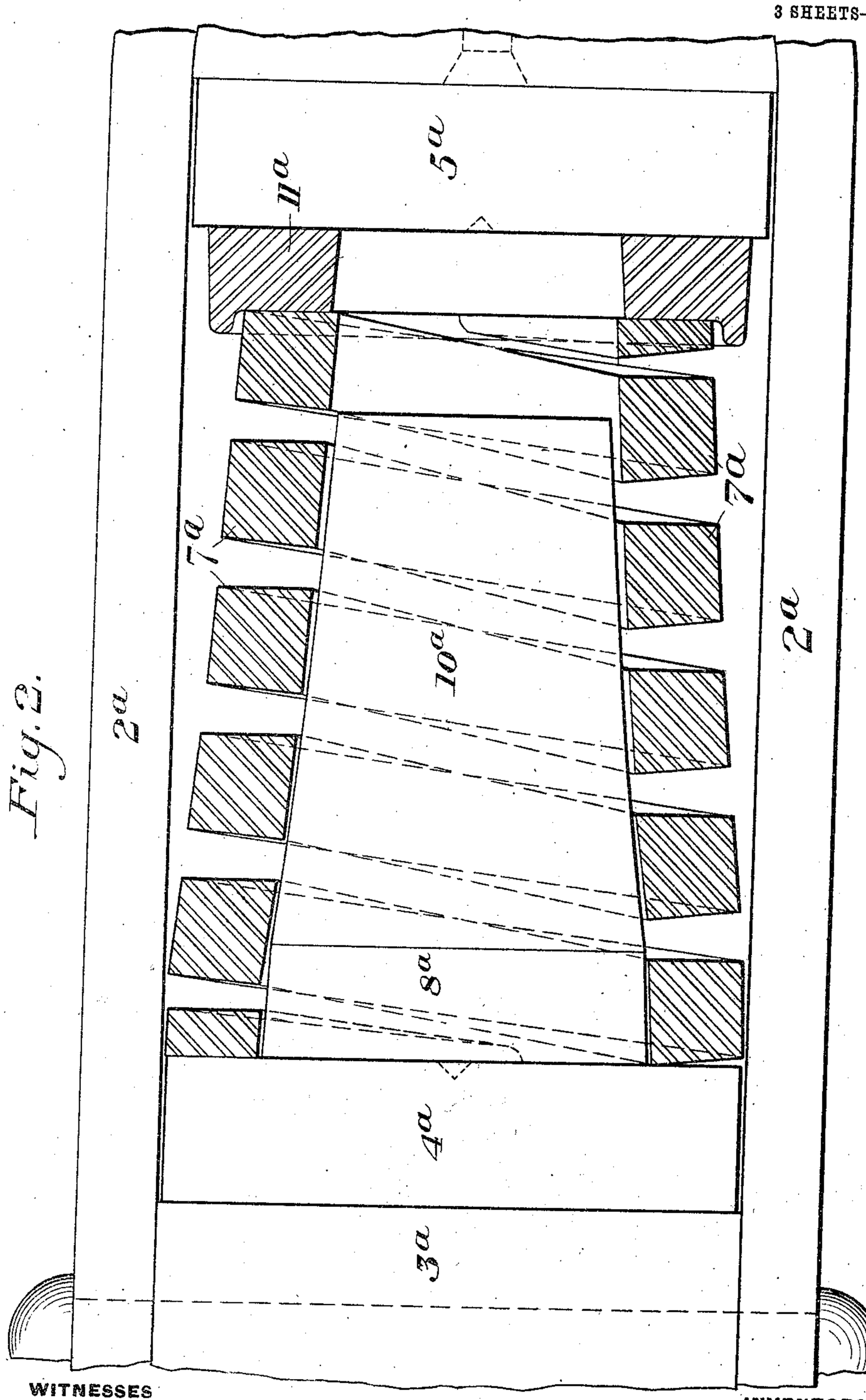

Fig. 2.

WITNESSES

R. A. Balderson

V. W. Swartz

INVENTORS.

Roy A. French

Lolie T. Girdler

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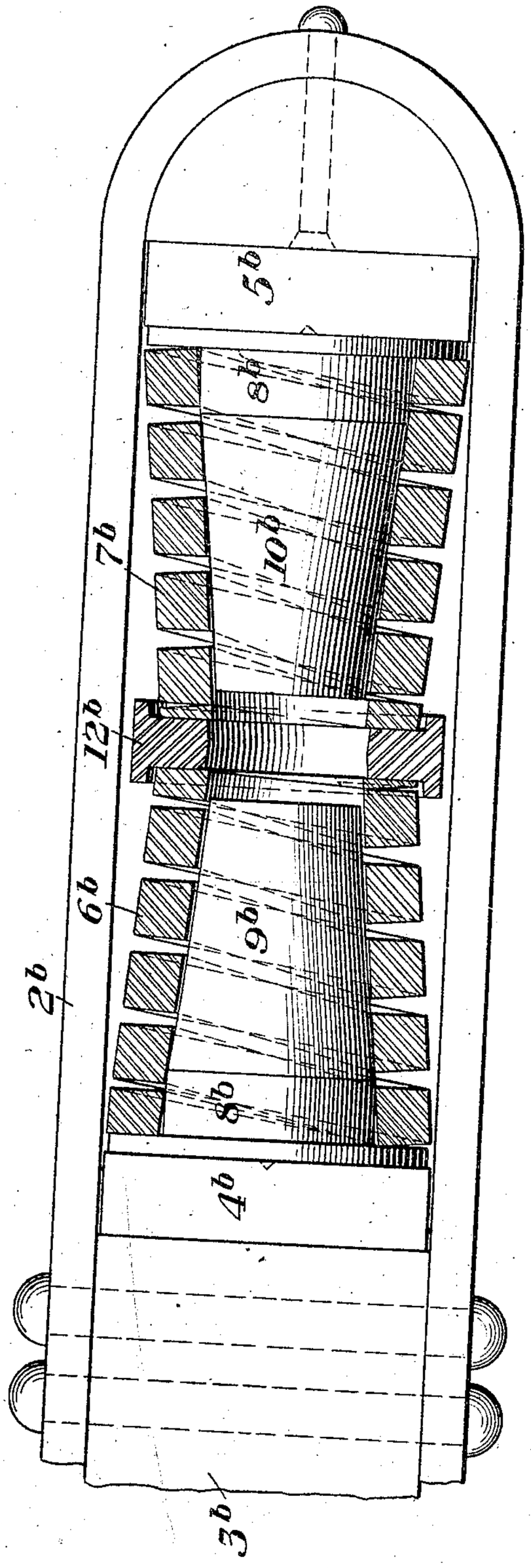

Fig. 3.

WITNESSES

R. A. Balderson

W. W. Swartz

INVENTORS.

Roy A. French

Louis T. Girdler

UNITED STATES PATENT OFFICE.

ROY A. FRENCH, OF OAKMONT, AND LOUIS T. GIRDLER, OF SEWICKLEY, PENNSYLVANIA, ASSIGNORS TO FORT PITT SPRING & MANUFACTURING CO., OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

RAILWAY DRAFT-GEAR.

944,327. Specification of Letters Patent. **Patented Dec. 28, 1909.**

Application filed October 24, 1906. Serial No. 340,345

To all whom it may concern:

Be it known that we, ROY A. FRENCH, of Oakmont, Allegheny county, Pennsylvania, and LOUIS T. GIRDLER, of Sewickley, Allegheny county, Pennsylvania, have invented a new and useful Railway Draft-Gear, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional side elevation showing one form of our improved gear; Fig. 2 is a partial enlarged view showing our invention applied to a gear having a single spring; and Fig. 3 is a view similar to Fig. 1, showing a modified form.

Our invention relates to the class of draft gear, and is designed to provide a gear having tandem springs with means for applying a radial pressure to the springs through cones or cores having descreasing cross-section.

It is also designed to equalize the pressure upon the different coils of a spring wherein radial pressure is applied from a core.

A further object is to do away with stops, cages, etc., in a tandem gear having two springs with means for exerting a radial pressure.

In the drawings, referring to the form of Fig. 1, 2 represents the yoke, 3 the draw bar, 4 the front follower and 5 the rear follower. Between the followers two conical springs 6 and 7 are arranged in tandem with their largest diameters at the adjacent ends, and within the springs is mounted a core 8 of double conical form, the cone portions 9 and 10 decreasing in diameter from the center toward the ends.

The outer ends of the springs preferably bear upon filler plates 11 which are preferably recessed to receive the ends of the springs, and are provided with central holes to receive the ends of the core during the stroke. In this form the core is preferably provided with a ring-shaped projection 12 at its center which spaces apart the inner ends of the springs, and receives the thrusts. The portions of the core adjacent to the ring 12 may be cylindrical or tapered to a smaller amount than the remaining portions. If the inner face of the spring and the outer face of the core are true cones, the coils nearest the small end of the cone will receive the greater radial strain, owing to their greater travel during the stroke. Inasmuch as the radial strain will cause a permanent set in the coils if carried beyond the elastic limit, it is therefore necessary in such a form to so proportion the parts that the radial strain will not exceed the elastic limit in the coils nearest the small end of the cone. Consequently the strain upon the coils nearer the large end of the cone, must be far below the elastic limit, thus decreasing the resistance. We have overcome this difficulty by curving the surface of the conical member instead of making it a straight or true conical form. By making this curve sharper near the larger end of the cone and flatter near the small end, we can compensate for the greater travel of the smaller diameter coils, and cause a substantially uniform bursting strain upon all the coils. This may be used either upon a tandem form, as shown in Fig. 1, or a single spring form, as shown in Fig. 2. Thus in Fig. 2, 2^a is the yoke, 3^a the draw bar, 4^a the front follower and 5^a the rear follower. The front follower is provided with the core which is preferably cylindrical or slightly, tapered in the part 8^a, while the remainder 10^a is of general conical form, but with the surface curved preferably in some hyperbolic form. In this case, the spring 7^a bears at one end against the follower 4^a, and at the other end against the filler plate 11^a which is recessed and provided with a central hole to receive the end of the core.

In all the forms we prefer to provide sufficient clearance space between the spring or springs and the core, so that there will be no friction or radial strain through the first part of the stroke in either direction; while during the latter part of the stroke, the core exerts its radial pressure upon the several coils of the spring during their closing against each other.

In Fig. 3, we show a form substantially like Fig. 1, except that the cones are reversed in position, their larger ends being at the outer ends of the springs. In this form, parts similar to Fig. 1 are marked with similar numerals with the letter *b* applied. In such case the filler plates 11 at

the outer ends of the springs may be done away with, and the ring 12ᵇ between the adjacent ends of the springs is preferably recessed to form seats, and provided with a central hole to receive the ends of the conical cores. By the words "conical" or "cone" in the specification and claims, we intend to cover a core having a decreasing cross-section whether its surface is in straight lines or curves.

The advantages of our invention result from the simplicity and compactness of the device and the great increase in resistance due to the radial pressure of the core. By changing the angles of the core to the spring or springs we can vary the resistance and exert the radial pressure through the entire stroke or any desired part thereof.

Our device may be employed for a yielding resistance in ordnance or for other locations where such resistance is desired; and by the term "draft-rigging" in our specification and claims we intend to cover all such forms whether pressure is applied in one or both directions. The feature of compensating for the greater stroke of some of the coils may be used with either single or tandem springs, and many other changes may be made without departing from the spirit and scope of our invention.

We claim:—

1. In a friction device for draft riggings and other purposes, a longitudinal spiral conical spring, and a conical device, one of said parts fitting over the other to exert a radial pressure upon the spring, the conical device having portions of its frictional surface of different pitch; substantially as described.

2. In a friction device for draft riggings and other purposes, a longitudinal spiral spring, and a conical device in position to engage the spring and arranged to exert a radial pressure thereon, said device decreasing in diameter in different ratios in different parts thereof to compensate for the greater stroke of some of the coils; substantially as described.

3. In a friction device for draft riggings and other purposes, a longitudinal spiral spring, and a conical core coacting therewith and arranged to exert a radial pressure thereon, said core decreasing in diameter to a greater extent at its larger portions than at its smaller portions to compensate for the greater stroke of the coils near its smaller end; substantially as described.

4. In a friction device for draft riggings and other purposes, a longitudinal spiral spring, and a conical core within the spring and coacting therewith to exert a radial pressure thereon, the face of said cone being curved longitudinally; substantially as described.

5. In a draft rigging, a pair of spiral springs having spaced-apart coils and arranged in tandem, and a pair of conical devices coacting with the springs to exert a radial pressure thereon both on buffing and pulling strains; substantially as described.

6. In a friction device for draft riggings and other purposes, a pair of spiral springs having spaced-apart coils and arranged in tandem, said springs having decreasing diameters toward one end thereof, and a pair of conical cores coacting with the springs to exert a radial pressure thereon; substantially as described.

7. In a friction device for draft riggings and other purposes, a pair of spiral springs having spaced-apart coils and arranged in tandem and each having decreasing diameters toward one end thereof, and a pair of conical cones coacting with the springs to exert a radial pressure thereon, the surfaces of said cones decreasing in diameter to different amounts through the different portions thereof to compensate for the greater stroke of the coils near the small ends of the springs; substantially as described.

8. In a friction device for draft riggings and other purposes, a pair of tandem spiral springs of conical shape and having spaced-apart coils, said springs having their larger ends adjacent to each other, and a core of general double conical shape with its largest diameter at its central portion; substantially as described.

9. In a friction device for draft riggings and other purposes, a pair of tandem springs of conical shape having spaced-apart coils and having their larger ends adjacent to each other, and a core of general double conical shape with its largest diameter at its central portion, said core having a spacer between the inner ends of the springs; substantially as described.

10. In a friction device for draft riggings and other purposes, a pair of tandem spiral springs having spaced-apart coils, and conical devices arranged to exert a radial pressure upon the springs, said springs having a movable bearing at their smaller ends: substantially as described.

11. In a friction device for draft riggings and other purposes, a longitudinal spiral conical spring, and a mechanical device arranged to contact with the interior surface of said spring, the bearing surface of the device and the inner bearing surface of the spring being of different contours; substantially as described.

12. In a friction device for draft riggings and other purposes, a longitudinal spiral spring, and a conical device arranged to contact with and exert a radial pressure upon the spiral spring, the inner faces of the coils being curved outwardly with respect to the axis of the conical device; substantially as described.

13. A friction device for draft riggings and other purposes, comprising two coacting conical members having frictional surfaces arranged to be brought into contact with each other, said surfaces being non-parallel for at least a portion of their length; substantially as described.

In testimony whereof, we have hereunto set our hands.

ROY A. FRENCH.
LOUIS T. GIRDLER.

Witnesses:
GEO. B. BLEMING,
JOHN MILLER.