No. 803,413. PATENTED OCT. 31, 1905.

R. D. GALLAGHER, Jr.

DRAFT AND BUFFING RIGGING.

APPLICATION FILED DEC. 3, 1902.

3 SHEETS—SHEET 1.

Fig. 1.

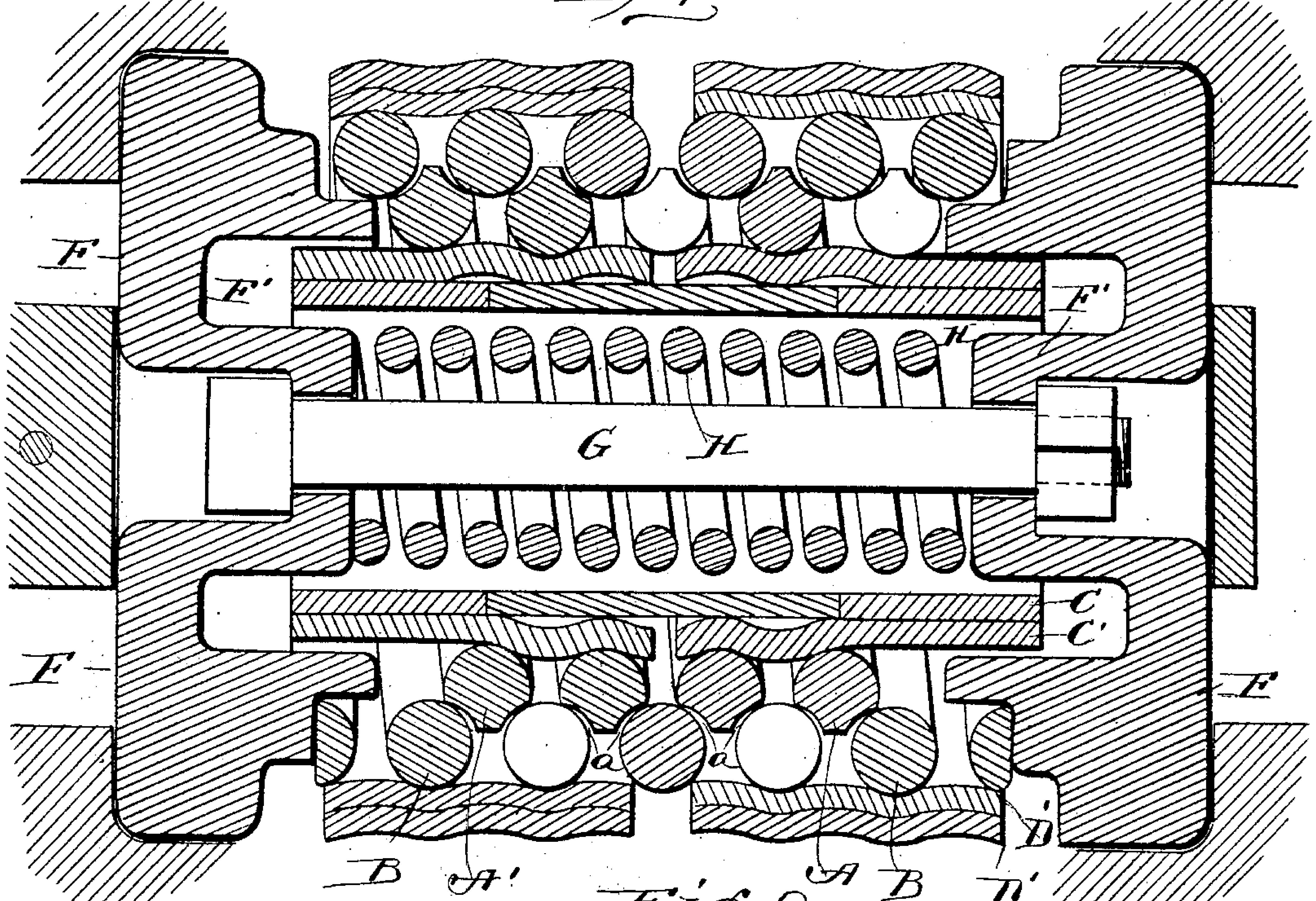
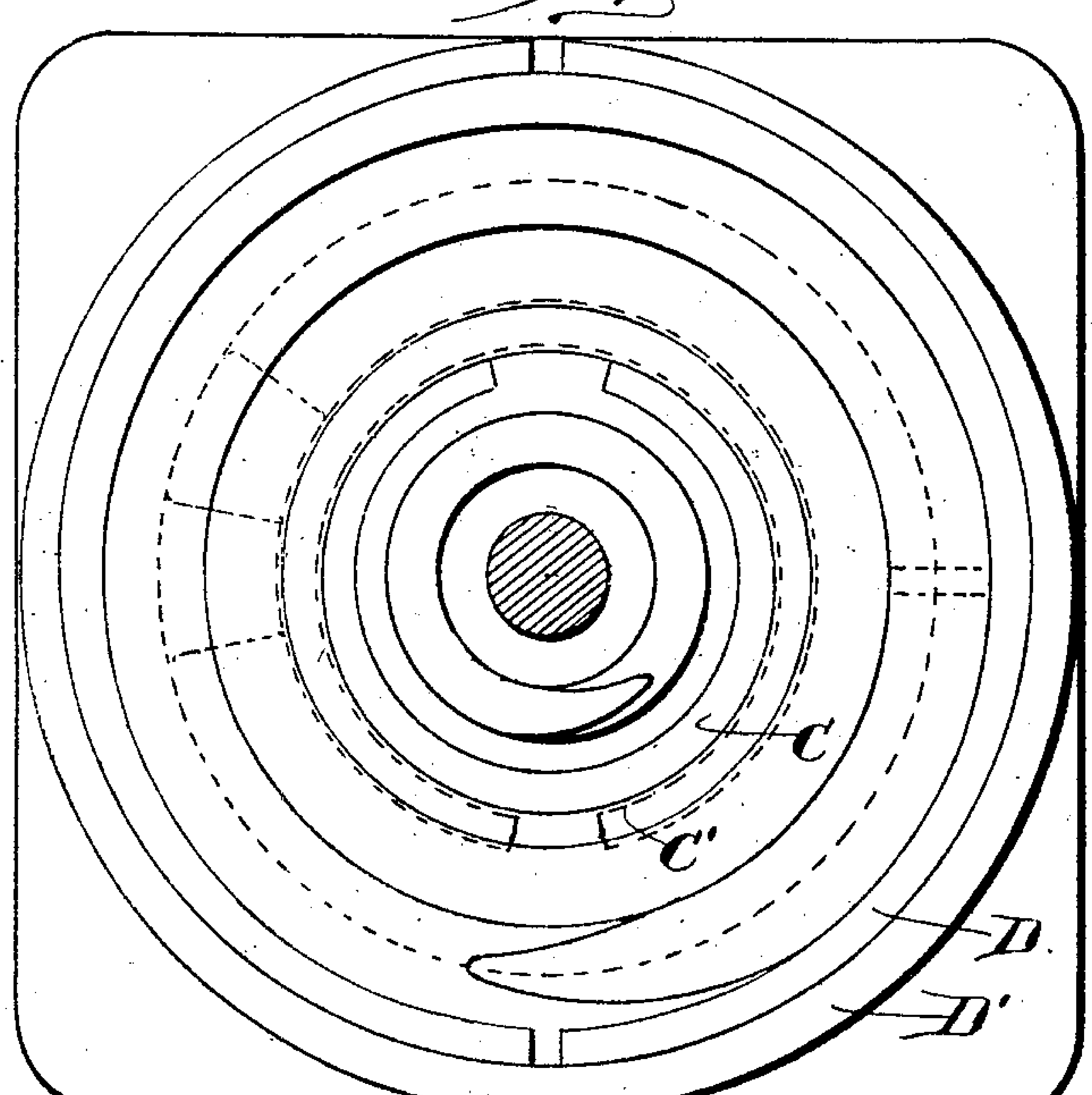


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

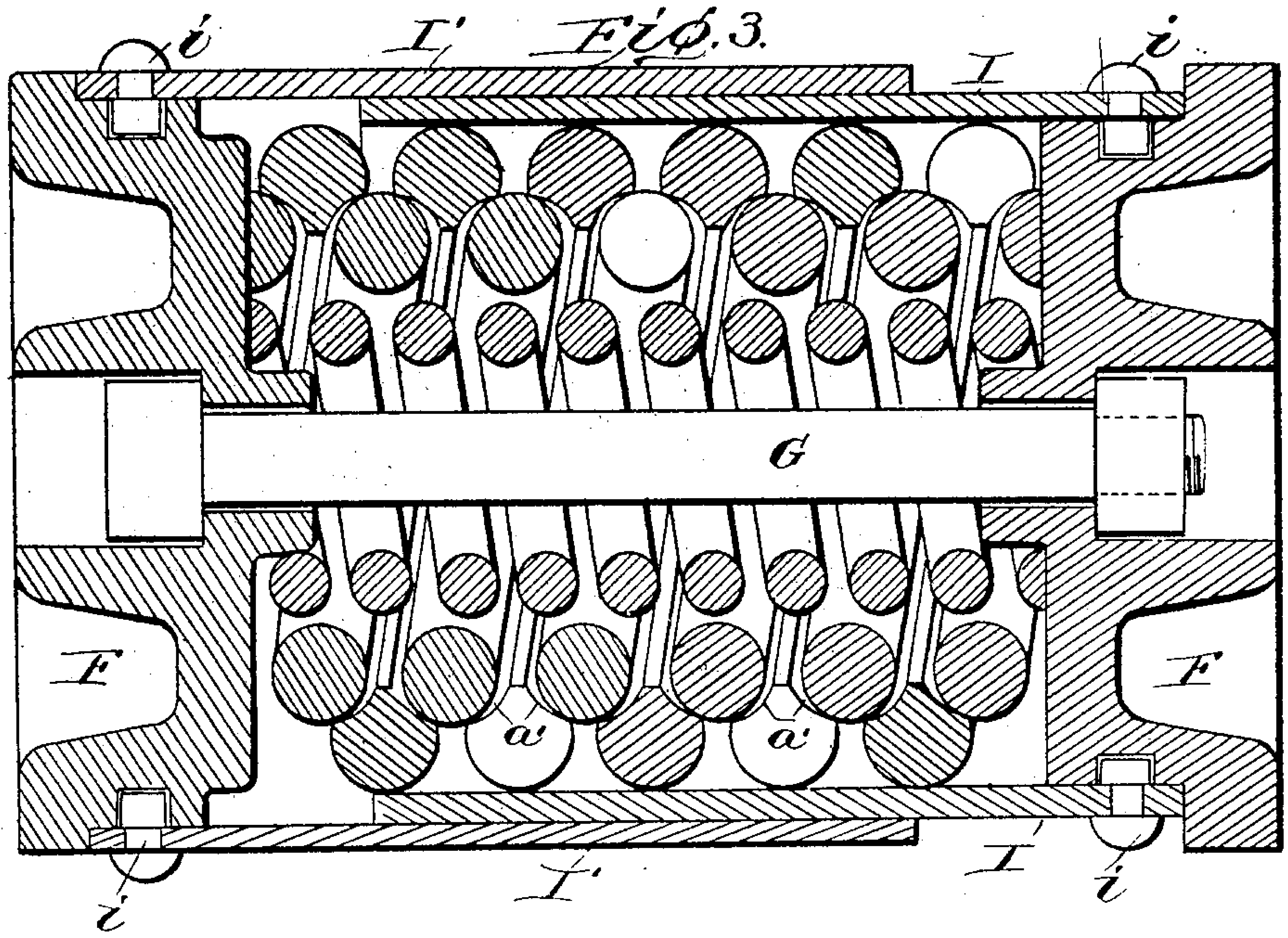
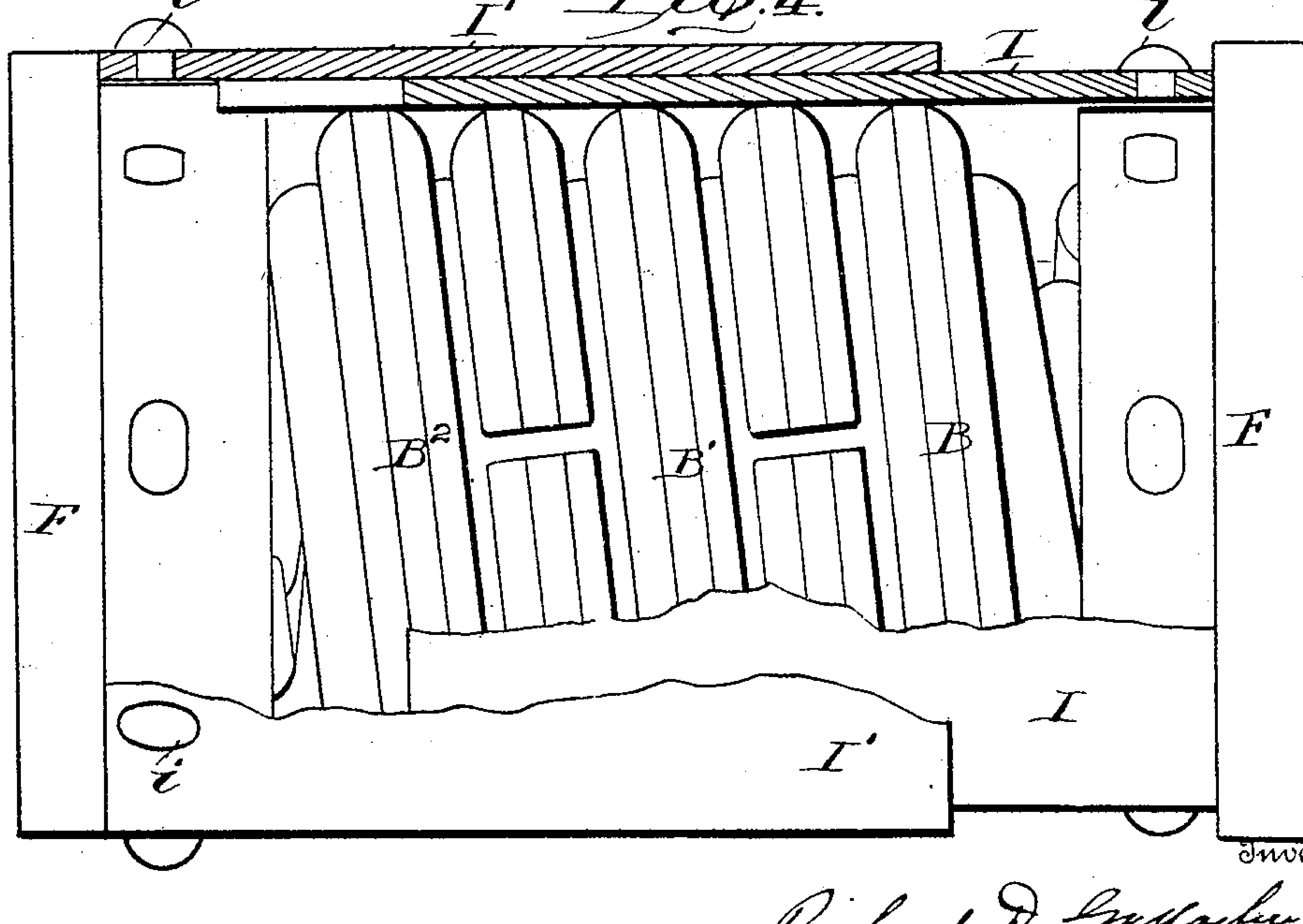


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

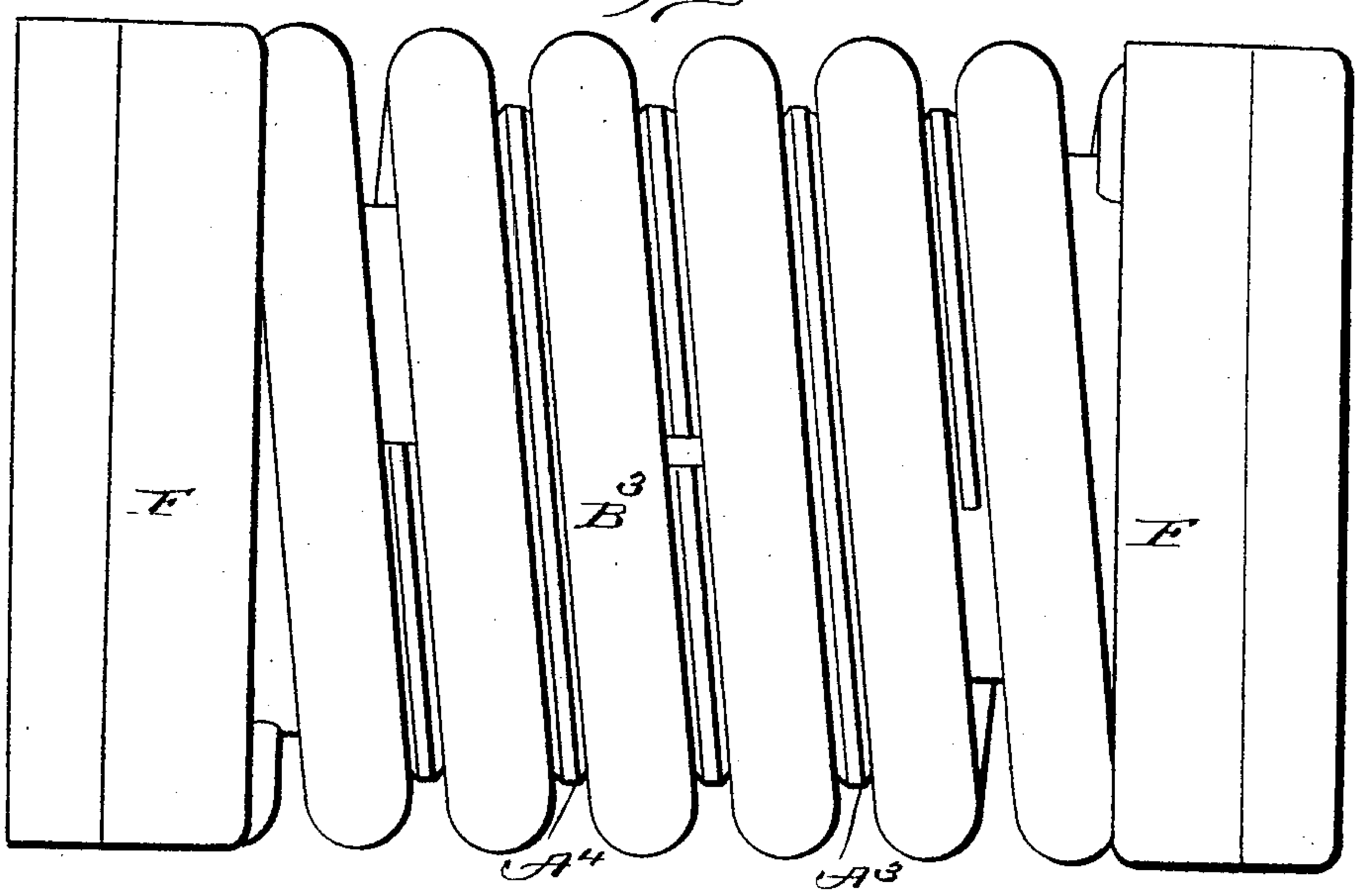
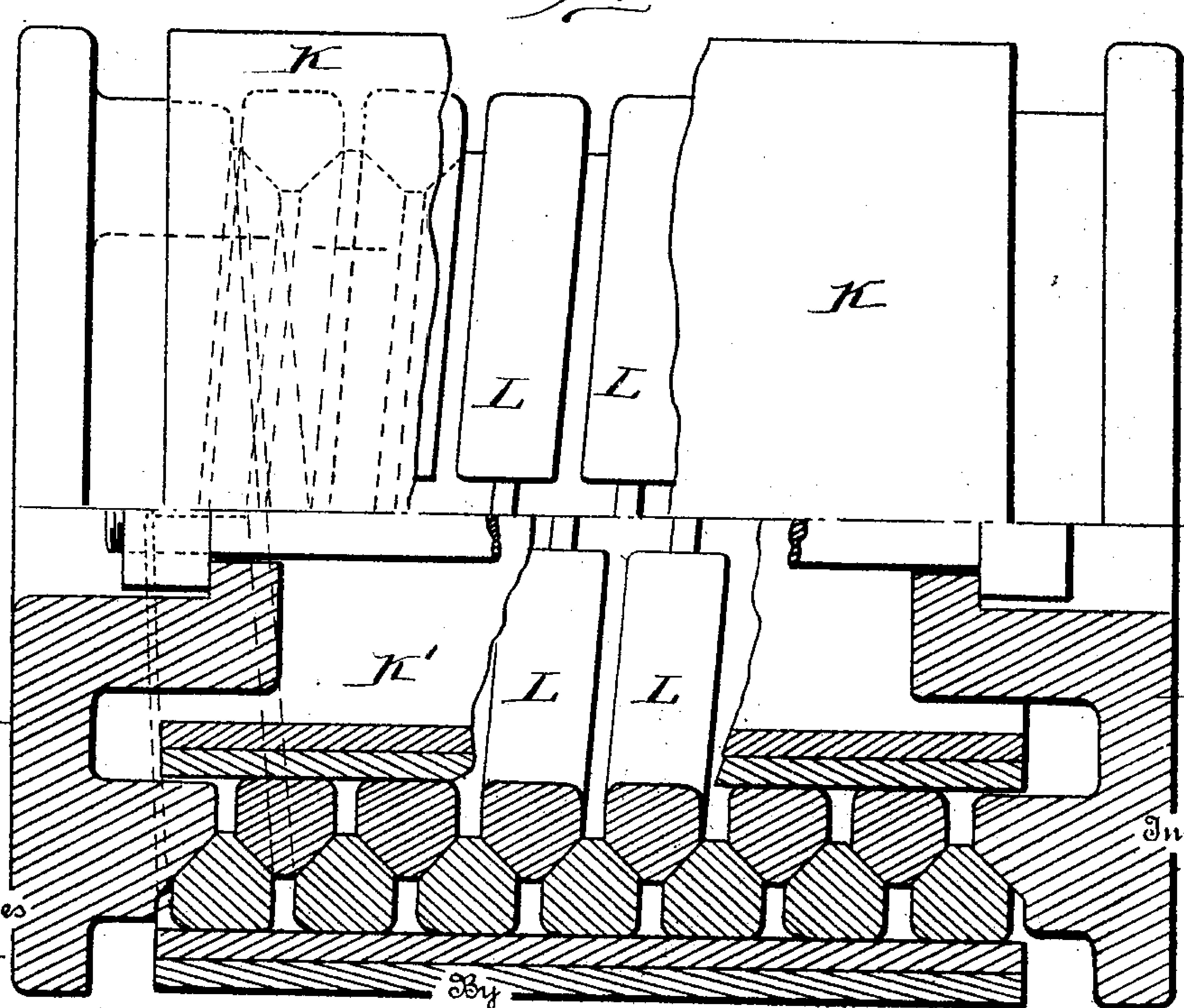


Fig. 6



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UNITED STATES PATENT OFFICE.

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DRAFT AND BUFFING RIGGING.

No. 803,413. Specification of Letters Patent. Patented Oct. 31, 1905.

Application filed December 3, 1902. Serial No. 133,763.

To all whom it may concern:

Be it known that I, RICHARD D. GALLAGHER, Jr., of New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Draft and Buffing Rigging; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in draft and buffing rigging for railway-cars, features of the invention, however, being applicable to any structure designed for the purpose of yieldingly resisting the relative movement of parts.

The objects of the invention are to provide a simple, easily-constructed, and easily-operated structure in which the resiliency of the resilient elements shall be so modified by friction that their resistance to compressive strains shall be greatly augmented and their recoil reduced to a minimum.

The invention consists in certain novel details of construction and combinations and arrangements of parts, all as will be now described, and pointed out particularly in the appended claims.

Referring to the accompanying drawings, Figure 1 is a horizontal section through a draft-rigging embodying the present improvements. Fig. 2 is an end elevation with one of the heads or followers removed. Fig. 3 is a view corresponding to Fig. 1, showing a slightly-modified arrangement and with the stops and draw-bar and strap omitted. Fig. 4 is a sectional elevation of the structure shown in Fig. 3. Fig. 5 is an elevation of a structure without an outer casing and with the outer helix in a single length. Fig. 6 is an elevation, partly in section and partly broken away, showing helices of modified cross-section.

Like letters of reference in the several figures indicate the same parts.

In accordance with the present invention the main resilient elements and between which the major portion of the friction is created are resilient helices, one or both of said helices being made in independent sections, the other helix, or a section thereof, bridging the space between the adjacent ends of the sections. The helices are nested one within the other with the convolutions alternated and lying partially between each other, so as to engage, create friction, and be put under transverse stress by pressure axially of and tending to press the convolutions of the helices toward each other. To supplement the resistance of the helices, as well as to maintain the same in proper relative position, casings of substantially cylindrical form are located within the helices or outside of the same or both inside and outside, which casings are preferably resilient and split. In the preferred construction a duplicity of such casings are employed nested together, whereby when transverse stress in the helices takes place friction will be created both between the helices and casings and between the nested casings themselves.

Referring to Fig. 1, the letters A and A′ indicate the sections of an inner resilient helix, and B B′ B^2 the sections of an outer helix. Each of the sections bridges the space between adjacent ends of the sections of the other helix, whereby when assembled they will properly position each other, and the convolutions of the helices are alternated, each lying partially between and bridging the spaces between the convolutions of the other helix. Thus any movement of the convolutions toward each other will create stress transversely of the axis of the helix due to the frictional engagement of the convolutions.

By making the helices in sections each section may expand or contract independently of the other. Thus under expansion the proximate ends of the sections will separate, and under contraction they will approach each other, and by properly gaging the length of the sections the frictional resistance to such movements may be gaged.

In the preferred construction the coöperating or friction faces of the convolutions are so formed that frictional resistance increases as the movement of compression progresses, for which purpose the frictional faces of one of said helices increases in angularity to the axis of the helix toward that portion of the face last to contact under pressure longitudinally of said axis. In Fig. 1 the helix A A′ has its friction-faces at *a* concaved, the portions of the faces with which the helix B B′ B^2 make initial contact lying most nearly in parallelism with the axis of the helix, curving thence gradually to a position more nearly at right angles to such axis. Obviously the friction-face to accomplish the desired result may be on either the inner or outer helix, and in Fig. 3 the faces a' are shown on the outer helix.

To augment the resistance of the helices to pressure axially and tending to close the convolutions, they may be confined by resilient casings which will be expanded or contracted by the expansion or contraction of the helices transversely of the axis. In Fig. 1 sectional casings C C′ are shown within and casings D D′ outside of the helices. The casings are substantially cylindrical, split, as shown in Fig. 2, and formed in sections longitudinally of the helices. The casings are nested to present extended frictional faces between which friction will be created sufficient to materially increase the resistance. This may be further increased and the parts operate to mutually retain each other in position to better advantage by making the faces of the casings corrugated or undulating. Thus the convolutions of the helices will normally lie in the recesses with portions projecting more or less between the convolutions, thus not only increasing the frictional resistance, but causing an increased stress of the casings as the convolutions are pressed together.

The helices, together with the casings, are preferably held between heads F F, the heads where it is desired to assemble the structure and maintain the same as an entity being connected by a central bolt G, the ends of which are located in recessed internal projections F′ to permit the heads to move toward each other without obstruction. Prompt return of the parts to normal after compressive strains is insured by a central spring H acting directly on the heads.

As shown in Fig. 1, the casings are both separate from the heads, and usually sufficient space is left between the casings and heads and between the sections of the casings to allow for the full compressive movement, the casings forming a final stop; but it is obvious that the casings may be connected for movement with the heads to slide longitudinally with relation to each other, the casings being pressed together by the transverse movement of the convolutions of the helices. Such an arrangement is shown in Figs. 3 and 4, where the casings I I′ are telescoped together and are connected with the heads by studs i i. In Fig. 4 is shown also the external appearance of an outer sectional helix, the ends of the sections being shown slightly separated.

In Fig. 5 is shown a structure wherein the outer helix B^3 is in a single length, while the inner helix is in sections A^3 A^4. The latter, however, do not extend to the ends of the helix B^3. Thus the said free ends of the latter will have the ordinary spring action and may be made to be first compressed, giving a preliminary or initial soft spring resistance followed by the increased resistance due to the friction between the parts and the resistance due to the transverse stress of the convolutions.

Fig. 6 illustrates plain split cylindrical casings K K′ and helices formed of sections L, having somewhat less than a complete convolution in each. The friction-faces in this instance are flat when viewed in section taken longitudinally of the helix. Thus each helix presents the form of a wedge adapted to be forced back from between the convolutions of the other helix by axial pressure, each being thus put under transverse stress through the wedging action of the friction-faces.

It is preferred that the convolutions of the nested helices should be in contact; but in practice it is obvious that this is not essential, as the frictional resistance will be inaugurated when such contact is established and will continue until the limit of movement is reached.

Obviously the shorter helices are rings distorted to form helices, and such rings may, as shown in Fig. 6, extend only substantially once around the device or, as shown in the other views—Fig. 5, for instance—may extend twice or more times around the device, and I do not wish to be understood as limiting myself to any particular length of the helices or rings.

The cross-sectional appearance of the casings in all of the forms illustrated will be readily understood from the end elevation, Fig. 2, and in operation it will be understood that the outside tubular casing exerts an inward pressure tending to resist any expansion of the outer spring and the tubular resilient casing on the inside exerts an outward pressure on the inner surface of the inner coil tending to resist any contraction or reduction in the diameter of said coil. Any construction or expansion of the coils or any movement of the convolutions with relation to each other (all of which movements occur in use) will cause the contacting faces of the coils and tubular elements or casings to rub on each other and create friction for the purposes hereinbefore set forth.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for the purpose specified, a resilient friction member formed of a plurality of resilient helices arranged end to end and a resilient helix bridging the space between the adjacent ends of the first-mentioned helices and with its convolutions partially between and bridging the spaces between the convolutions of the said first-mentioned helices, whereby the convolutions of the helices are put under transverse stress and friction created between the same by pressure axially of the helices; substantially as described.

2. In an apparatus for the purpose specified, a resilient friction member formed of a plurality of inner resilient helices arranged

end to end and a plurality of outer helices arranged end to end, the said inner and outer helices bridging the spaces between the adjacent ends of the other respectively, and the convolutions forming the inner and outer helices being located partially between and bridging the spaces between the convolutions of each other, whereby the convolutions are put under transverse stress and friction created between the same by pressure axially of the helices; substantially as described.

3. In an apparatus for the purpose specified, the combination with the heads or followers, a plurality of resilient helices arranged end to end between said followers and a resilient helix nesting therewith and bridging the space between the adjacent ends of the first-mentioned helices and with its convolutions partially between and bridging the spaces between the convolutions of the said first-mentioned helices, whereby the convolutions of the helices are put under transverse stress and friction created between the same by pressure axially of the helices; substantially as described.

4. In an apparatus for the purpose specified, a resilient friction member formed of resilient helices, nested one within the other, the convolutions of one helix lying partially between and bridging the spaces between the convolutions of the other helix, the surfaces of one helix adapted to contact with the other helix being formed of increased inclination to the axis of the helices in those portions last to contact with the other helix under pressure axially of the helices; substantially as described.

5. In an apparatus for the purpose specified, a resilient friction member formed of resilient helices nested one within the other, the convolutions of one helix lying partially between and bridging the spaces between the convolutions of the other helix, the surfaces of one helix adapted to contact with the other helix being formed on a curve increasing in inclination to the axis of the helix in those portions last to contact with the other helix under pressure axially of the helices; substantially as described.

6. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between the convolutions under axial pressure, of a casing for preventing lateral displacement of the helices; substantially as described.

7. In an apparatus for the purpose specified, the combination with the resilient helices, nested one within the other in position to effect frictional engagement between the convolutions under axial pressure, of a cylindrical casing surrounding the helices and heads between which the helices are confined located at the ends of the casing; substantially as described.

8. In an apparatus for the purpose specified, the combination with the resilient helices, nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of a resilient split cylindrical casing engaging one of said helices to resist transverse stress in said helix; substantially as described.

9. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions, under axial pressure, of a resilient split cylindrical casing surrounding the helices and coöperating with the outer helix to resist transverse stress under pressure axially of the helices; substantially as described.

10. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of a resilient split cylindrical casing formed in sections longitudinally of the helices and adapted to resist transverse stress of the helices; substantially as described.

11. The combination of a plurality of resilient helices of different axial lengths, nested one within the other in position to effect frictional engagement between the convolutions under axial pressure.

12. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of a split cylindrical casing having its surface projecting between the convolutions, whereby movements creating both axial and transverse stress in said helices is resisted by the casing; substantially as described.

13. In an apparatus, for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of a split cylindrical casing having its surface corrugated to project between the convolutions, whereby movements creating both axial and transverse stress in said helices is resisted; substantially as described.

14. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of a split cylindrical casing formed in sections longitudinally of the helices and having its surface corrugated to project between the convolutions, whereby movements creating both axial and transverse stress in the said helices is resisted; substantially as described.

15. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, said helices being sectional and bridging the spaces between the ends of each other, of a casing for retaining said helices in proper relative positions; substantially as described.

16. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of cylindrical casings between which said helices are located; substantially as described.

17. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of resilient cylindrical split casings between which said helices are located and with which they engage when under transverse stress; substantially as described.

18. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of resilient cylindrical split casings between which said helices are confined, the surfaces of said casings being corrugated to enter between the convolutions; substantially as described.

19. In an apparatus for the purpose specified, the combination with the resilient helices nested one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of resilient cylindrical split casings nested one within the other in frictional engagement and engaging the helices to be put under transverse stress by movements creating transverse stress in said helices; substantially as described.

20. A friction device comprising a spring having a plurality of continuous turns, and provided with a frictional face, in combination with a member having a frictional face which is yieldingly held in contact with the friction-face thereof.

21. In a draft and buffing apparatus, a main spring member having an endwise movement of compression and a transverse movement of expansion between the followers, and an auxiliary spring member in frictional engagement with the first-mentioned spring member and having a lateral sliding motion on the said main spring as the latter expands and contracts.

22. In a draft and buffing apparatus, a helical spring located between the followers, and an auxiliary helical spring, the successive convolutions of which are in frictional engagement with the main spring.

23. In a friction device, outer and inner coiled members each consisting of a series of coils, the frictional surfaces of both springs being in contact during the entire operation of the spring, substantially as described.

24. In a friction device, outer and inner coiled members, one consisting of a continuous spring made up of a series of coils, and the other consisting of a succession of disconnected coils wound about the continuous spring, substantially as described.

25. In a friction device, outer and inner coiled members, each consisting of a series of coils, one of the coil members being of a greater sectional area than the other, substantially as described.

26. In a friction device, a spring member consisting of a series of connected coils, and one or more spring-coils in frictional engagement with the aforesaid spring member, substantially as described.

27. A friction device comprising, in combination, a continuous spring provided with friction-surfaces, and a plurality of friction-rings, the friction-surfaces whereof engage those of the spring.

28. A friction device comprising a spring and a split friction-ring located between adjacent coils of said spring.

29. A friction device comprising a helical spring, and a friction-ring located between adjacent coils and having engaging frictional faces.

30. A friction device comprising, in combination, a continuous spring and a friction-ring coöperating by frictional surfaces with said continuous spring in the production of frictional resistance.

31. A friction device comprising, in combination, a helical spring and a frictional ring having engaging frictional surfaces.

32. A frictional device comprising a continuous helical spring having inclined friction-faces, in combination with a plurality of slip friction-rings located between adjacent coils of the spring and having corresponding inclined friction-faces engaging those of the spring.

33. A friction device comprising a helical spring provided with inclined friction-faces, in combination with friction members located between adjacent coils and having coöperating frictional faces engaging those of the spring.

34. A friction device comprising a helical spring provided with inclined frictional faces, in combination with a split resilient friction-ring having friction-faces engaging those of the spring and located between adjacent coils.

35. A friction device comprising a spring provided with a frictional face, in combination with a member having a frictional face

adapted to contact with the frictional face of the spring, said spring and member being so disposed relatively to each other as to permit preliminary compression of the spring without frictional resistance, and on further compression to exert yielding frictional resistance to the friction-face on said spring.

36. In a friction device, a plurality of coöperating frictional elements fitted between and in frictional engagement with two drums, one of which is resilient, substantially as described.

37. In a draft-rigging, follower-plates, connections therefrom to a draw-bar, and yielding connections for the follower-plates comprising a plurality of frictional elements fitted between and in frictional engagement with two drums, one of which is resilient, substantially as described.

38. In combination with a coil-spring, a tubular resilient element arranged within the coil and exerting an outward pressure on the inner surface of the coil.

39. In combination with a coil-spring, a resilient element arranged within the coil and in contact with the inner surface of the coil and exerting a frictional pressure on the inner surface thereof, as the coil is compressed and expanded in use.

40. In an apparatus for the purpose specified, the combination with the resilient helices mated one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of cylindrical casings between which said helices are located; substantially as described.

41. In an apparatus for the purpose specified, the combination with the resilient helices mated one within the other in position to effect frictional engagement between and transverse stress of the convolutions under axial pressure, of resilient cylindrical split casings between which said helices are located; substantially as described.

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