(No Model.) 3 Sheets—Sheet 1.

S. BROWN.

FRICTION CLUTCH.

No. 572,957. Patented Dec. 15, 1896.

FIG. 2.

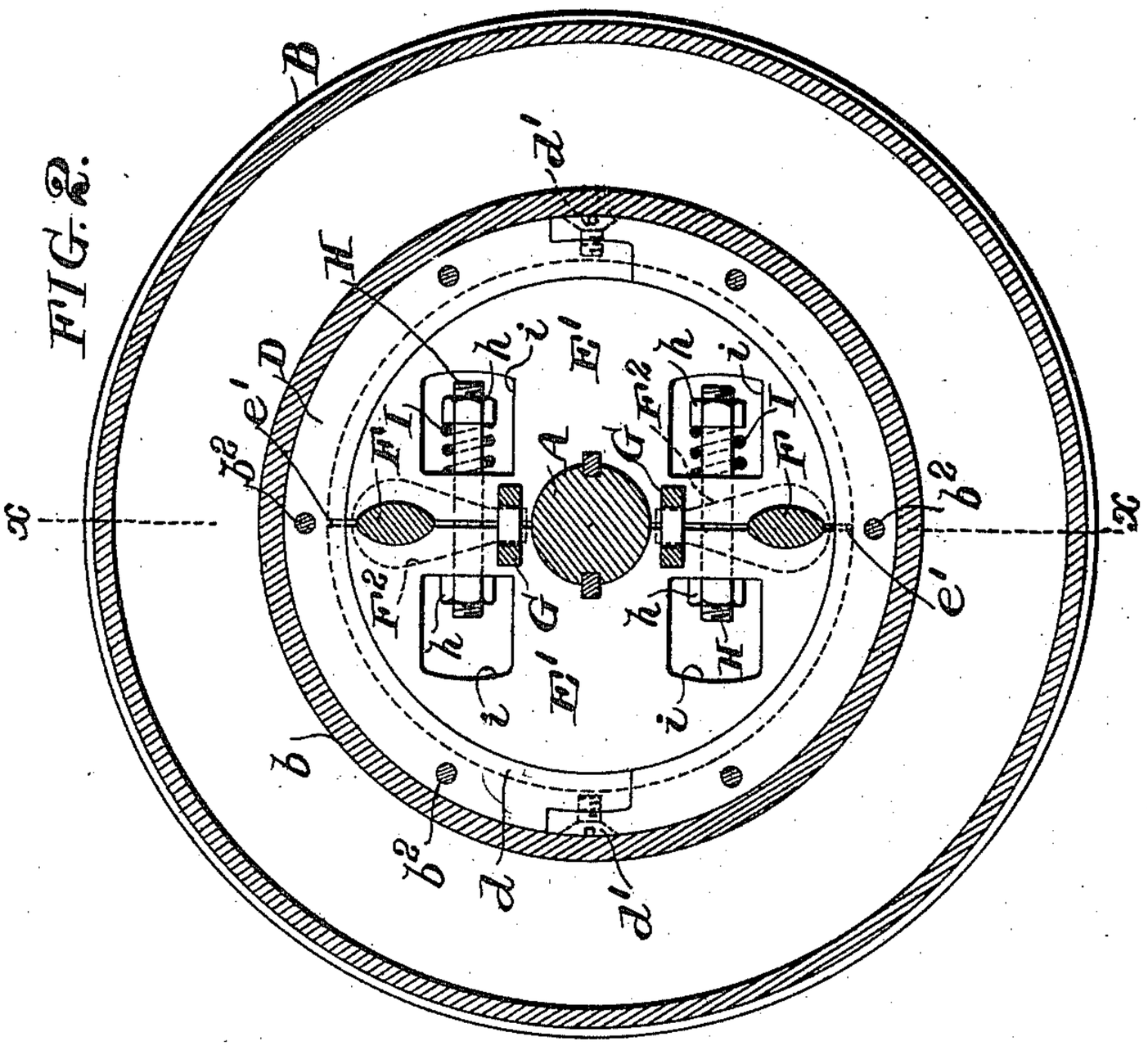

FIG. 1.

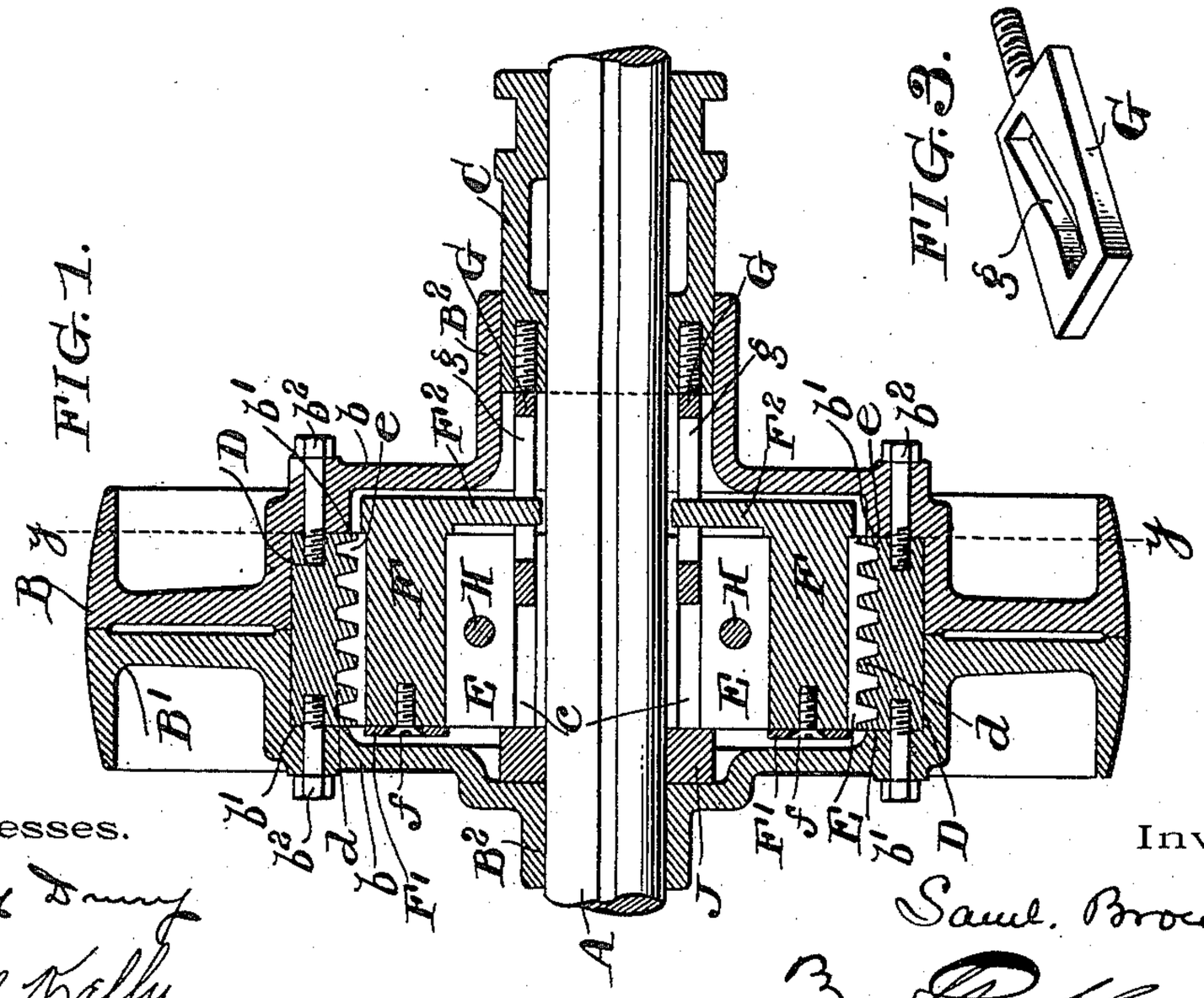

FIG. 3.

Witnesses.

Henry Dumy

R. M. Kelly

Inventor.

Saml. Brown

by Thos. G. Orrell

Attorney.

(No Model.) 3 Sheets—Sheet 2.

S. BROWN.

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FIG. 5.

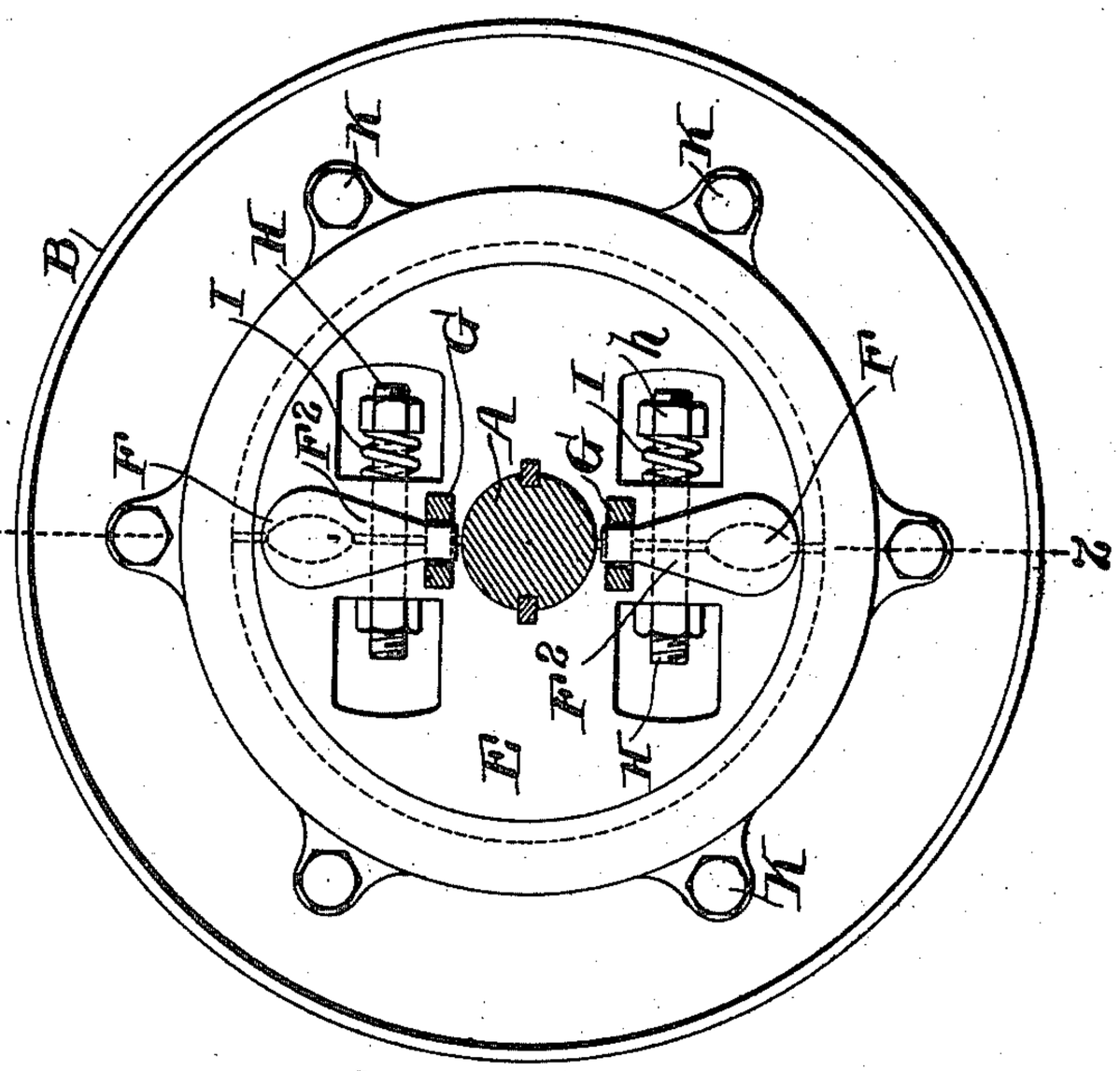
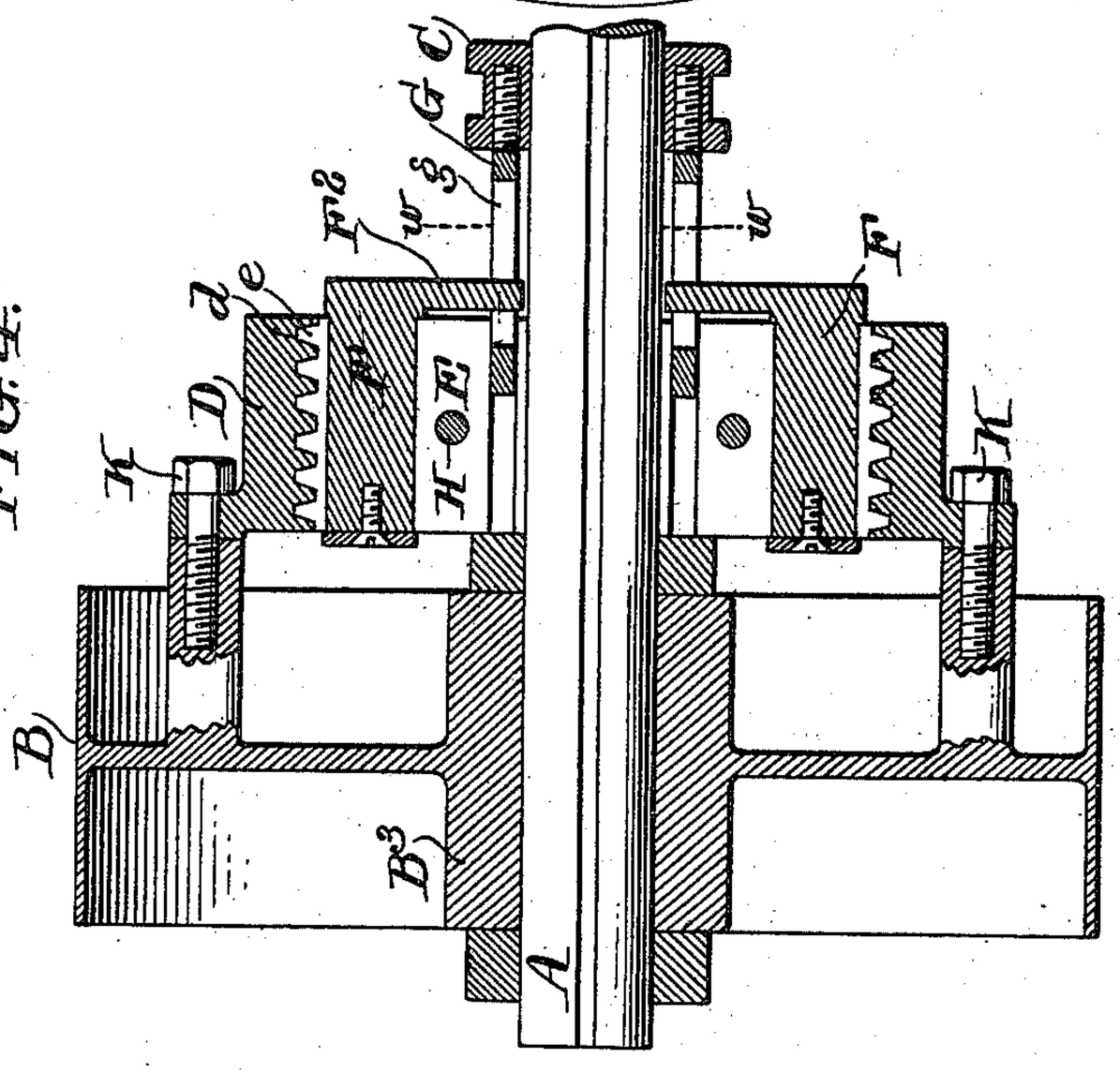


FIG. 4.



Witnesses.
Harry Drury
R. M. Kelly

Inventor.
Saml. Brown
By A. Pritchard & Co.
Attorney.

(No Model.) 3 Sheets—Sheet 3.

S. BROWN.

FRICTION CLUTCH.

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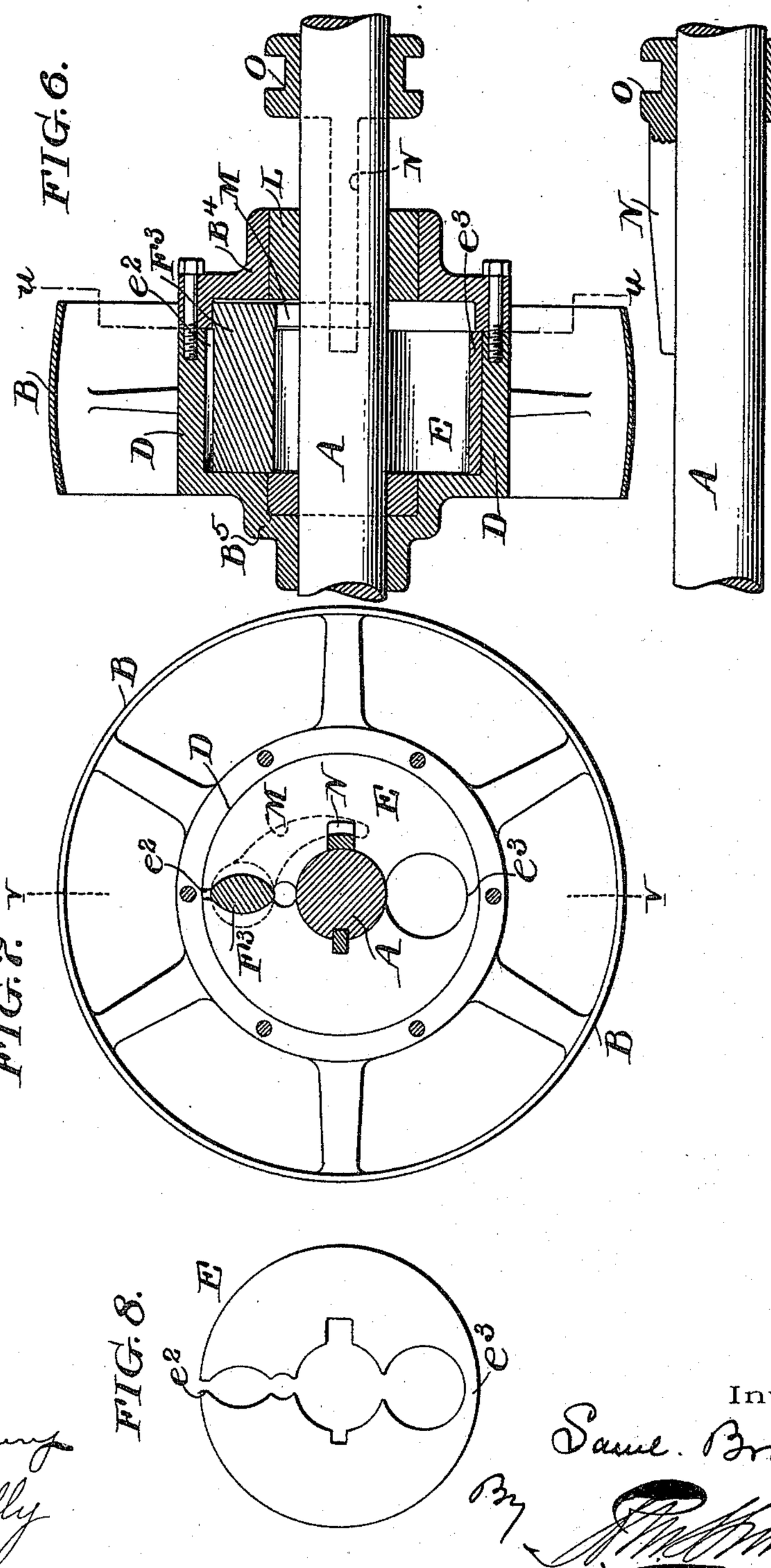

FIG. 9.

FIG. 2.

FIG. 8.

Witnesses.
Henry Drury
R. M. Kelly

Inventor.
Samuel Brown
By J. F. McCormick
Attorney.

UNITED STATES PATENT OFFICE.

SAMUEL BROWN, OF PHILADELPHIA, PENNSYLVANIA.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 572,957, dated December 15, 1896.

Application filed October 29, 1895. Serial No. 567,233. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL BROWN, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Friction-Clutches, of which the following is a specification.

My invention relates to friction-clutches; and it consists of certain improvements which are hereinafter described and are shown in the accompanying drawings.

It is the object of my invention to produce a friction-clutch of simplified construction having a positive and quick action.

My invention also relates to improvements in means for expanding the friction-plate and to the employment of grooved friction-faces in the coacting parts, and also to other improvements in construction which are hereinafter fully described and claimed.

I shall now refer to the accompanying drawings.

Figure 1 is a vertical sectional view of a friction-clutch embodying my invention, taken on the line *x x* of Fig. 2. Fig. 2 is a transverse sectional view of the same on the line *y y* of Fig. 1. Fig. 3 is a perspective view of one of the slides for actuating the clutch. Fig. 4 is a vertical sectional view of a friction-clutch embodying my invention and illustrating a modification thereof, taken on the line *z z* of Fig. 5. Fig. 5 is a transverse sectional view of the same on the line *w w* of Fig. 4. Fig. 6 is a longitudinal vertical sectional view of a friction-clutch, illustrating further modifications of the invention, taken on the line *v v* of Fig. 7. Fig. 7 is a transverse sectional view on the line *u u* of Fig. 6. Fig. 8 is a detail plan view of the detached friction-disk embodied in the construction shown in Figs. 6 and 7; and Fig. 9 is an elevation of the shaft and clutch-actuating slide, with the latter partly in section.

A is the driving-shaft.

B is the driven pulley. In the construction shown in Figs. 1 and 2 the pulley B is divided longitudinally in two sections B′ B′, and has hubs B^2 B^2, connected with the rims by webs *b*. The hubs B^2 B^2 are loosely journaled on the shaft A, but in this construction there is an intermediate sleeve C between the shaft A and the enlarged hub B^2 of one of the sections B′ of the pulley, which acts as an intermediate bearing.

D is an internal ring carried by the pulley B. As shown, the sections B′ B′ are provided with internal shoulders *b′*, which fit over the ring D, to which the sections B′ B′ are secured, as by the bolts b^2. The pulley B is thus made up of the two sections B′ B′ and the ring D, to which they are bolted. The ring D is shown made in two sections, bolted together by screws *d′*. The inner face of the ring D is provided with annular grooves *d*, adapted to receive the ribs *e* of the correspondingly-grooved periphery of the clutch-ring E, which is keyed on the shaft A within the ring D. This clutch-ring E is split or divided longitudinally, as at *e′*, so that the two members E′ E′ may be forced or sprung apart to force the grooved faces *e* into engagement with the internally-grooved face *d* of the ring D.

F F are cam-blocks or eccentric pieces arranged between the two members E′ E′, the faces of which may be cut away or recessed, as shown, to receive them.

F′ are plates secured to the outer ends of the pieces F, as by screws *f*, and projecting over the faces of the plates E′ E′ to hold the pieces F F against displacement.

F^2 are arms carried by the pieces F and projecting inwardly toward the shaft A, where their ends engage cam grooves or slots *g* in slides G, which are carried by the sleeve C and are guided in recesses or guideways *c* in the disk E.

The sleeve C may be moved longitudinally on the shaft A, to which it is keyed, to move the slides G in and out in the guides *c*. When the slides G are thus moved, the cam slots or grooves *g*, acting on the arms F^2 of the pieces F, will turn the pieces F and thus cause them to force the sections or parts E′ E′ outward, so that the faces *e* will be forced into engagement with the grooved periphery of the ring D, thus bringing the pulley into driving engagement with the disk E and through it with the shaft A. The movement of the slides G in the opposite direction will cause the slots *g* to act on the arms F^2 and thus rock back, releasing the parts E′ E′ of the disk E. The sleeve C may be moved by the usual shifting yoke and lever.

To insure the return of the parts E′ E′ to release the faces *e* from engagement with the ring D, I prefer to employ springs.

In the construction shown in Figs. 1 to 5 the two sections E′ E′ are loosely connected by bolts H, which permit play and allow the sections to be moved apart. Springs I, interposed between the heads of the bolts and a part of the disk E, act to force the parts E′ E′ together, while permitting the expansion of the disk under the action of the cam-blocks F F. I have shown the bolts H passing through the opposed faces of the sections E′ E′ and having their ends, which are provided with nuts or heads *h*, extending into apertures or recesses *i* in the sections E′ E′ and the springs I arranged between the nuts on the bolts and the face of the opening *i*.

J is a bearing-collar on the shaft A between one of the hubs B^2 and the disk E.

The grooves and ribs *d e* are preferably V-shaped, as shown, so that the friction between the faces *d* and *e* will increase as the pieces E′ E′ are moved outward when the disk E is expanded and will decrease as the disk is contracted. While the employment of these grooved faces *d* and *e* is a substantial part of my invention to which I lay claim, it is not essential to the invention so far as relates to the construction of the clutch, and, if desired, the periphery of the expanding disk E and the friction-ring D may be provided with smooth faces, and such a construction is shown employed in the modification of my invention which is illustrated in Figs. 6, 7, and 8.

Instead of employing an expanding disk E, composed of sections actually separated from one another, the sections may be connected together by a spring-union, as in the construction illustrated in Figs. 6, 7, and 8.

If desired, the expanding piece E may be composed of more than two sections or members.

The modification shown in Figs. 4 and 5, so far as the construction and mode of operation of the expanding piece are concerned, is identical with the construction shown in Figs. 1, 2, and 3, but instead of arranging the friction-ring D and the expanding piece E within the periphery of the pulley B have shown the ring D arranged on one side of the pulley B and bolted thereto by bolts K. In this case the hub B^3 of the pulley is loosely journaled directly on the shaft A, and the sleeve C, which carries the slides G, does not act as a bearing.

The construction shown in Figs. 6, 7, and 8 illustrates the expanding ring located within the pulley, the grooved faces *d* and *e* omitted, and the expanding ring composed of spring members instead of being split.

The pulley B has the friction-ring D integral with it. B^4 is a collar bolted to the face of the pulley and forms one of the hubs of the pulley. L is a bearing-sleeve on the shaft A, on which this hub B^5 is shown integral with the pulley and journaled directly on the shaft.

The expanding ring E is split, as shown at e^2, but instead of being entirely divided into separate sections the parts are left united by a spring-piece e^3, which will permit the members to be spread apart to expand the ring and force the faces thereof against the faces of the ring D. In this case it is necessary to employ only a single expanding cam-block or piece, and I have shown this block F^3 journaled between the members of the ring, as in the constructions previously described.

M is the depending arm of the piece F^3, which extends inwardly adjacent to the shaft A.

N is a tapered finger or cam carried by a movable sleeve O on the shaft A and adapted to act on the arm M and thus rock the piece F^3 and expand the disk E when the sleeve O is moved. The spring-union e^3 of the members of the disk E will retract them and relieve the frictional contact of the faces of the disk E and ring D when the finger N is moved back. If desired, however, this movement may be assisted by the employment of a spring, as in the construction shown in Figs. 1 to 5.

The operation of the clutch will be understood from the foregoing description.

The expansion of the disk or plate E, whether made in separate sections or in parts having a spring union, will force the faces of the disk into frictional contact with the face of the ring D, carried by the pulley, thus forming a driving connection with the shaft. The expansion of the disk or plate E by means of the cam blocks or pieces enables great pressure to be applied and causes the clutch to act quickly and positively.

The minor details of construction, which have been shown for purposes of illustration, may be varied without affecting the invention.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a friction-clutch, the combination of a friction-ring carried by the driven pulley and provided with an internal grooved face, a sectional friction-plate having its periphery provided with grooves corresponding with the grooves of the friction-ring and composed of members E′, E′, loosely connected by bolts H, intermediate springs I acting on the sections of the friction-plate tending to hold the members contracted, cam-pieces F interposed between the members of the friction-plate, and means acting on said cam-pieces to turn them and expand the sections of the friction-plate.

2. In a friction-clutch, the combination of a friction-ring carried by the driven pulley and provided with an internal grooved face, a sectional friction-plate having its periphery provided with grooves corresponding with the grooves of the friction-ring and composed of members E′, E′, loosely connected by bolts H, intermediate springs I acting on the sec-

tions of the friction-plate tending to hold the members contracted, cam-pieces F interposed between the members of the friction-plate, arms carried by the cam-pieces, and slides having cam slots or grooves engaging the arms of the cam-pieces and adapted when moved to actuate the cam-pieces and force the sections of the friction-plate apart.

3. In a friction-clutch, the combination of a friction-ring carried by the driven pulley, a sectional friction-plate composed of two members E′, E′, cam-pieces F arranged between the members and adapted when turned to force the two members E′, E′, outward, arms carried by the pieces F, and slides having cam slots or grooves engaging the arms of the pieces F and adapted when moved to actuate them and rock the cam-pieces F.

In testimony of which invention I hereunto set my hand.

SAMUEL BROWN.

Witnesses:
ERNEST HOWARD HUNTER,
ROSE M. KELLY.