

E. J. BLOOD,  
CANNON.

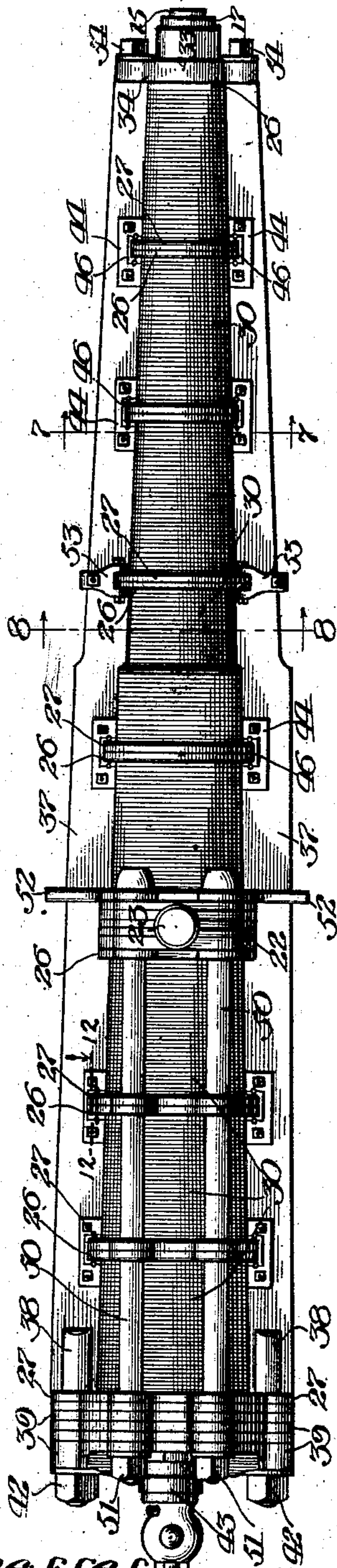
APPLICATION FILED JULY 26, 1909.

958,220.

Patented May 17, 1910.

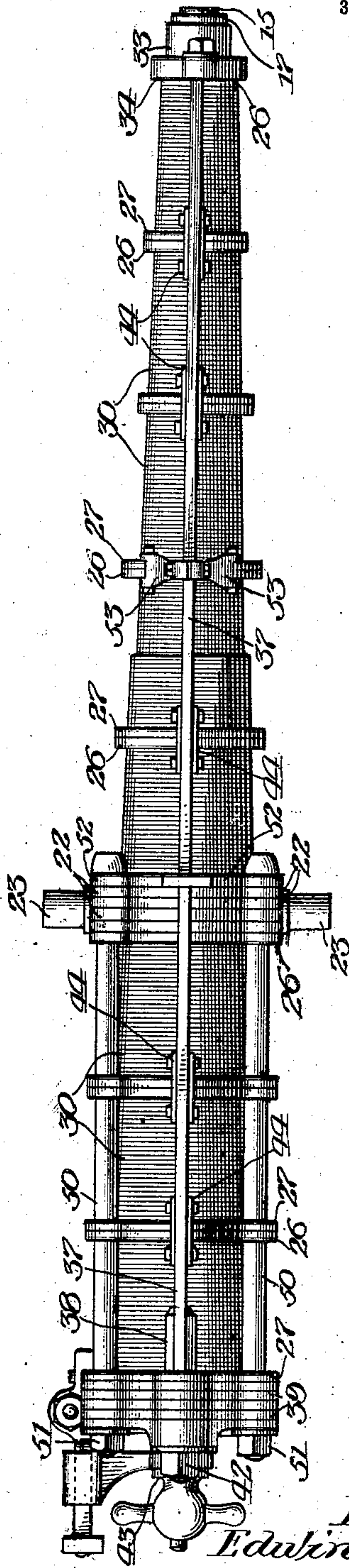
3 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
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Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

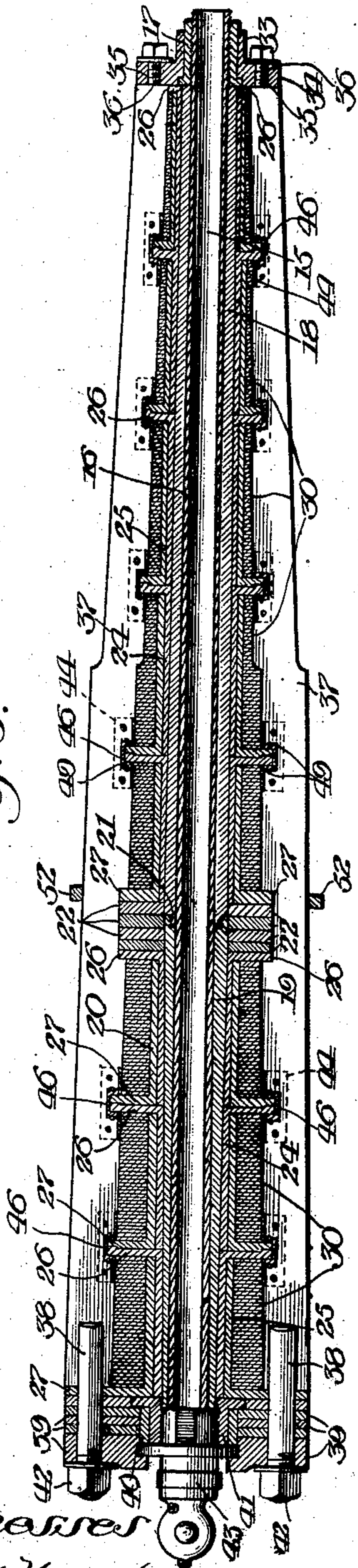


Fig. 5.

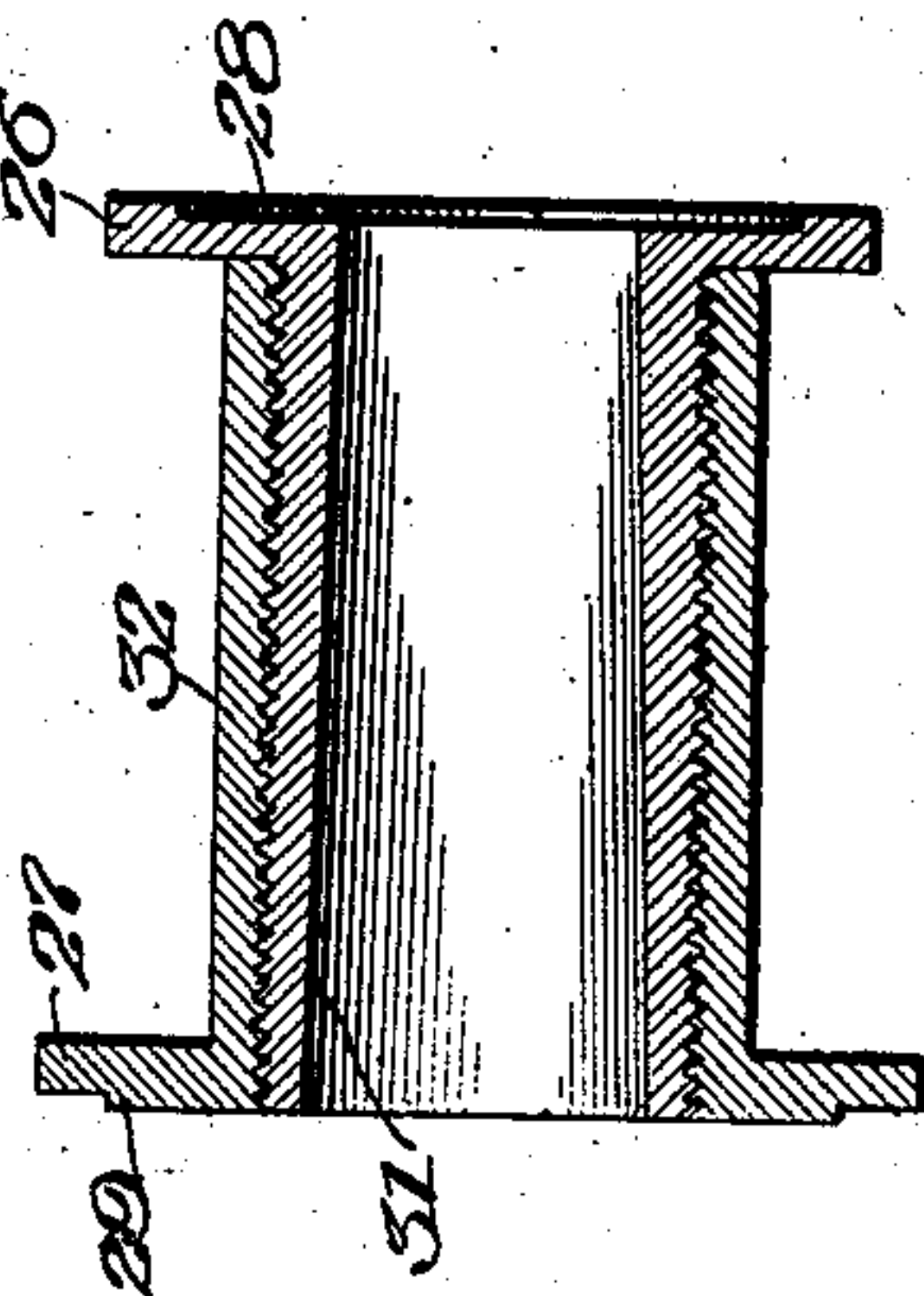
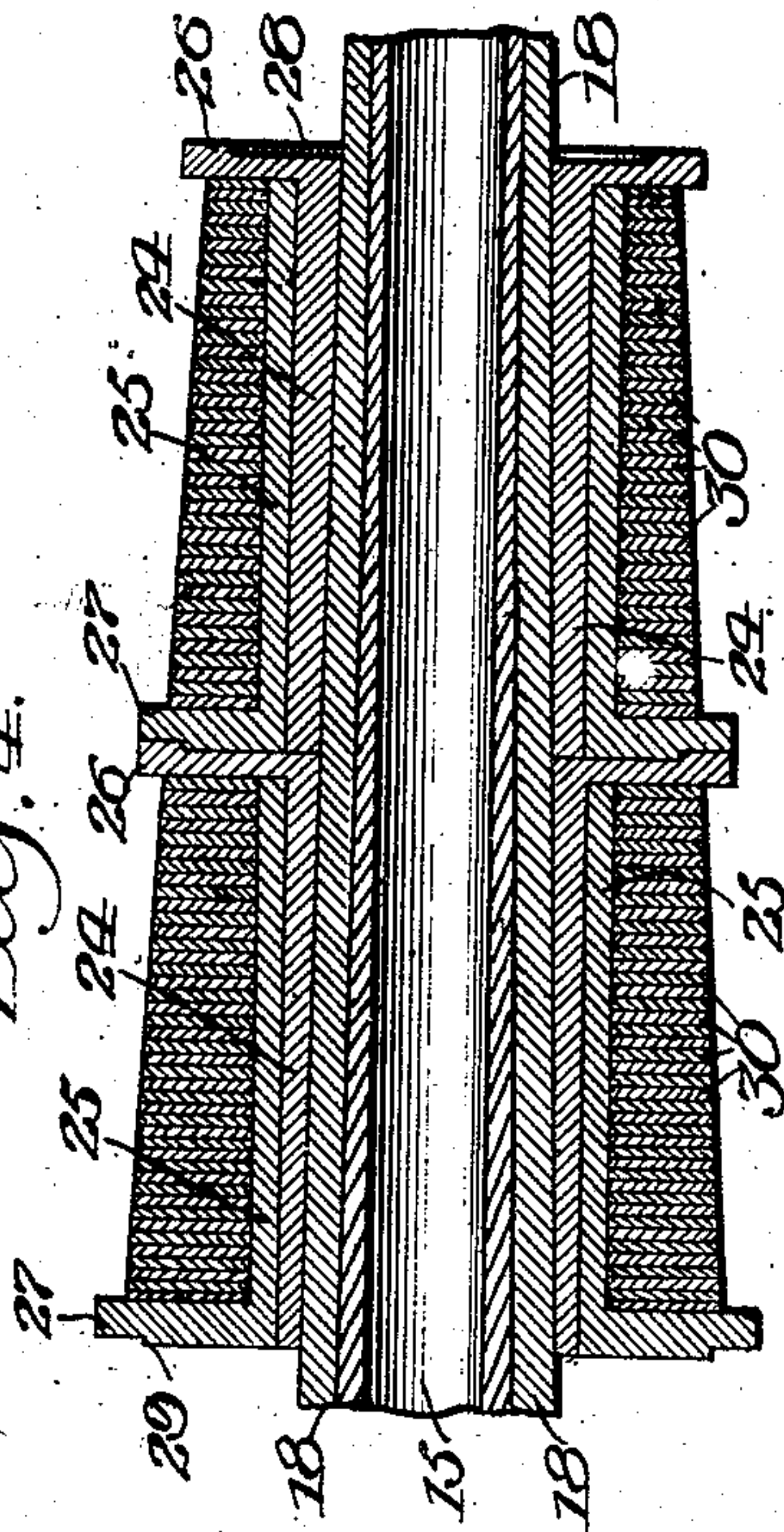


Fig. 4.



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3 SHEETS—SHEET 3.

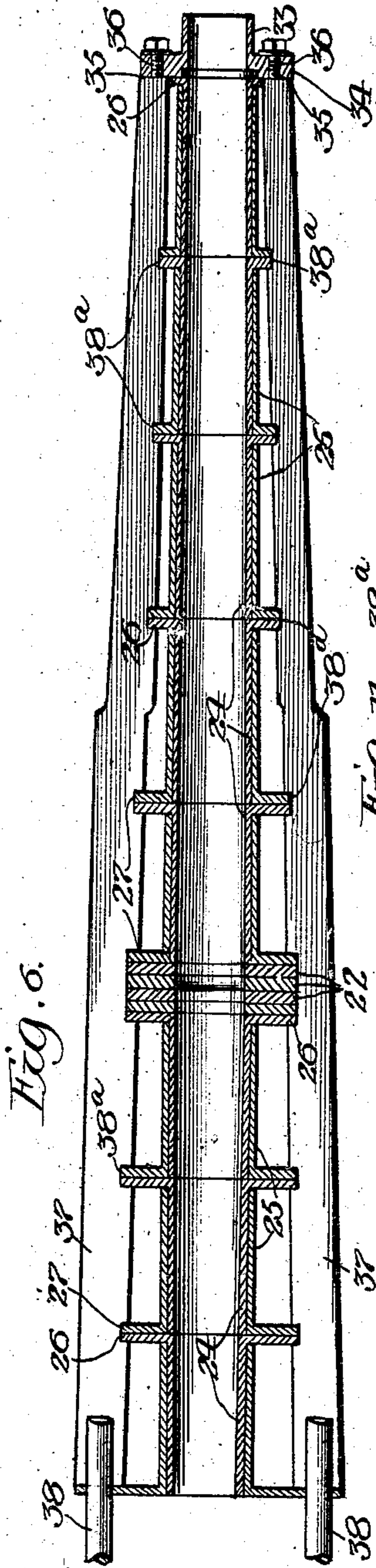


Fig. 6.

Fig. 12.

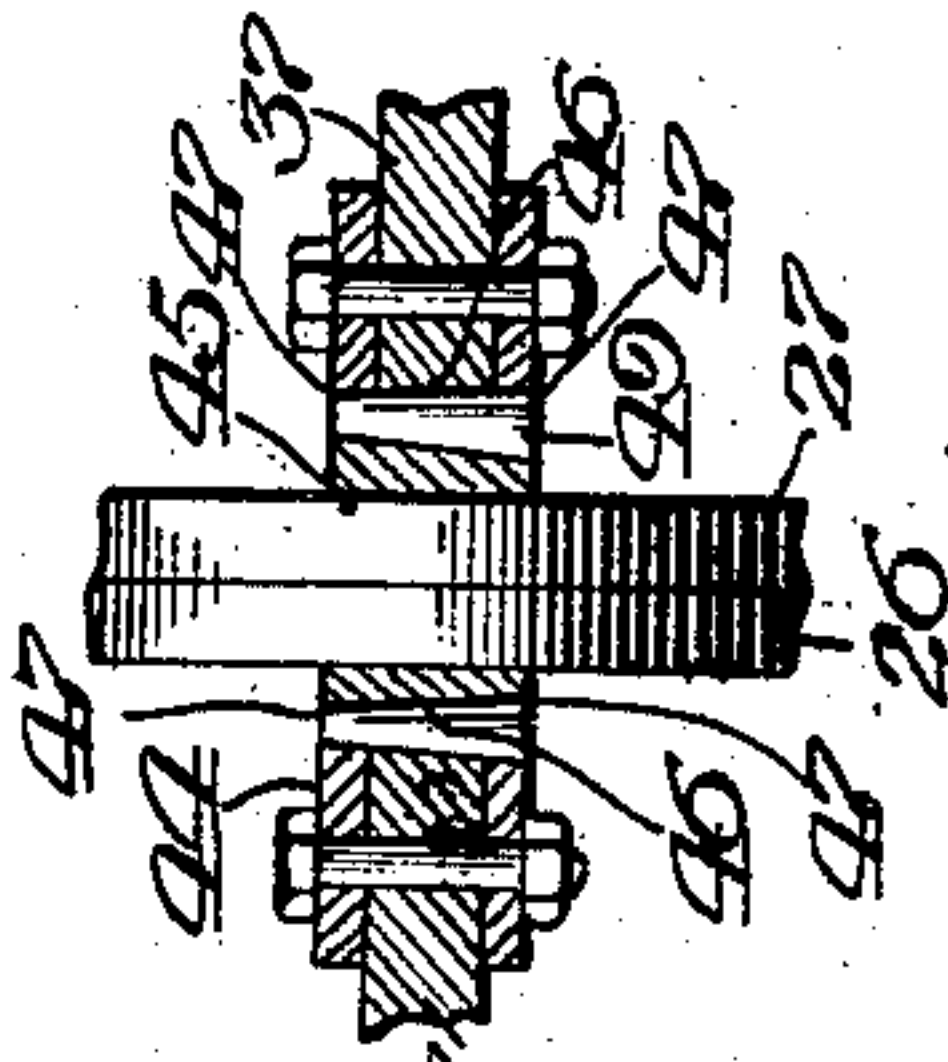


Fig. 11.

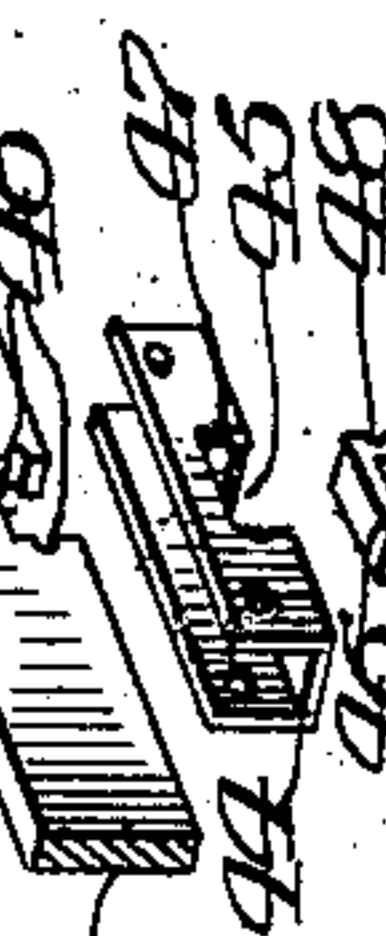


Fig. 10.

Fig. 8.

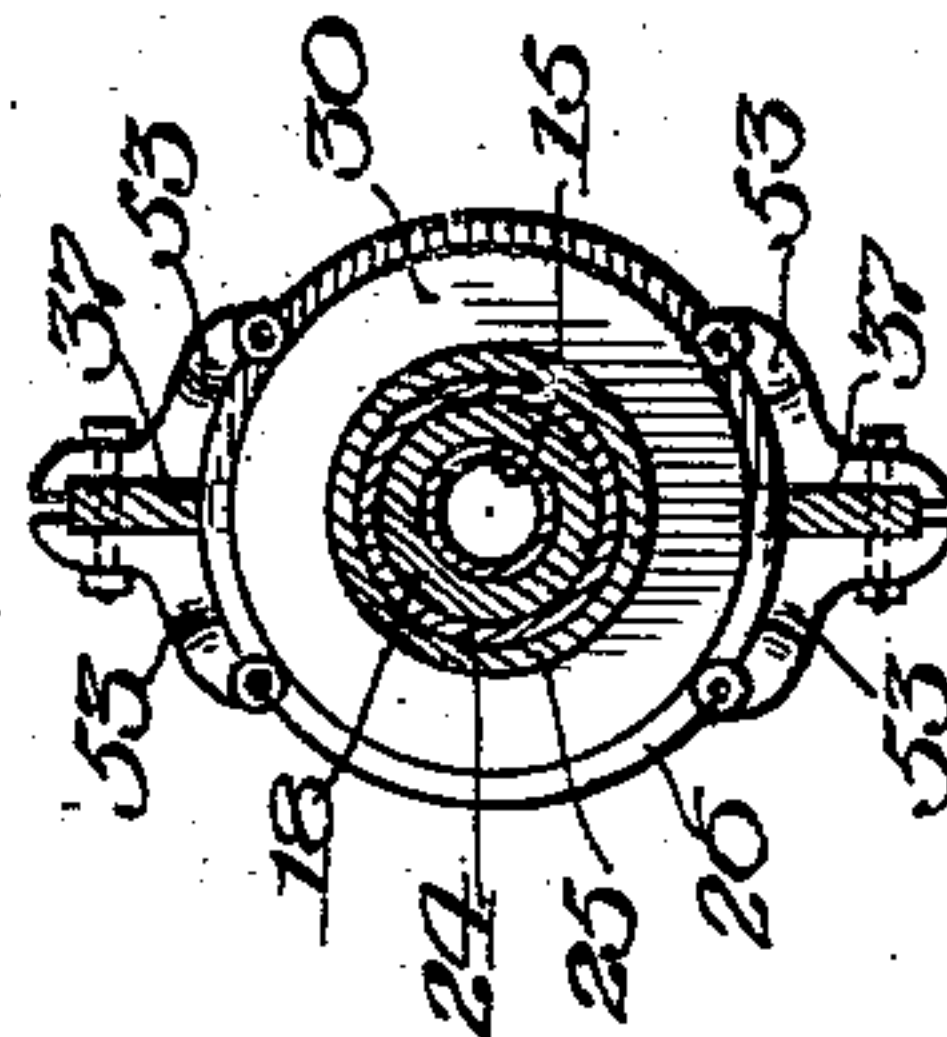


Fig. 13.



Fig. 9.

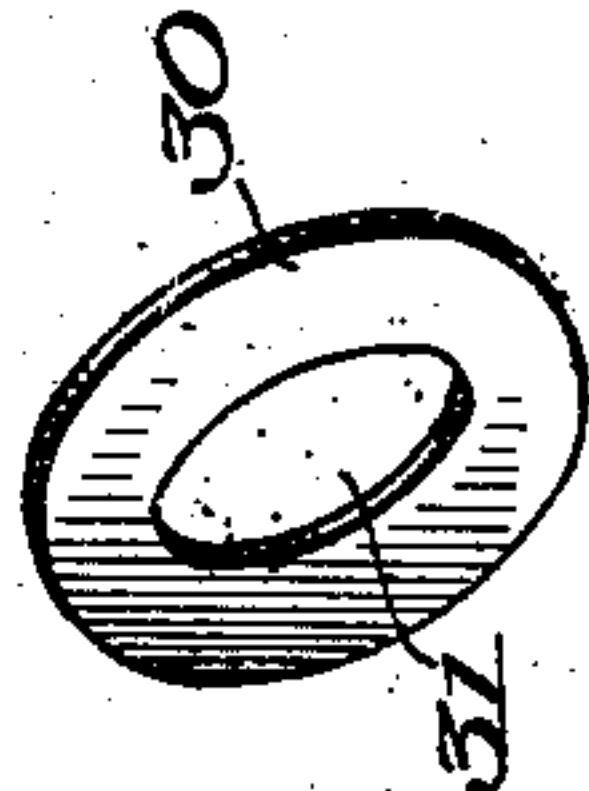
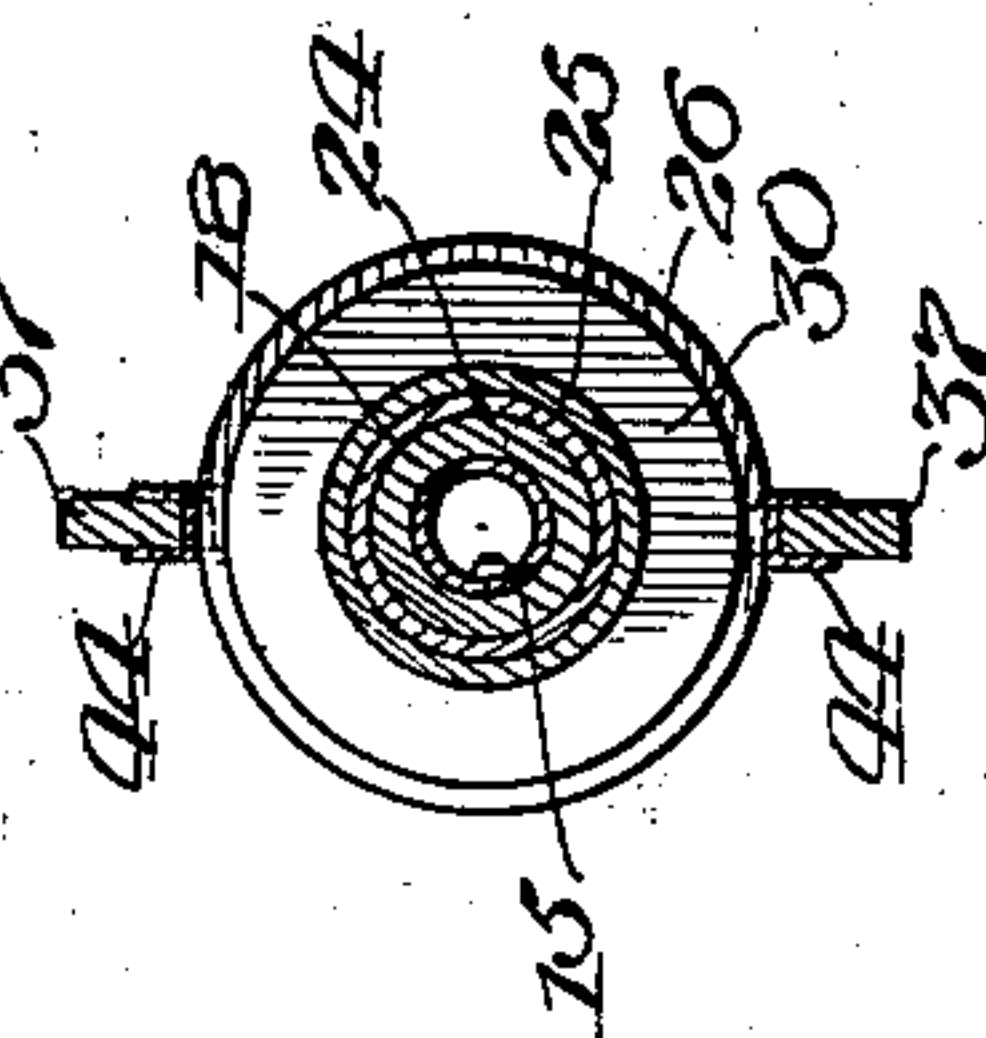


Fig. 7.



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# UNITED STATES PATENT OFFICE.

EDWIN J. BLOOD, OF CHICAGO, ILLINOIS.

CANNON.

958,220.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed July 26, 1909. Serial No. 509,515.

*To all whom it may concern:*

Be it known that I, EDWIN J. BLOOD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Cannon, of which the following is a specification.

This invention has relation to improvements in the construction of heavy ordnance, and one of the principal objects thereof is to provide means whereby the largest type of guns or cannons of great strength and durability can be constructed without the use of very heavy forgings, but instead thereof by the employment of a large number of small parts reduced to very thin or sheet like formation by a rolling process or otherwise, thereby attaining superior and known quality of the parts and avoiding the risks of hidden and inherent defects and internal strains attendant upon heavy forgings.

Another main object of the invention is to provide simple and efficient means for furnishing to the assembled parts great longitudinal strength and rigidity to resist or overcome the longitudinal, as well as the cross-sectional strains produced when the cannon is discharged or fired.

The above-named objects, as well as various other results and advantages, which will hereinafter become evident, are attained by the peculiar construction, novel arrangement, and combination of the parts of the invention, as will be hereinafter more fully set forth and specifically claimed.

In order to enable others skilled in the art to which my invention pertains, to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a view in side elevation of a cannon embodying the invention, showing the parts thereof assembled ready for use; Fig. 2 is a plan view thereof; Fig. 3 is a view partly in elevation and partly in longitudinal section of the completed cannon; Fig. 4 is an enlarged longitudinal sectional view through a portion of the barrels, showing one form of the steel spools which surround the outer barrel and support the steel disks mounted thereon; Fig. 5 is a longitudinal sectional view of one of the disk-carrying spools, showing a modification in its construction; Fig. 6 is a view partly in elevation and partly in longitudinal section

of a series of spools, showing means for securing them together longitudinally; Fig. 7 is a cross-sectional view taken on line 7—7 of Fig. 1 looking in the direction indicated by the arrows; Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 1 looking in the direction indicated by the arrows; Fig. 9 is a detached perspective view of one of the disks which surround the spools; Fig. 10 is a perspective view of a portion of the abutting ends of two of the spools; Fig. 11 is a perspective view of a group of the elements used in connecting the spools together longitudinally. Fig. 12 is an enlarged plan view, partly in section taken in line 12, of Fig. 1, and Fig. 13, is a cross-sectional view of the inner and outer barrels, showing an interposed sleeve for equalizing the tension of said barrels.

Like numerals of reference, refer to corresponding parts throughout the different views of the drawings.

The crystalline formation of a massive steel ingot weighing many tons is but partially changed to a fibrous formation by the process of forging, but when reduced by rollers or otherwise to very thin or sheet like form, the metal is changed entirely to a fibrous formation increasing its tensile strength several hundred per cent., sometimes reaching as high as three hundred thousand pounds per square inch while ninety thousand pounds per square inch is high in a massive forging, hence to insure the greatest strength and durability in the larger type of guns or cannons I prefer and usually will employ metal of a fibrous formation and in pieces of such size and form as may be desired to attain high tensile strength and to enable parts of superior and known quality only to be selected and incorporated in the structure of the cannon.

Referring now, and more particularly to Fig. 3, of the drawings, the reference numeral 15, designates the inner barrel of the gun, which is tapered on its outer surface from its breech end to the muzzle end thereof and is provided with a longitudinal bore 16, throughout its entire length. The muzzle end of the barrel 15, is externally screw-threaded to engage a nut 17, to abut against the front end of the outer barrel and the front of one of a series of spools, so as to assist in securely holding said members together. The outer barrel is preferably made of a front section 18, and a rear sec-



tion 19, the inner end of one of which, usually the rear section may be provided with a circumferential recess 20, to receive a correspondingly shaped and sized extension 21, on the inner end of the other section, usually the front one. These sections are provided with a bore which tapers uniformly from the rear to the front end of the barrel, to receive the externally tapered inner barrel, and each of said sections is externally tapered from its inner to its outer end so that when joined, the greatest diameter of the outer barrel, which said sections form, will be at the juncture of the sections, which juncture is preferably located at or near the trunnions. Surrounding the adjacent portions of the sections 18, and 19, are a series of trunnion-disks 22, under tension, some of which may be formed or provided so as to be located on opposite sides of the gun, with extensions 23, or trunnions. Located on and around the sections 18, and 19, forming the outer barrel are a series of metal spools, usually of steel, each of which consists of two tubular body members 24, and 25, one fitted within the other under tension, and having at opposite ends annular flanges or heads 26, and 27, respectively. The outer surface of one of the flanges of each of the spools is provided with an annular recess 28, to receive a correspondingly shaped and sized extension 29, on the outer surface of the adjacent flange or head of another spool, thus affording interlocking means for the heads of the spools, as well as means for distributing or dividing between the meeting flanges or heads the cross-sectional strain which may occur at their juncture.

As is clearly shown in Figs. 4, and 6, of the drawings, the bores of the inner tubular body members of the spools are tapered, to correspond with the taper of the sections 18, and 19, of the outer barrel, around which sections they are closely fitted and securely held as will be presently explained. Before the tubular bodies of each spool are telescoped or fitted one within another, a series of metal or steel disks 30, each having a central opening 31, to receive the outer body or tubular member, is forced thereon until said member is completely covered therewith, after which the inner member is forced into the outer one until its flange, contacts with the flangeless end of the outer member and with one of the disks 30, thereon. When the disks 30, and members 24, and 25, of each spool have thus been assembled, it is apparent that the spools may be forced one at a time on the outer barrel and, from each end thereof, in which operation it will be understood, (see Fig. 3,) that the flange or head 27, of the spool on the inner end of the section 18, of the outer barrel will rest against the front trunnion-disk 22, and that the flange 26, of the spool

on the inner end of the section 19, will rest against the rear trunnion-disk, which disks and the said flanges, as well as all of the spool flanges are of greater diameter than the spool disks. Ordinarily the inner and outer tubular members of each spool will have their outer and inner surfaces respectively, smooth as shown in Figs. 3, and 4, but sometimes tubular members 31, and 32, having screw-threads on their adjacent surfaces, as shown in Fig. 5, may be employed. Surrounding the nut 17, at the muzzle is a collar 33, having a flange 34, which rests against the head 26, of the front spool. The flange 34, of the collar 33, is provided with a number of openings 35, to receive reduced and screw-threaded portions 36, on strengthening members 37, which may consist of any desired number, and may be rods or bars, as shown in the present instance. Each of the members is provided on its inner surface with a series of recesses 38<sup>a</sup>, located at suitable distances apart to receive the abutting flanges 26, and 27, of the spools. The rear end of each of the members 37, is provided with a rearward extension 38, which has its outer end screw-threaded, and said extensions are passed through suitable openings in the flange 27, of the rear spool, and also through suitable openings in the breech-plates 39, which are located around a collar 40, which surrounds a screw-threaded collar 41, which engages the rear end of the section 19, of the outer barrel. The outer end of each of the extensions 38, has secured thereon a nut 42, by means of which the breech-plates 39, may be forced against the rear surface of the flange 27, of the rear spool.

As the invention does not involve the construction of the breech-block, it is deemed unnecessary to enter into a detailed description of its construction, and I desire it to be understood that I may employ any suitable kind of such block 43, without departing from the spirit of the invention.

Secured longitudinally on the inner portion of each of the members 37, at each of the recesses 38<sup>a</sup>, therein, is a channeled clip 44, each of which has a transverse recess 45, to register with the recesses 38<sup>a</sup>, and to receive saddles 46, which stride the abutting flanges or heads 26, and 27, of the disk-carrying spools. Each of the transverse recesses 38<sup>a</sup>, in the members 37, is provided in each of its ends with a horizontally and transversely disposed pin-seat 46, to register with similar seats 47, in each end of each of the transverse recesses 45, in each of the said clips. As shown, each of the saddles 46, is channeled transversely and has in each of its ends a cross-wise pin-seat 48, which together with the seats 46, and 47, form tapered openings for the tapered pins or wedges 49, used for securing said parts to-



gether. By forcing the tapered pins or wedges 49, into the tapered openings formed by the seats 46, 47, and 48, it is apparent that additional strength will be afforded to the spools, to withstand the longitudinal strain to which they will be subjected.

As shown in Figs. 1, and 2, of the drawings, the trunnion disks 22, and breech-plates 39, as well as the spool flanges therebetween, are of sufficient size so as to extend outwardly from the peripheries of the disks 30, and are connected together by means of strong bolts 50, which are extended through suitable openings in the trunnion disks, breech plates, and spool flanges, and have on their rear ends nuts 51, to securely hold said members together. Surrounding the members 37, as well as the disks 30, at or near the trunnion disks 22, is a ring 52, which may be forced on the members 37, from the tapered ends thereof, until it reaches the desired location where it is evident that it will assist in holding the members 37, against the spool disks 30, as well as against the flanges 26, and 27, thereof. At a suitable point in front of the trunnion disks, one pair of the spool flanges or heads 26, and 27, (see Figs. 1, 2, and 8,) is provided at opposite points with saddles for the strengthening members 37, each of which saddles preferably consists of two members 53, each of which is bolted at one of its ends to said flanges and near their other ends to the members 37, thus firmly uniting said members to said flanges.

From the foregoing and by reference to the drawings it will be readily understood and clearly seen that the disk carrying spools when assembled on the outer barrel and when connected together by the strengthening members 37, will in conjunction with said members and barrel provide a foundation frame of truss formation, giving to the gun great rigidity and longitudinal strength, as well as furnishing great resistance to cross-sectional strains.

As before stated the disk carrying spools may be assembled on the outer barrel one at a time, or may be removed therefrom one at a time, thus affording easy means for detaching the parts, so that they may be readily transported. After the disk carrying spools shall have been assembled on the sections of the outer barrel, and secured together by means of the longitudinally extended strengthening members 37, and bolts or rods 50, and the nuts 42, 54, and 51, on said members and bolts, it is obvious that as the outer barrel is tapered internally from its rear end forwardly, the externally tapered inner barrel 15, may be inserted therein under pressure, and when damaged may be removed and another one substituted. In order to attain even or uniform pressure or tension of the inner and outer barrels, when

the former is inserted in the bore of the latter I may sometimes use a sleeve 55, of copper or other ductile material around the inner barrel as is shown in Fig. 13, of the drawings.

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

1. A cannon consisting of a barrel, a series of spools mounted thereon, each spool consisting of two tubular body members fitted one within the other and having at opposite ends an outwardly extended flange, reinforcing material surrounding the outer body member, and means to secure said spools together and on the barrel.

2. A cannon consisting of a barrel, a series of spools mounted thereon, each spool consisting of two tubular body members fitted one within the other and having at opposite ends an outwardly extended flange, reinforcing material surrounding the outer body member, longitudinally extended strengthening members located on the outer surface of the reinforcing material and in engagement with the flanges of the spools, and means at the ends of the strengthening members to secure them, the spools and barrels together.

3. A cannon consisting of a barrel, a series of spools mounted thereon, each spool consisting of two tubular body members fitted one within the other and having at opposite ends an outwardly extended flange, a series of disks located on the outer body member of each spool and presenting their edges to its outer surface, and means to secure said spools together and on the barrel.

4. A cannon consisting of an inner barrel, an outer barrel surrounding the same and externally tapered, a series of spools mounted on the outer barrel, each spool consisting of two tubular body members fitted one within the other and having at opposite ends an outwardly extended flange, reinforcing material surrounding the outer body member, and means to secure said spools together on the outer barrel.

5. A cannon consisting of an inner barrel having its front portion externally screw-threaded, an outer barrel surrounding the same and externally tapered, a series of spools mounted on the outer barrel, each spool consisting of two tubular body members fitted one within the other and having at opposite ends an outwardly extended flange, reinforcing means surrounding the outer body member, a nut engaging the front portion of the inner barrel, a flanged collar on said nut, longitudinally extended strengthening members located on the outer surface of the reinforcing material and in engagement with the flanges of the spools and the flange of said collar, means at the rear end of the strengthening members and



barrels to secure said members, spools, and barrels together.

6. A cannon consisting of an inner barrel, an outer barrel consisting of oppositely tapered sections surrounding the same, a series of spools mounted on the sections of the outer barrel, each spool consisting of two tubular body members fitted one within the other and having at opposite ends an outwardly extended flange, a series of disks located on the outer body member of each spool and presenting their edges to its outer

surface, longitudinally extended strengthening members located on the outer surface of said disks and each having recesses to engage the abutting flanges of the spools, and means at the ends of the strengthening members to secure them, the spools and barrels together.

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Witnesses:

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