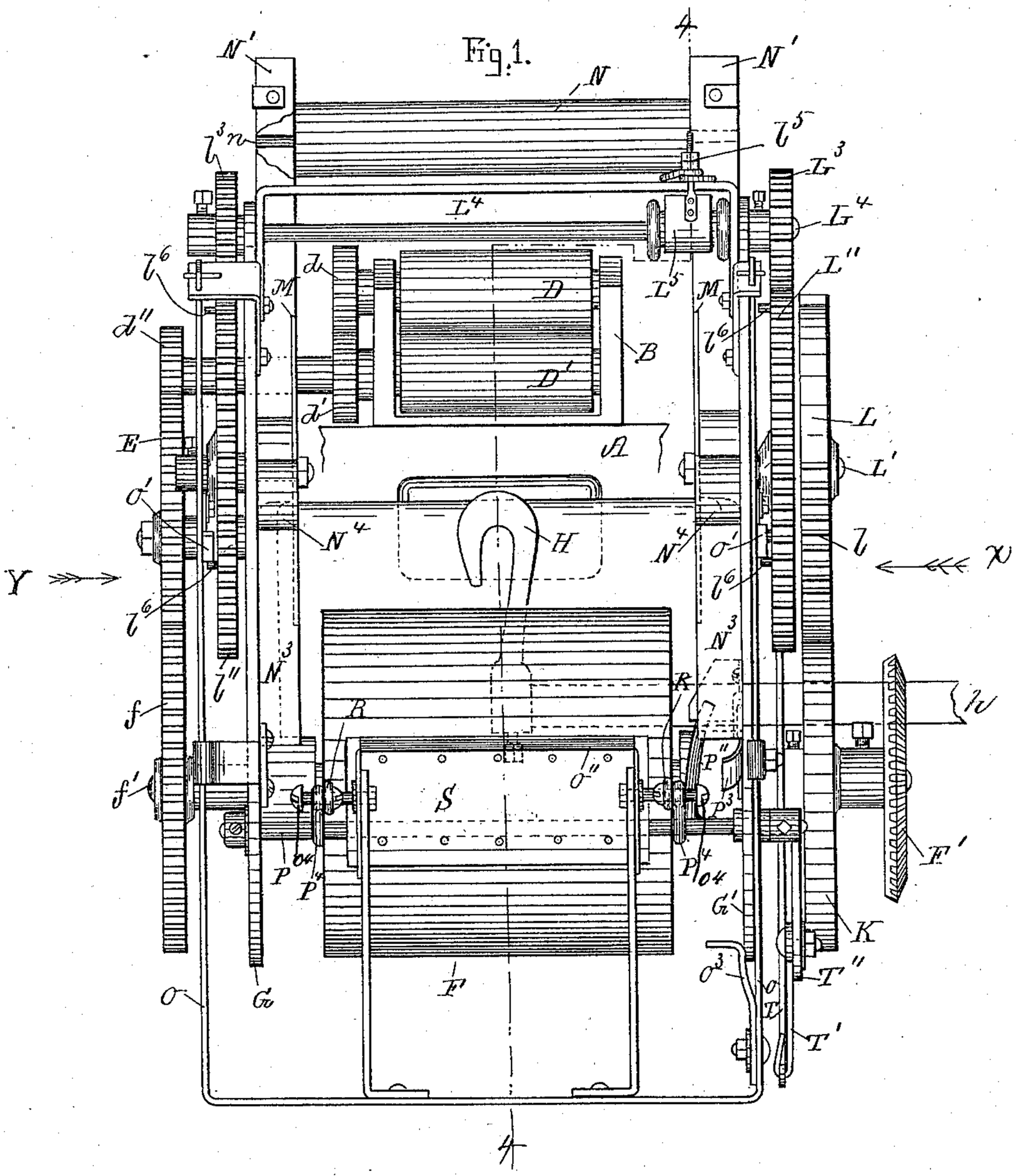
(No Model.) 4 Sheets—Sheet 1.

H. WHITE.

BALLING MACHINE.

No. 544,941. Patented Aug. 20, 1895.

Fig. 1.



Witnesses.

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Charles A. Harris.

Inventor:

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(No Model.) 4 Sheets—Sheet 2.

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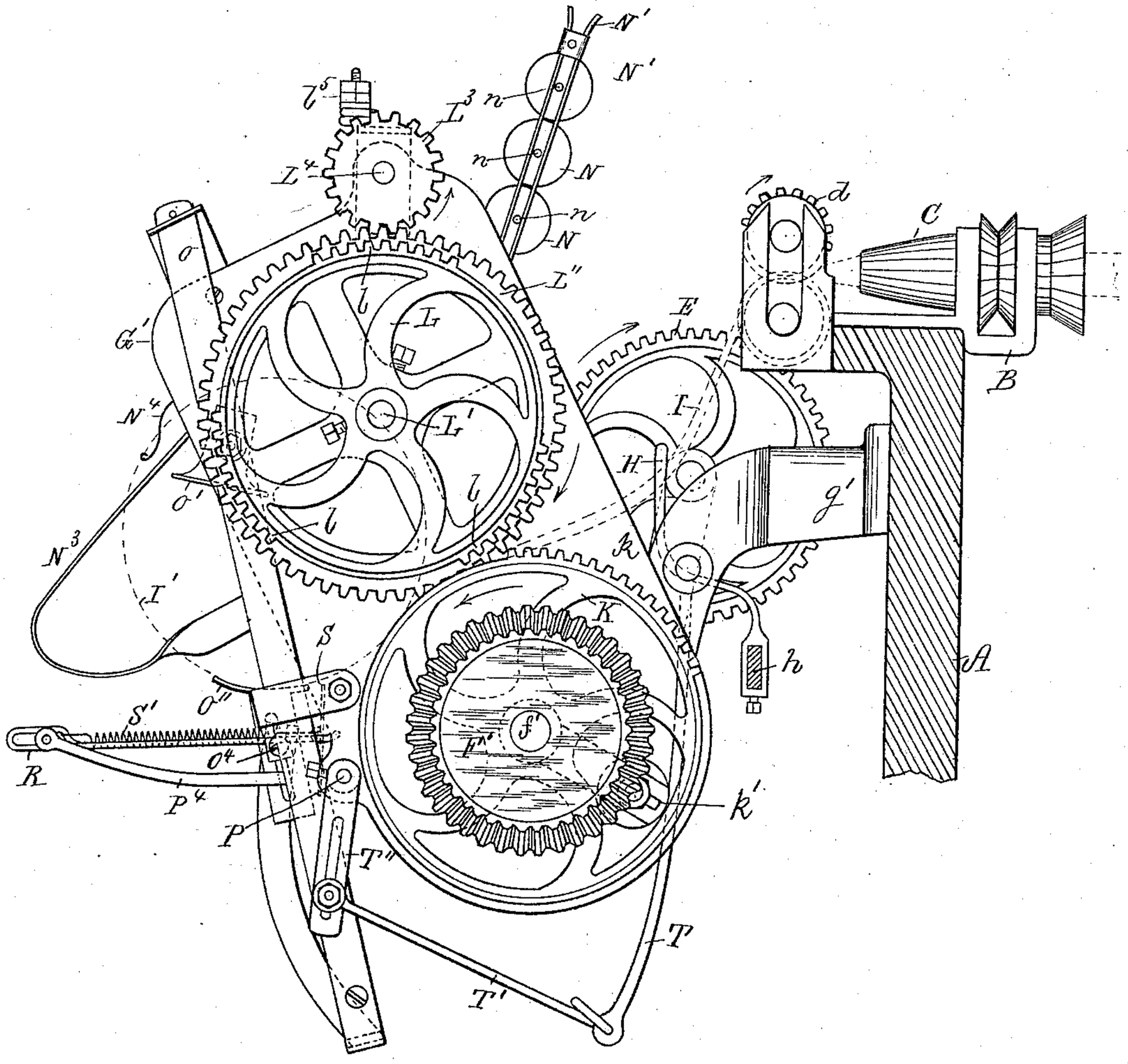
Fig. 2.



Witnesses.

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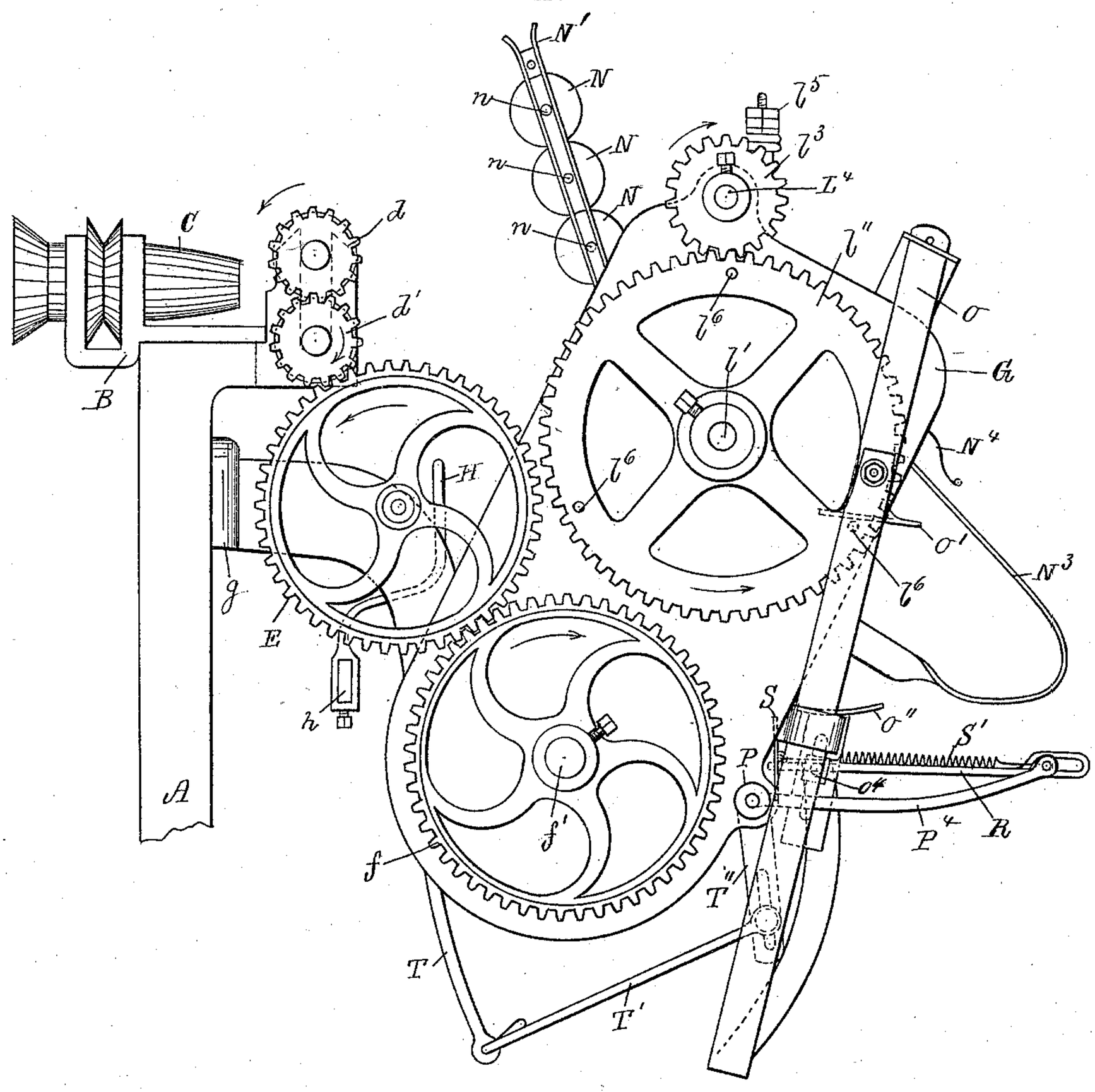
(No Model.) 4 Sheets—Sheet 3.

H. WHITE.

BALLING MACHINE.

No. 544,941. Patented Aug. 20, 1895.

Fig. 3.



Witnesses.

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(No Model.) 4 Sheets—Sheet 4.

H. WHITE.

BALLING MACHINE.

No. 544,941. Patented Aug. 20, 1895.

Fig. 4.

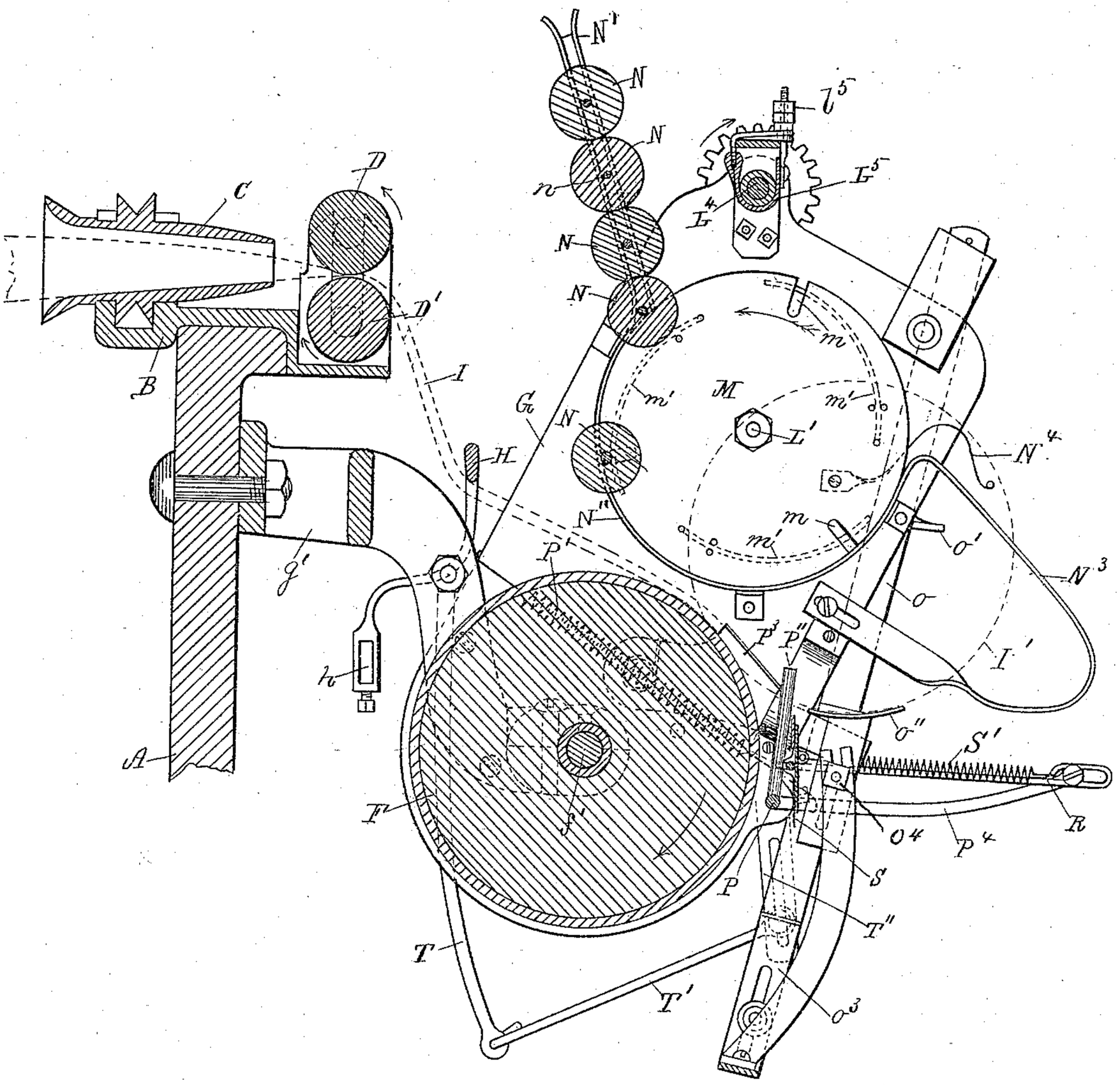
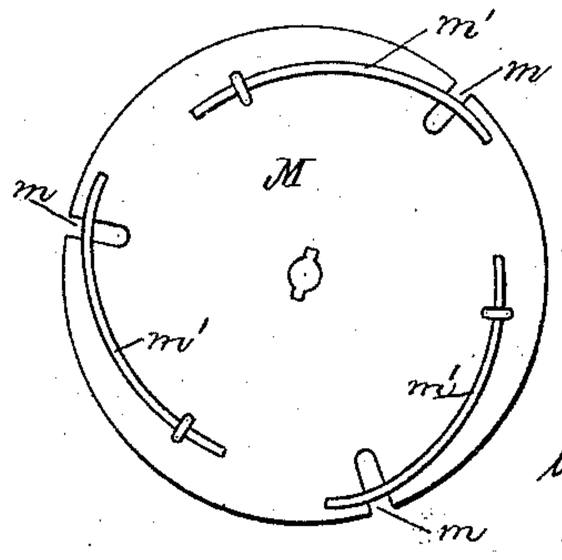


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY WHITE, OF NORTH ANDOVER, ASSIGNOR OF ONE-HALF TO HARRY SUTTON, OF SALEM, MASSACHUSETTS.

BALLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 544,941, dated August 20, 1895.

Application filed March 11, 1895. Serial No. 541,316. (No model.)

To all whom it may concern:

Be it known that I, HENRY WHITE, a citizen of the United States, and a resident of North Andover, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Balling-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in balling-machines; and its objects are to automatically wind the sliver from a wool-carding engine upon successive cores or spools and to automatically cut or break off the sliver when the spool is filled to the desired size, as well as to automatically eject such filled spool from the balling-machine and to automatically feed a fresh core to be filled, thus dispensing with constant watching of the balling-machine, removing the filled spool when made of the desired size, and inserting an empty core to be filled, as will hereinafter be more fully shown and described, reference being had to the accompanying drawings, wherein—

Figure 1 represents a front elevation of the invention. Fig. 2 represents a side elevation seen from X in Fig. 1. Fig. 3 represents a side elevation seen from Y in Fig. 1. Fig. 4 represents a vertical section on the broken line 4 4 shown in Fig. 1, and Fig. 5 represents a detail exterior view of one of the notched spool-carrying disks.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

A in Figs. 2, 3, and 4 represents one of the side frames of a carding-engine, to which is secured a bracket B, in which are journaled the rotary twister-tube C and feed-rollers D D′ in the usual manner. The feed-rollers D D′ are provided with intermeshing gear-pinions *d d′*, the latter having its teeth meshing into the teeth of the loose intermediate gear E, meshing in the teeth of the gear *f* on the drum-shaft *f′*, to which the drum F is secured, as is common in balling-machines. The said drum-shaft is journaled in sides or frames G G′, attached to or made in one piece with brackets *g g′*, secured in a suitable manner to the frame A of the carding-engine. To one end of the drum-shaft *f′* is secured a bevel-gear F′, which is set in rotary motion by means of a suitable gear or mechanism from the carding-engine, as usual.

h in Figs. 1, 2, 3, and 4 represents the longitudinally-movable sliver guide-rod actuated by the mechanism on the carding-engine, as usual, and to said rod is secured the hook H, which guides the sliver I lengthwise relative to the drum during the balling operation, as is common in devices of this kind.

Outside of the frame G′ is secured to the drum-shaft *f′* a wheel K, having a segmental gear-surface *k*, as shown in Figs. 1 and 2, which gear is set in a constant rotary motion in the direction of arrow shown in Fig. 2 by the bevel-gear F′ and suitable mechanism from the carding-engine. The segmental gear portion *k* intermeshes intermittently with segmental gear portions *l l l* on the gear L, secured to the shaft L′, journaled in the side frame G′, as shown in Fig. 2. To the shaft L′ is secured a gear L″, the teeth of which mesh into a pinion L^3, secured to a shaft L^4, journaled in the frames G and G′, and having secured to its other end, outside of the side frame G, a similar pinion 13, the teeth of which mesh in a gear *l″*, secured to a shaft *l′*, journaled in the side frame G, as fully shown in Figs. 1 and 3. To the shafts L′ and *l′* are secured, inside of the frames G G′, the spool-carrying circular disks M M, having radial notches *m m m*, adapted to receive the end trunnions *n n* of the cores N N N as they are being fed from the racks or core-guides N′ N′, secured to the frames G G′, as shown in the drawings. It will thus be seen that the spool-carrying disks M M are coupled together and caused to rotate intermittently together by the intermediate connecting mechanism consisting of the gears L″ *l″*, shafts L′ *l′*, pinions L^3 l^3, and pinion-shaft L^4, as hereinabove described.

L^5 is a friction band or shoe, which is adjustably held in frictional contact with the pinion-shaft L^4 by means of adjustable nuts l^5 for the purpose of imparting a tension on the disks M M and holding the ball I′ (in dotted lines in Fig. 4) in proper frictional contact with the rotating drum F as the sliver is being wound on the core or spool during the balling operation.

N″ N″ are semicircular strips, (one for each

disk M,) each of which forms a continuation of the rear wall of the core-guide or rack N′, as shown in Fig. 4, and serves to hold the cores N, connected to the disks M M, during the balling operation. Each semicircular strip N″ terminates at its front end as an inclined discharge-guide N^3, projecting sufficiently in front of the machine so as to permit the filled ball to fall from the machine without coming in contact with the raising and sliver-cutting-off mechanism arranged below such discharge-guides. As the ball increases in size it is caused to rise upward, and in so doing it causes the heads M M to turn slowly in the direction of the arrow shown in Fig. 4, and when the ball is filled to the desired size the heads have been rotated sufficiently to cause the segmental gear portion *k* to engage with one of the segmental gear portions 1 on the gear L, causing the latter to be rotated a part of a revolution, and in so doing causes the gears L″ *l*″ also to rotate a part of a revolution. During the rotation of said gears L″ *l*″ pins or projections l^6 l^6 thereon come in contact with projections O′ O′ on the lifter-bars O O, which are guided in the frames G G′ and have attached to them in a suitable adjustable manner the ball-lifter plate O″, which is automatically raised by the intermittent rotation of the gears L *l*, so as to automatically raise the filled ball from the drum against yielding springs N^4, arranged above the discharge-ways N^3, (shown in Fig. 4,) previous to the cutting of the sliver by the cutting device hereinafter to be described.

During the operation of filling one spool another one is automatically dropped from the guides N′ into the notches *m m* in the heads M M ready to receive the sliver as soon as it is cut off and the filled ball discharged at the front of the machine.

The cutting device for automatically cutting off the sliver when the filled ball is raised from the drum F previous to its discharge is constructed as follows: In the lower front portion of the frames G G′ is journaled a shaft P, which is normally held in the position shown in the drawings, preferably by means of a spring P′, (shown in dotted lines in Fig. 4,) which causes a projection P″ on said shaft to be held in contact with a pivoted latch P^3. (Shown in Fig. 4.) On the inside of one of the lifter-bars O is a projection O^3, Fig. 1, which, as the lifter-bars are raised, comes in contact with said latch P^3 and raises it sufficiently to disengage the projection P″ from said latch during the cutting of the sliver. The shaft P is provided with a pair of forwardly-projecting arms or brackets P^4 P^4, to the forward ends of which is loosely pivoted the cutter-carrier R, on the rear of which is hung the cutter-blade S, normally held in the position shown by means of a suitable spring S′. On the lifter-plate O″ are attached side projections O^4 O^4, which come in contact with the cutter-carrier R during the upward motion of said lifter-plate O″ and its lifter-bars O O, thus causing said cutter to be raised into proper position before being released to cut off the sliver. As soon as the latch P^3 is released, as stated, from the projection P″, the arms P^4 are swung upward by the influence of the spring P′, by which the cutter-blade S is moved over the face of the drum F below the filled ball, thus causing the sliver to be cut off at or about the same time as the filled ball is ejected from between the springs N^4 and the upper portions of the discharge-guides N^3, while at or about the same time an empty spool N is brought by the heads M M in position on the drum F to receive the severed end of the sliver, which is then caused to be wound upon such core, as in the beginning.

m′ m′ m′ in Fig. 5 and dotted lines in Fig. 4 represent springs arranged on the heads M adjacent to their notches *m*, and they serve for holding the trunnions of the spool while being filled against the semicircular band N″, and also serve in ejecting the filled balls from such notches after said balls have been raised by the lifter device.

The cutting-off device is automatically returned to its normal position shown in the drawings after the sliver has been cut off by a pin or pin and roll *k′* on the gear K coming in contact with a lever T, pivoted at its upper end to the frame or bracket *g′* and having connected to its lower end a link T′, the forward end of which is adjustably connected to a lever T″, secured to the shaft P, as shown in Figs. 2, 3, and 4, causing the projection P″ to come to a stop against the pivoted latch P^3, as shown in Fig. 4.

The operation is as follows: The sliver I as it comes from the delivery-roll of the carding-engine is conducted through the twister-tube C, through the feed-rolls D D′, and through the laterally-movable guide H, as usual, and is received and wound upon a core N, journaled in the revolving heads M M, which are revolved by the filling of the core, which is rotated by friction from the drum F. During the filling operation of one spool another core is taken from the guideways N′ into the notched rotary heads M M. As the spool increases in size it rises and causes the heads M M to revolve, and when the spool is filled to the desired size the sectional gears *k l* intermesh and rotate the heads positively a part of a revolution and raise the filled spool I′ from the drum F and bring a fresh empty core N against the said drum F. During the rotation of the segmental gears *k l* the lifter and lifter-plate raise the filled spool from the notched heads and hold it in such additionally-raised position until the cutting-off device is released by the lifter-bar projection O^3 coming in contact with the releasing-latch P^3 when the cutting-off plate is drawn backward by its spring crosswise over the sliver which is thus cut off or broken. The cutting-off device is then returned to its normal position by the pin or pin and roll on the gear K coming in contact with the lever connected

to the shaft of the cutting-off device. After the sliver has been cut off the lifter-bars are released from the pins of the segmental gears and drop to their normal positions by gravity or springs and are released from the filled spool, which is then free to drop from the inclined ways N^3 onto the floor or into a suitable receptacle at or about the same time the end of the sliver commences to wind on the next core, and so on.

By the use of this my improved balling-machine it is not necessary to employ a special attendant to insert a core and wind the end of the sliver upon it and to remove the filled spool and cut or tear off the sliver when such spool is removed, as all that is needed for the attendant to do is to keep the core-guides charged with empty cores, and consequently one person can attend a number of balling-machines, thus saving a great amount of time and labor.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a balling machine a pair of intermittently rotating notched heads, core guides, and a series of cores arranged in said core guides communicating with the notches in said heads combined with an automatic ball lifter and discharge device and an automatic sliver severing mechanism substantially as and for the purpose set forth.

2. In a balling machine a constantly revolving drum having secured to its shaft a segmental gear combined with a pair of intermittently rotating notched spool carrying heads gearing for rotating said heads in unison, one of said heads having secured to its axle a segmental gear meshing in the segmental gear on the drum shaft substantially as and for the purpose set forth.

3. In a balling machine, the combination of a rotary drum, a pair of intermittently rotating notched core carrying heads, a lifter and ball discharge device, gears secured to said heads, and projections carried by said gears and operating to engage and raise said lifter and ball discharge device, substantially as described.

4. In a balling machine, a rotary drum and intermittently rotating notched core carrying heads combined with a ball lifter and discharge device, a pivoted spring pressed sliver cutting off device, a pivoted latch normally holding said cutting off device inoperative, and projections carried by the ball lifting device and operating to release said pivoted latch during the operation of cutting off the sliver, substantially as described.

5. In a balling machine, the combination of a rotary drum, core guides, a pair of intermittently rotating notched core carrying heads adapted to receive the cores from the core guides, a spring actuated sliver cutting off device, a ball lifter and discharge device, means for releasing said cutting off device, and mechanism for returning the cutting off device to its normal position, substantially as described.

6. In a balling machine, the combination of a rotary drum, core guides, a pair of intermittently rotating notched core carrying heads, gear wheels secured on said heads, a shaft, pinions mounted in said shaft and meshing with said gears, and an adjustable friction device for regulating the tension on said heads, substantially as described.

7. In a balling machine a rotary drum and a pair of intermittently rotating notched core carrying heads M, M, having springs m', m', combined with core guides N′, N′, and the semi-circular inclosing bands N″, N″, with their forwardly projecting curved or inclined ball discharging portions N^3, N^3, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 31st day of January, A. D. 1895.

HENRY WHITE.

Witnesses:
ALBAN ANDRÉN,
CLIFTON M. CHAPMAN.