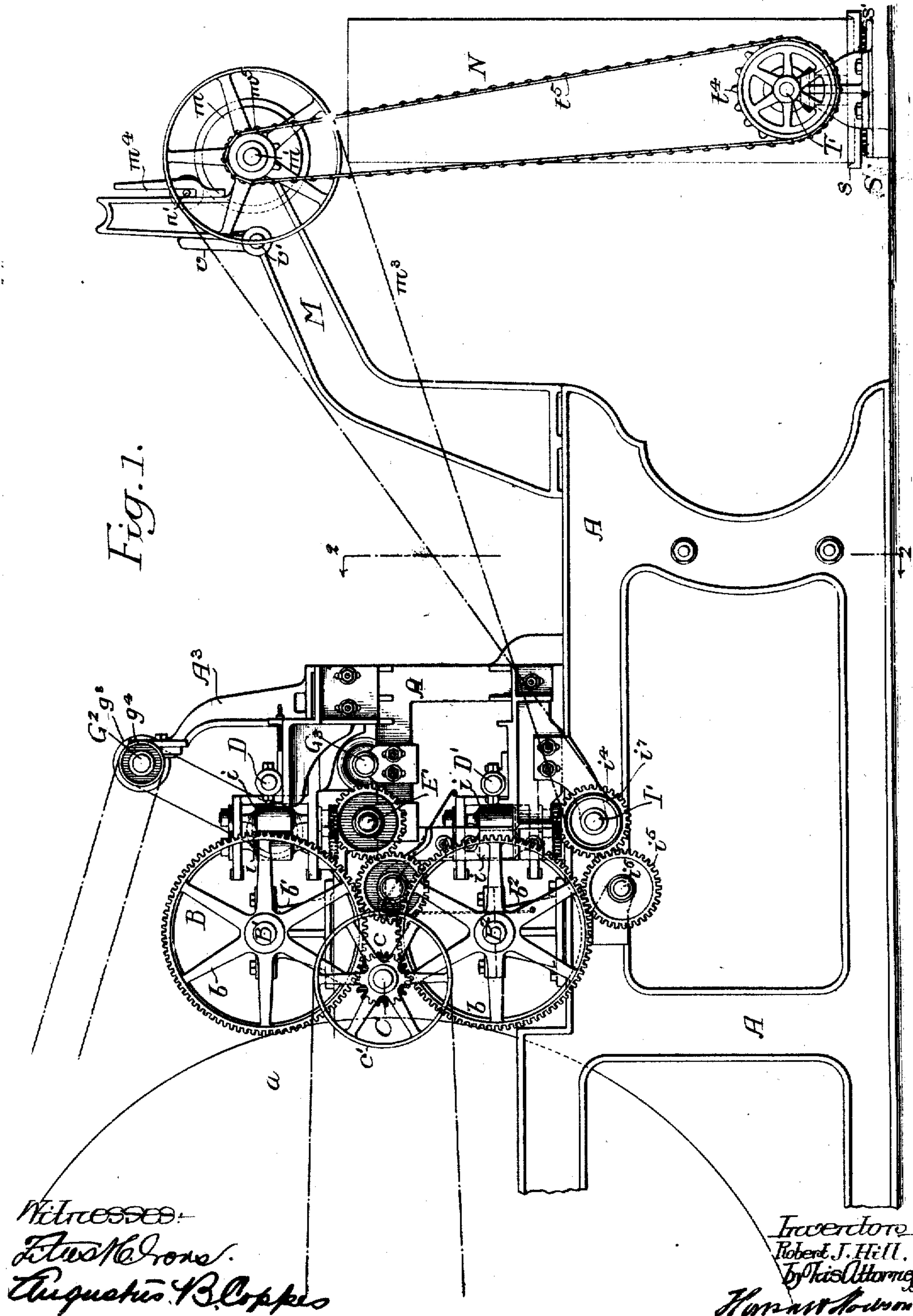


R. J. HILL.
CONDENSING APPARATUS FOR CARDING MACHINES.
APPLICATION FILED APR. 16, 1908.

996,037.

Patented June 20, 1911.

5 SHEETS—SHEET 1



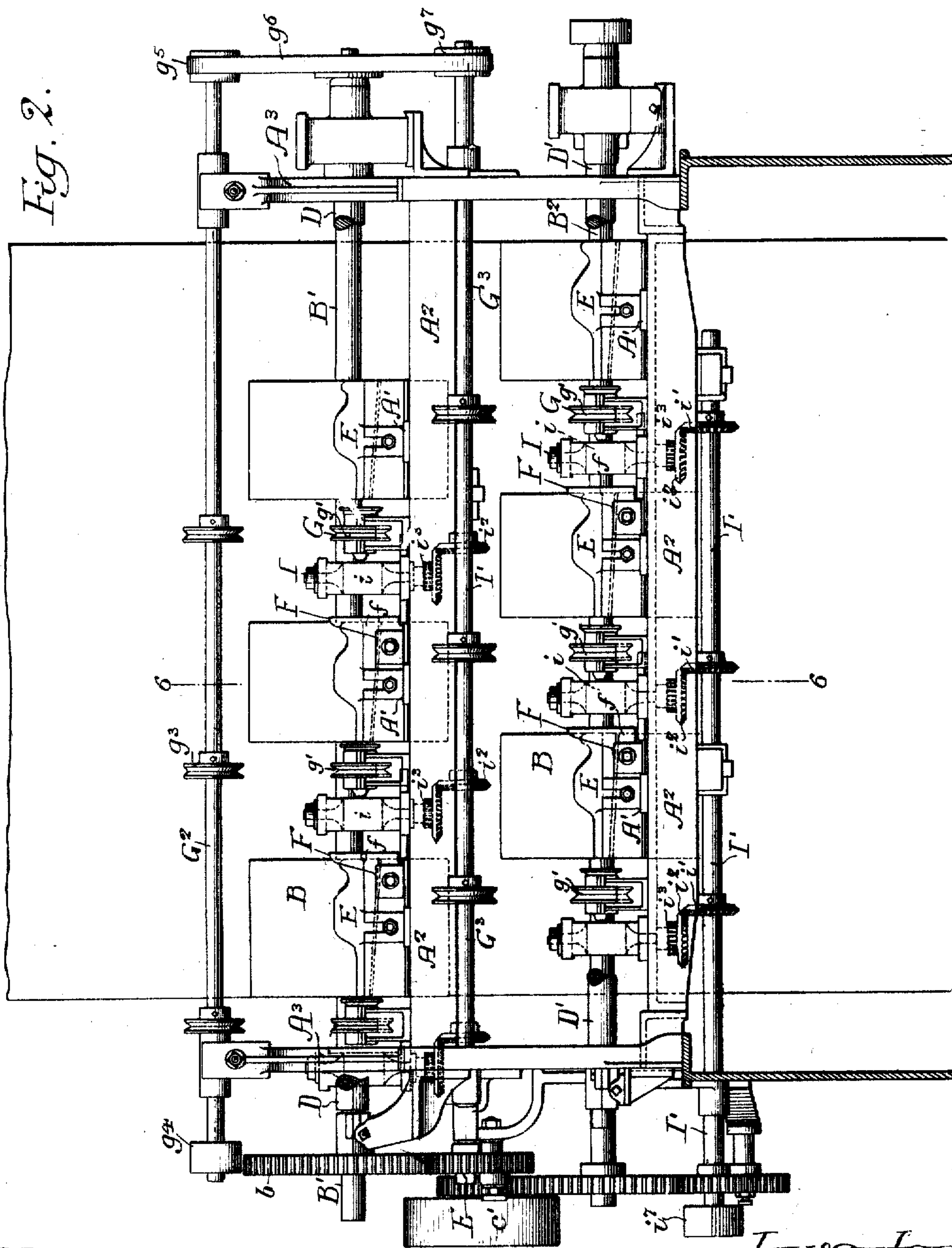
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5 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
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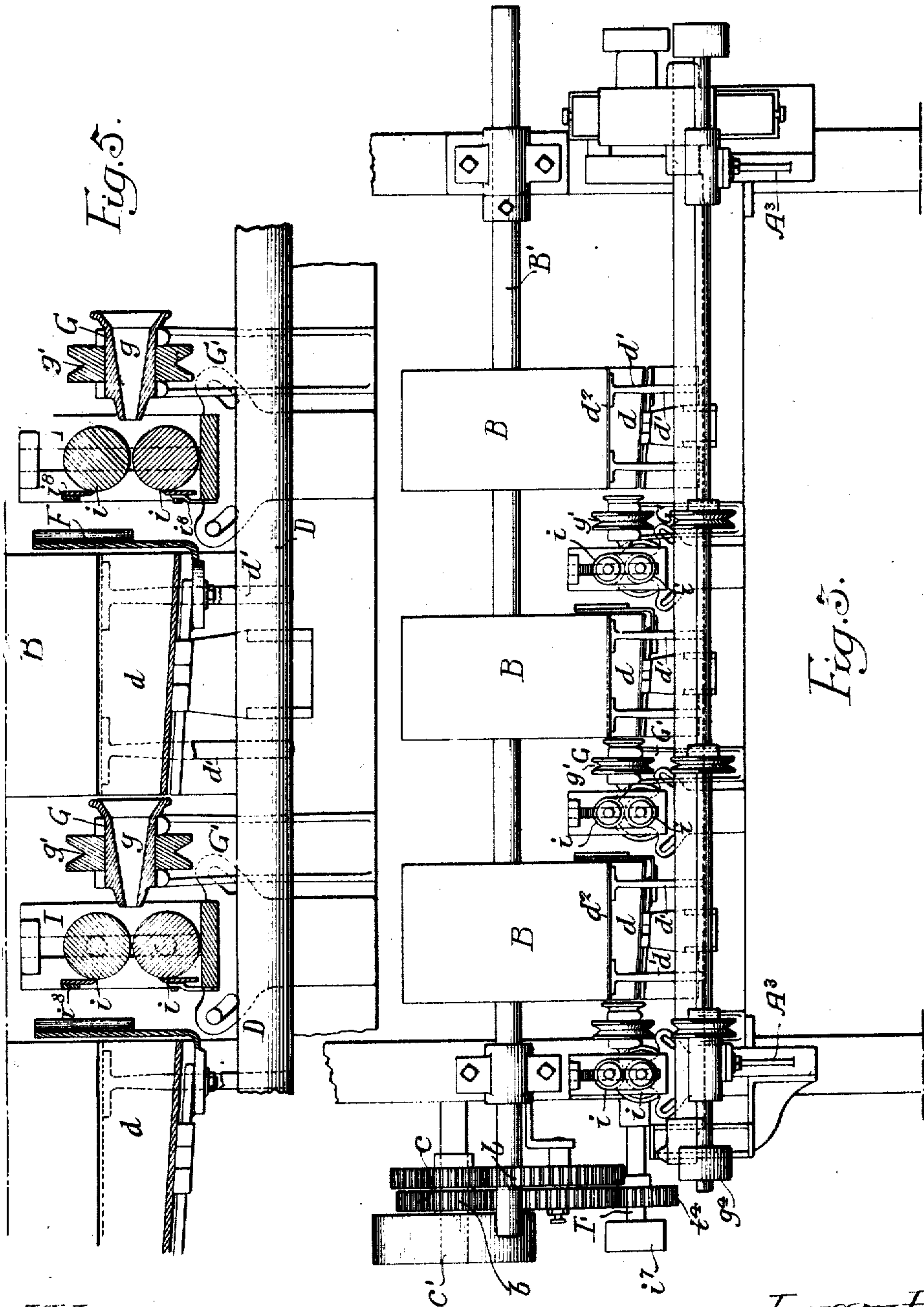
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

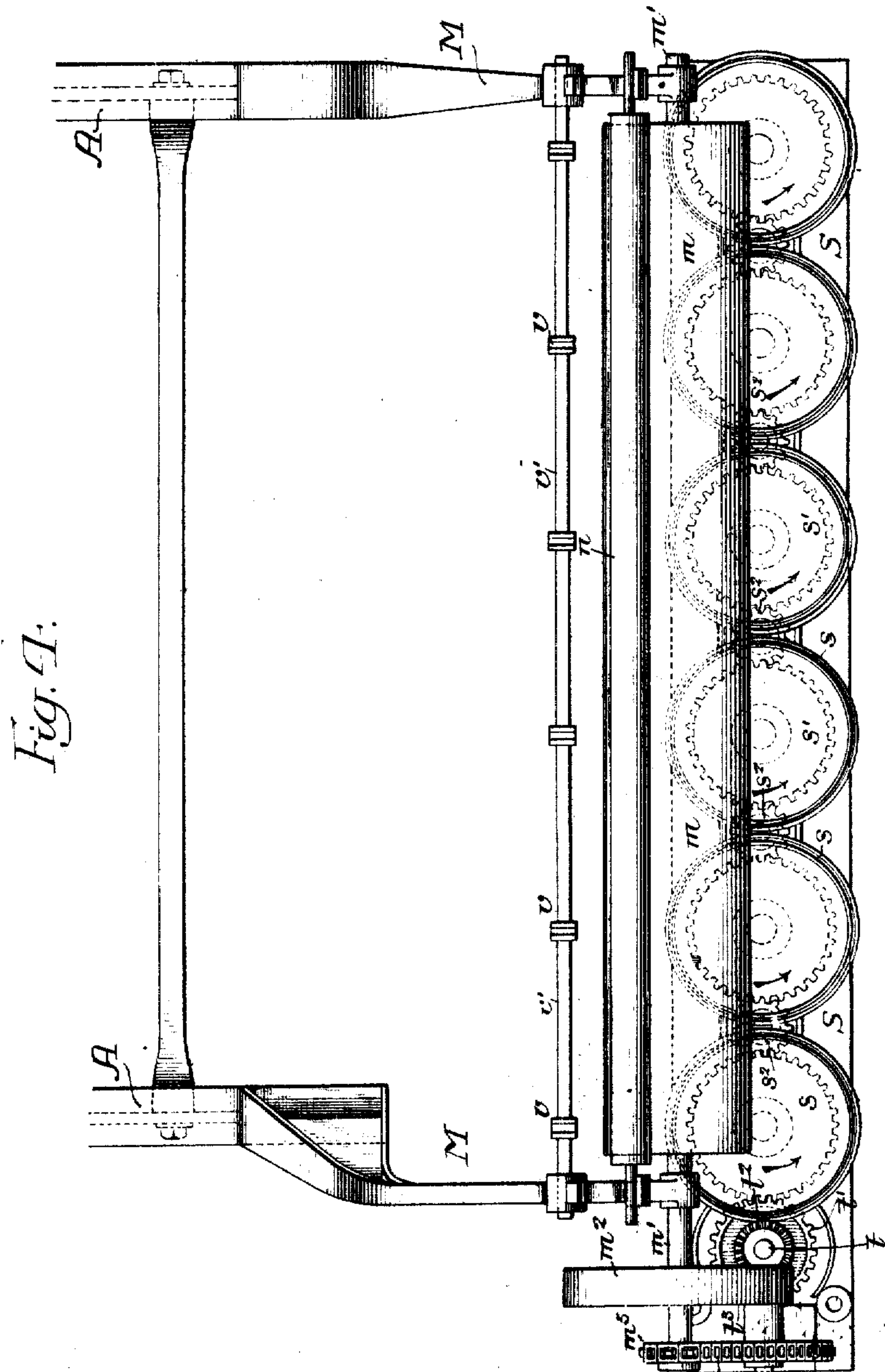


Fig. 4.

Witnesses:
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5 SHEETS—SHEET 5.

Fig. 6

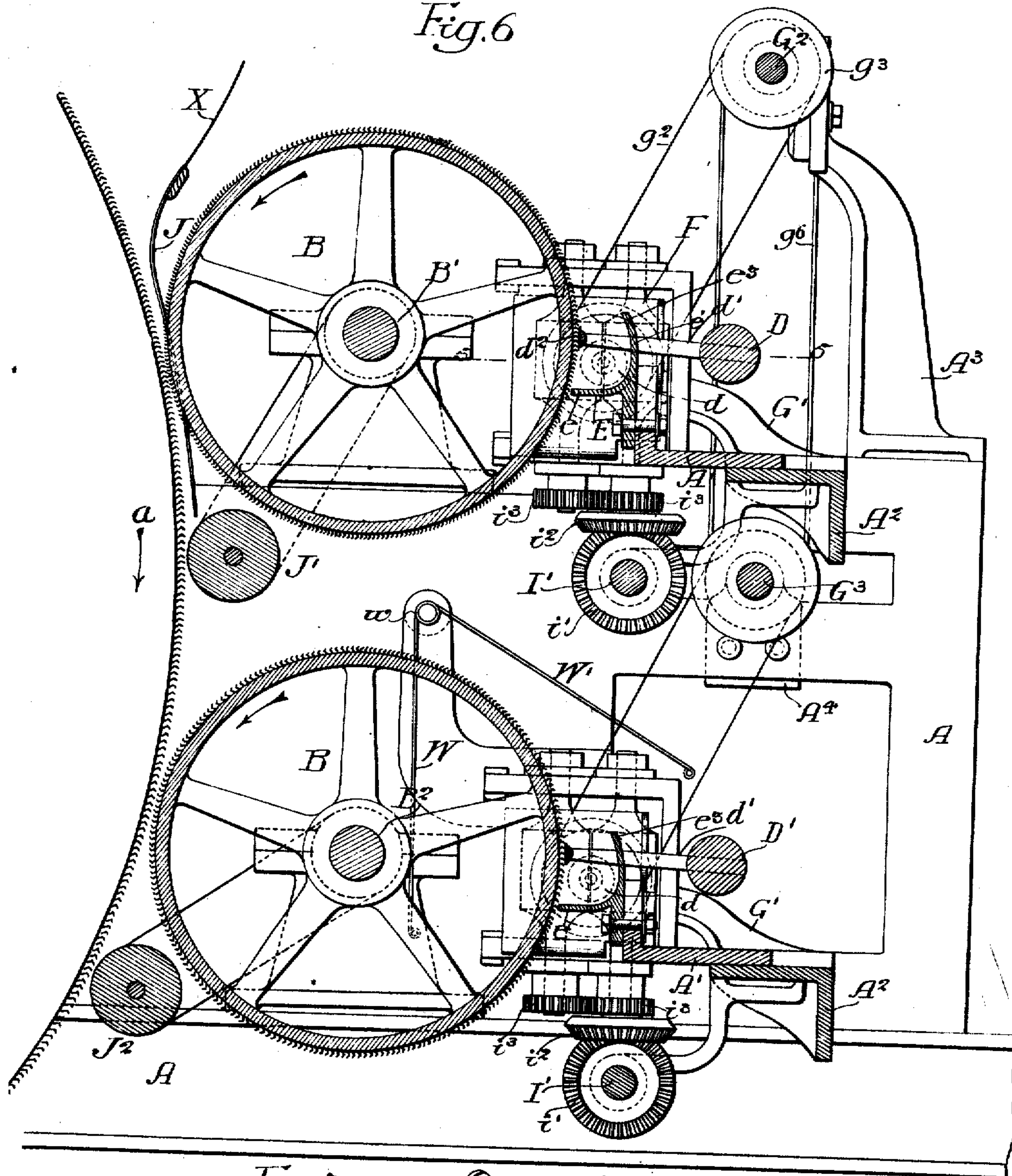


Fig. 7.

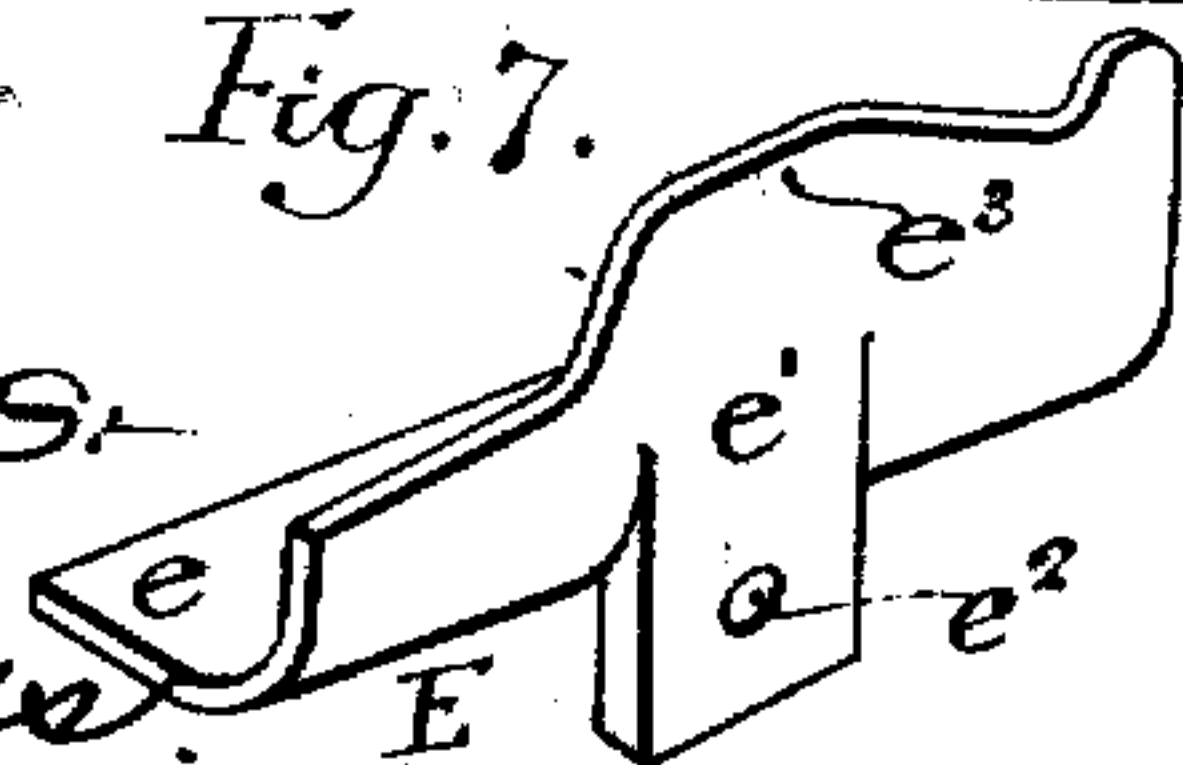
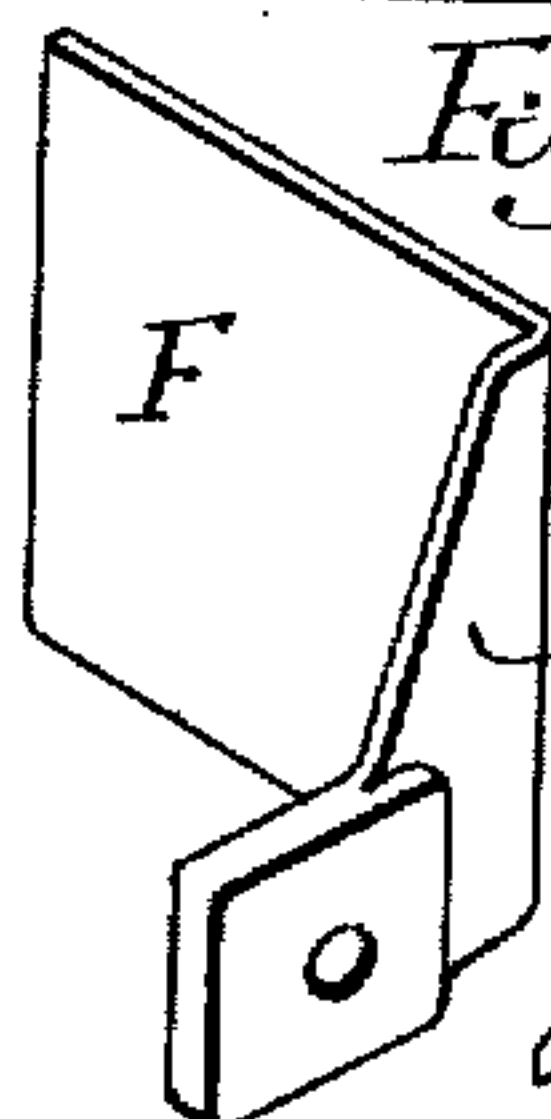


Fig. 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT J. HILL, OF CAMDEN, NEW JERSEY, ASSIGNOR TO SMITH & FURBUSH MACHINE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CONDENSING APPARATUS FOR CARDING-MACHINES.

996,037.

Specification of Letters Patent. Patented June 20, 1911.

Application filed April 16, 1908. Serial No. 427,489.

To all whom it may concern:

Be it known that I, ROBERT J. HILL, a citizen of the United States, residing in Camden, New Jersey, have invented certain Improvements in Condensing Apparatus for Carding-Machines, of which the following is a specification.

My invention relates to certain improvements in condensing apparatus for carding machines used in making yarn from jute, scrap, gunny bagging, flax, or similar fibers, but it will be understood that other fibers may be treated on the machine made in accordance with my invention.

The object of my invention is to provide a machine which will rapidly and economically condense such material as jute, scrap, gunny bagging, flax and similar fibers.

The invention is particularly adapted for condensing fibers from jute coverings used on cotton bales, so that this jute covering can be used over and over again, but it will be understood that my invention can be used for other purposes as well.

The fabric of cotton bale coverings is formed from very coarse fibers and the jute, if properly treated, can be used over and over again by separating the fibers and passing them through carding machines and condensers and weaving the covering. I find that by the use of my improved machine the fiber is not destroyed to any appreciable extent and can be used repeatedly for the purpose for which it is intended, viz., for the covering of cotton bales.

In the accompanying drawings:—Figure 1, is a side view showing an improved condenser for carding machines; Fig. 2, is a vertical sectional view on the line 2—2, Fig. 1, the plates J, W and W' having been left off for clearness; Fig. 3, is a plan view of certain of the parts shown in Fig. 2; Fig. 4, is a plan view showing the cans and the mechanism connected therewith; Fig. 5, is an enlarged sectional plan view on the line 5—5; Fig. 6, is an enlarged vertical sectional view on the line 6—6, Fig. 2; Fig. 7, is a perspective view of the trough; and Fig. 8, is a perspective view of the guard.

A is the rear portion of a carding machine, which supports the condensing apparatus.

a is the main cylinder of the carding engine.

B, B are the doffing rolls which, in the present instance, are mounted on shafts B', B² and the rolls are narrow and staggered as shown in Fig. 2, so that the cylinders of the lower shaft B² alternate with the cylinders of the upper shaft B' extending from one edge of the main carding cylinder to the other. In the present instance there are six distinct doffing rolls taking off six distinct slivers from the main cylinder. The lower rolls slightly overlap the upper rolls so as to remove all the fibers from the cylinders, and the end rolls are wider than those at the center so that each roll will remove about the same amount of material.

The shafts B', B² are mounted on brackets b', b², respectively. The brackets are secured to the frame A and on one end of each shaft is a gear wheel *b* and each of these gear wheels meshes with a pinion *c* on a driven shaft C having a belt wheel *c'* around which passes a driving belt for the condensing end of the machine, so that both doffing rolls turn in the direction of the arrow, Fig. 6, and preferably at the same speed.

Extending in front of the doffing rolls B are the comb shafts D, D', mounted in bearings in the frame A, and on each of these shafts is a series of combs *d* consisting of arms *d'* and the comb proper *d*², which extends the full width of the doffing roll, and these combs are given a limited vibrating motion so as to comb the fibers from the doffing rolls to produce the slubbing. The ordinary mechanism may be used to give the necessary vibration to the combs.

Directly under each comb and in front of each doffing roll is a trough E having a base portion *e* and a side flange *e'*, as clearly shown in Fig. 7, and the trough has a downwardly extending projection *e*² by which it is attached to the cross member A' of the frame by a bolt. The bolt passes through an opening in the trough and through a slot in the frame so that when it is desired to remove any one of the troughs the bolt can be slackened and the trough lifted out of its place. It will be noticed that each trough has an extension *e*³, Fig. 7, forming a de-

deflector for preventing the air currents carrying the slubbing over the walls of the trough. By means of this deflector the slubbing is directed in a straight line to the twisting head without liability of knotting.

Secured to the frame A' is a transverse stop plate F , Fig. 8, which has an extension f perforated for the passage of the bolt by which it is secured to the frame A' , and this stop plate extends between the troughs as shown clearly in Fig. 2, so as to prevent the slubbing from one trough coming in contact and mixing with the slubbing in the other troughs. The troughs are spaced apart sufficiently to allow for the introduction of the twisting head G and the roll housings I , which are located at one side of each trough, as clearly shown in Fig. 2.

The twisting head is shown in Fig. 5, and consists of a head G having a tapered opening g with a bell mouth to receive the slubbing; the small end of the opening is oval or otherwise out of the round. On this twisting head is a pulley g' over which passes the driving band g^2 from a pulley g^2 on a shaft G^2 ; the twisting head being mounted on a suitable bracket G' mounted on the frame A^2 of the machine to which the arm A' is secured. The large end of the tapered opening g being next to the trough the slubbing freely enters the opening and as it moves forward is contracted by the walls of the opening and, owing to the irregular shape of the small end of the opening, it is given a slight twist as it passes through the twisting head. In dealing with a fiber such as jute it is not necessary to give the slubbing very much twist, simply enough to keep it together so that it can be worked.

The upper shaft G^2 is mounted on a bracket A^3 supported on the frame A and the lower shaft G^3 is mounted on a bracket A^4 secured to the frame A , and these shafts can be driven in any suitable manner. At one end of the shaft G^2 is a driving pulley g^4 around which passes a belt leading to a driven shaft on the carding machine and on the opposite end of the shaft G^2 is a belt pulley g^5 around which passes a belt g^6 to a pulley g^7 on the shaft G^3 .

Adjoining each twisting head G is a vertical pair of rolls i, i' mounted in the housings I , and these rolls are driven from the shaft I' on which is mounted a beveled gear wheel i'' meshing with a beveled wheel i^2 on the spindle of one of the rolls and the two rolls are geared together by pinions i^3 so that both rolls turn in unison and draw the slubbing through the twisting head G . The slubbing turns around one of these rolls and is led between guides e on a bar e' and over a transversely arranged roller m on a frame M which is supported by the main frame A of the machine and from this roll the slubbing passes into the cans N described

hereafter. On the end of each shaft I' is a gear wheel i^1 which meshes with an intermediate wheel i^2 on a stud i^3 . This intermediate wheel meshes with a gear wheel b so that the vertical rolls are driven from the shafts B^1, B^2 . It will be understood that the driving mechanism for the various shafts may be modified without departing from the essential features of my invention.

As remarked above, the slubbing passes from between the vertical rolls to the drum m carried by brackets or frames M secured to the main frame A , and the spindles m' of this drum are mounted in bearings on the brackets M and on one spindle is a belt pulley m^2 around which passes a belt to a pulley i^4 on one end of the shaft I' , although it will be understood that the drum may be driven from another point, if desired. Resting upon the drum m is a roller n having trunnions n' adapted to vertical slots m^3 in the brackets M . This roller is a pressure roller for holding the slubbing onto the drum m so that the drum will direct the slubbing from the condensing portion of the machine.

Mounted on a platform S preferably secured to the floor in the position indicated in Fig. 1, are disks s upon which the cans N are mounted. On the under side of each disk is a gear wheel s' , indicated clearly in dotted lines in Fig. 4, and meshing with the gear wheels are intermediate pinions s^2 . Each intermediate pinion meshes with the two wheels on each side of it. At one end of the platform S is a vertical shaft t on which is a gear wheel t' which meshes with the first gear wheel s' , so that the several disks s are driven from one point and turn in unison. On the upper end of the shaft t is a beveled gear t^2 meshing with a beveled gear t^3 on a shaft T' on which is a sprocket wheel t^4 around which passes a chain t^5 to a sprocket wheel m^5 on the shaft m' .

In making the several doffing rolls, I construct the two outside rolls wider than the center rolls, as mentioned above, as the stock is not fed the full width of the main cylinder and consequently the greater body of the stock is at the center of the main cylinder, but by making the end rolls wider as shown in the drawings, each doffer removes about the same amount of stock, making the several slubbings equal.

In order to prevent the fiber wrapping around the drawing rolls, I provide scrapers z which are supported by the hangers and rest against the rolls, and any fiber which may adhere to the rolls is scraped off, thus preventing the carrying of fiber around the rolls.

Hung from a cross bar w mounted in suitable supports and extending between the doffing rolls of the lower series, are deflecting plates W , Fig. 6, which prevent the cur-

rents of air, caused by the operation of the machine, from affecting the movement of the slubbing and also prevent the air blowing under the upper sets of doffing mechanism.

Extending from one end of the machine to the other is a deflector W' arranged at an angle so as to prevent any fibers dropping from the upper set of doffers onto the lower set. These deflectors can be made of any material and arranged in any way desired.

I preferably mount in front of the main cylinder between each of the upper doffing rolls, a guard J of sheet metal attached at its upper end to the cover X of the carding machine, and extending down in close proximity to the face of the main cylinder.

Directly under the upper row of doffers and close to the main cylinder is a fly roll J' for directing any loose material which drops from the upper doffing rolls back to the main cylinder, and it also lays the fibers on the main cylinder which are not taken up by the upper doffers. There is another fly roll J² under the lower doffing rolls so as to direct any loose material which falls from the lower doffer back to the main cylinder. These fly rolls can be driven, as indicated in Fig. 6, from the doffer shafts B' and B², by providing the doffer shaft and the shaft of the rolls with pulleys around which pass driving belts.

The operation of the machine is as follows:—The fiber is removed from the main cylinder of the carding machine by the doffing rolls and then combed from the doffing rolls by vibrating combs, forming the slubbing which passes into the trough, then through the twisting head; the head giving it sufficient twist so that it may be held together in the drawing action as it passes between the vertical rolls. The slubbing then passes from the vertical rolls onto the drum m and into the cans and as the cans slowly rotate the slubbing is coiled within the cans. As each can is filled it is removed and another can substituted for it. After the slubbing is removed from this machine it is formed into a yarn of the proper size.

I claim:—

1. The combination in condensing mechanism for carding machines, of a main cylinder, a doffing roll, a trough in front of the doffing roll, a comb for combing the fiber into the trough, a twisting head at one end of the trough, a pair of rolls in front of the twisting head, and a deflecting stop plate in front of the rolls to deflect the slubbing in the direction of its receiving means.

2. The combination in condensing mechanism for carding machines, of a main cylinder, doffing rolls in front of the cylinder, a trough in front of each doffing roll, a twisting head at one end of each trough, rolls beyond each twisting head, and a deflecting

stop plate mounted between one set of rolls and the trough of the other doffing roll to deflect the slubbing in the direction of its receiving means.

3. The combination in condensing mechanism for carding machines, of a main cylinder, a series of doffing rolls in front of the main cylinder, a trough in front of each roll, a comb for each doffing roll for combing the yarn into the trough, a twisting head mounted at each end of each trough, a vertical pair of rolls mounted in front of each twisting head, means for driving the twisting head, means for driving the vertical rolls, and a detachable deflecting stop plate mounted between each trough and the adjoining pair of vertical rolls to deflect the slubbing in the direction of its receiving means.

4. The combination in condensing mechanism for carding machines, of a main cylinder, two series of doffing rolls, one above the other, the series of one set being opposite the spaces between those of the other set, a trough in front of each doffing roll, a comb for each doffing roll for combing the fiber into the trough, a twisting head at one end of each trough, a vertical pair of rolls in front of each twisting head, and a transverse deflecting stop plate separating the trough of one set from the twisting head of an adjoining set so that the yarn will be directed laterally from the machine.

5. The combination in a carding machine, of two sets of doffers, each consisting of narrow doffing rolls, one set of rolls alternating with the other, with a guard plate mounted between the upper set of doffers close to the main cylinder for preventing the fibers becoming detached from the main cylinder before reaching the lower set of doffing rolls.

6. The combination of a main cylinder, two sets of doffers, each consisting of a set of narrow doffing rolls, a guard between the rolls of the upper set, and a fly roll directly under the end of the said guard extending from one side of the machine to the other so as to catch any loose material dropping from the upper doffers, and pressing loose fiber onto the main cylinder.

7. The combination in a carding machine, of a main cylinder, two sets of doffing rolls, one above the other, doffing mechanism connected to the rolls, and a deflecting plate mounted between the doffing rolls of the lower series.

8. The combination in a carding machine, of a main cylinder, two sets of narrow doffing rolls, one mounted above the other, the rolls of one set alternating with those of the other set, a cross bar between the two sets of rolls, and a series of deflecting plates hung from the cross bar and extending between the rolls of the lower set.

9. The combination in a carding machine,

of a main cylinder, two sets of narrow doff-
ing rolls, one arranged above the other, a
doffing mechanism for each set of rolls, and
an inclined deflector extending over the
5 doffing mechanism of the lower set so as to
prevent any fibers dropping from the upper
set of doffing mechanisms to the lower set.

10. The combination in a carding ma-
chine, of a main cylinder, two sets of doffing
10 rolls, one mounted above the other, the
rolls being spaced apart, and the rolls
of the lower set being opposite the rolls of
the upper set, doffing mechanism for each
roll, a guard extending between the rolls

of the upper set close to the main cylinder, 15
a fly roll directly under the end of this guard
and in close proximity to the main cylin-
der and the upper doffing rolls, and a fly
roll close to the lower set of doffing rolls
and the main cylinder. 20

In testimony whereof, I have signed my
name to this specification, in the presence of
two subscribing witnesses.

ROBERT J. HILL.

Witnesses:

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WM. A. BARR.