No. 780,656. PATENTED JAN. 24, 1905.

P. HINKEL.

CRIMPING MACHINE.

APPLICATION FILED OCT. 14, 1903.

5 SHEETS—SHEET 1.

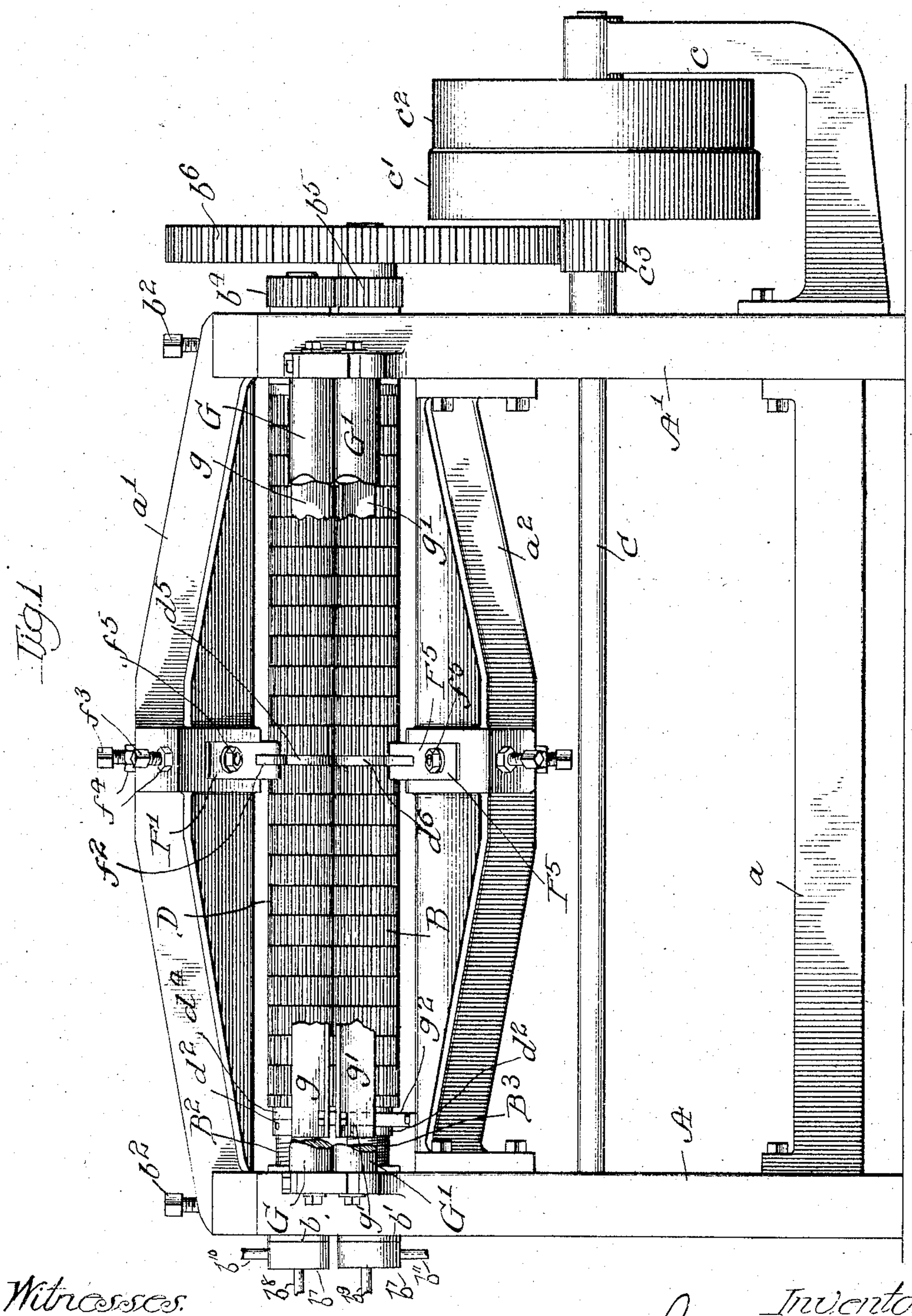

Fig. 1.

Witnesses.
Edw. Barrett
L. Miller.

Inventor
Peter Hinkel
Charles M. Rice
By
Atty.

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5 SHEETS—SHEET 2.

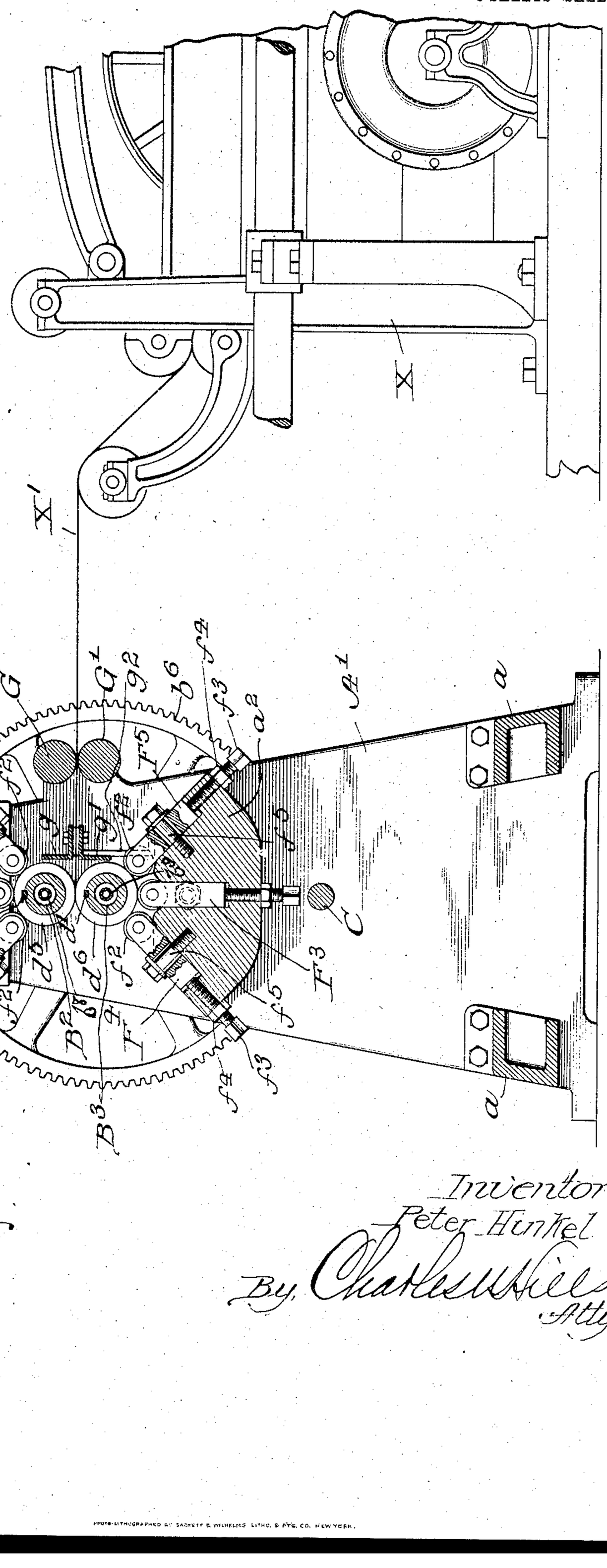

Fig. 2

Witnesses
Edw. Barrett
L. Alter.

Inventor
Peter Hinkel
By Charles Wells
Atty.

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5 SHEETS—SHEET 3.

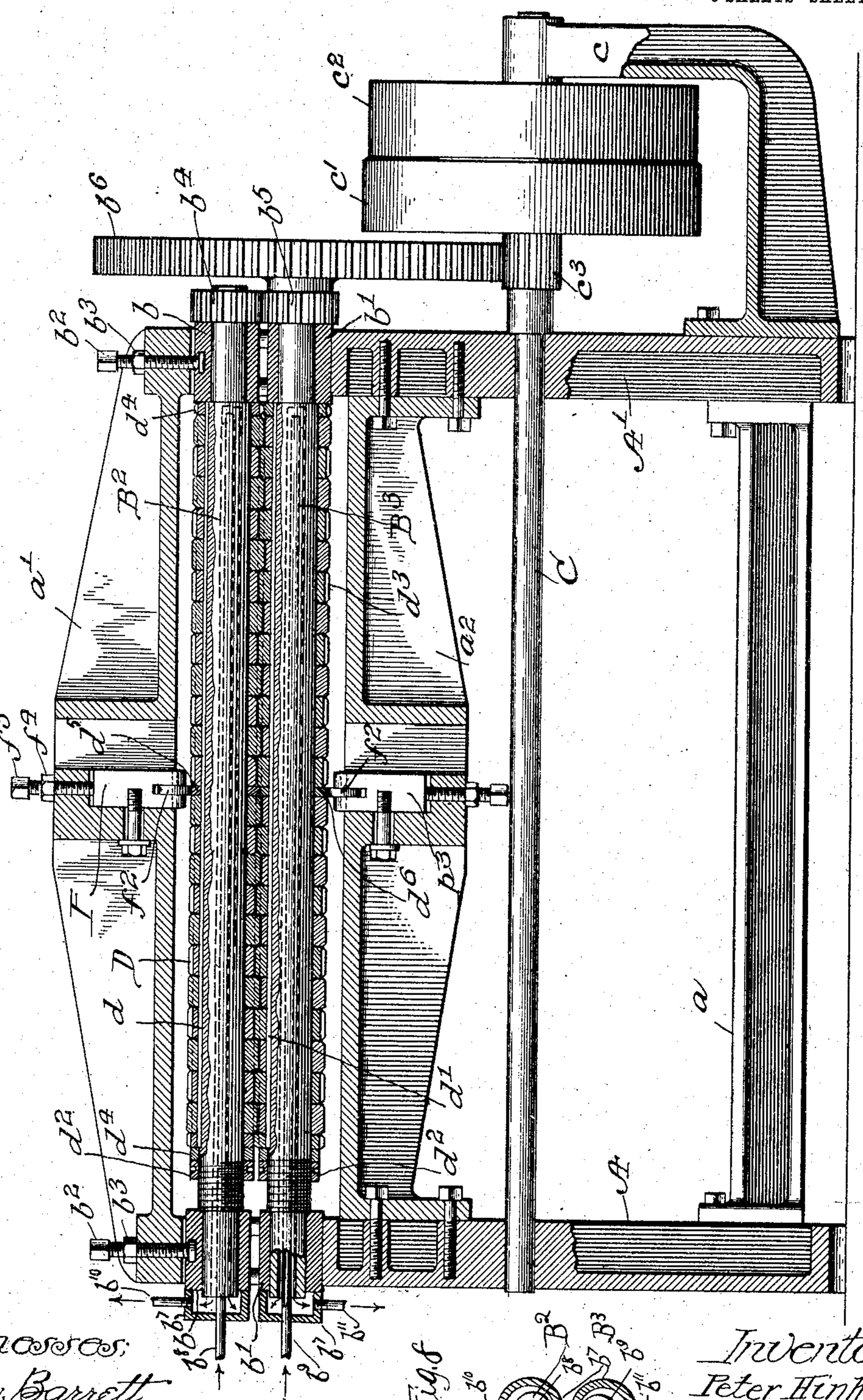

Fig. 3

Fig. 8

Witnesses:
Edw. Barrett
L. Miller.

Inventor:
Peter Hinkel,
By Charles E. Wells
Atty.

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5 SHEETS—SHEET 4.

Fig. 5

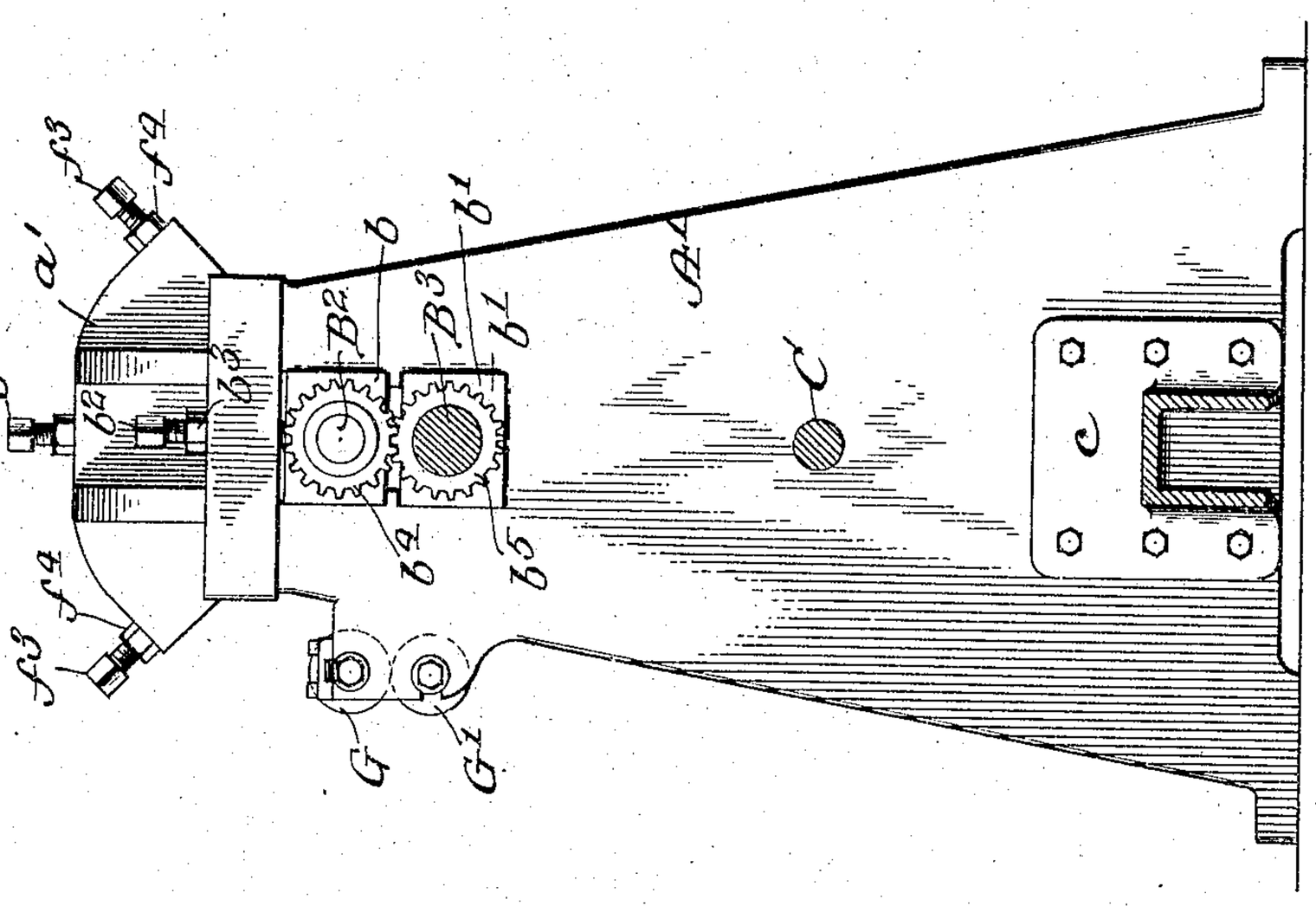
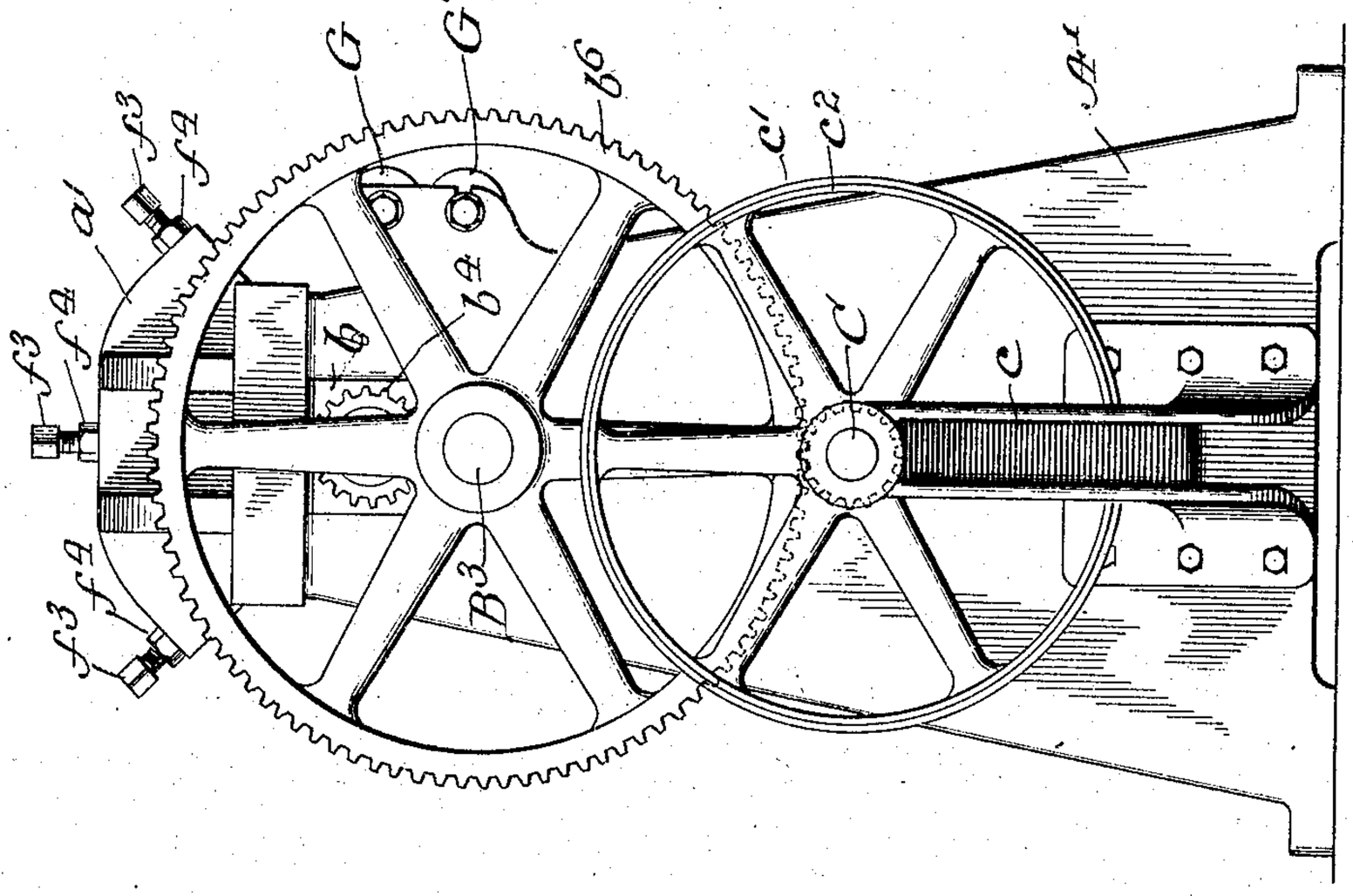


Fig. 4



Witnesses
Edw. Barritt
L. Alter.

Inventor
Peter Hinkel
By Charles A. Wiles
Atty.

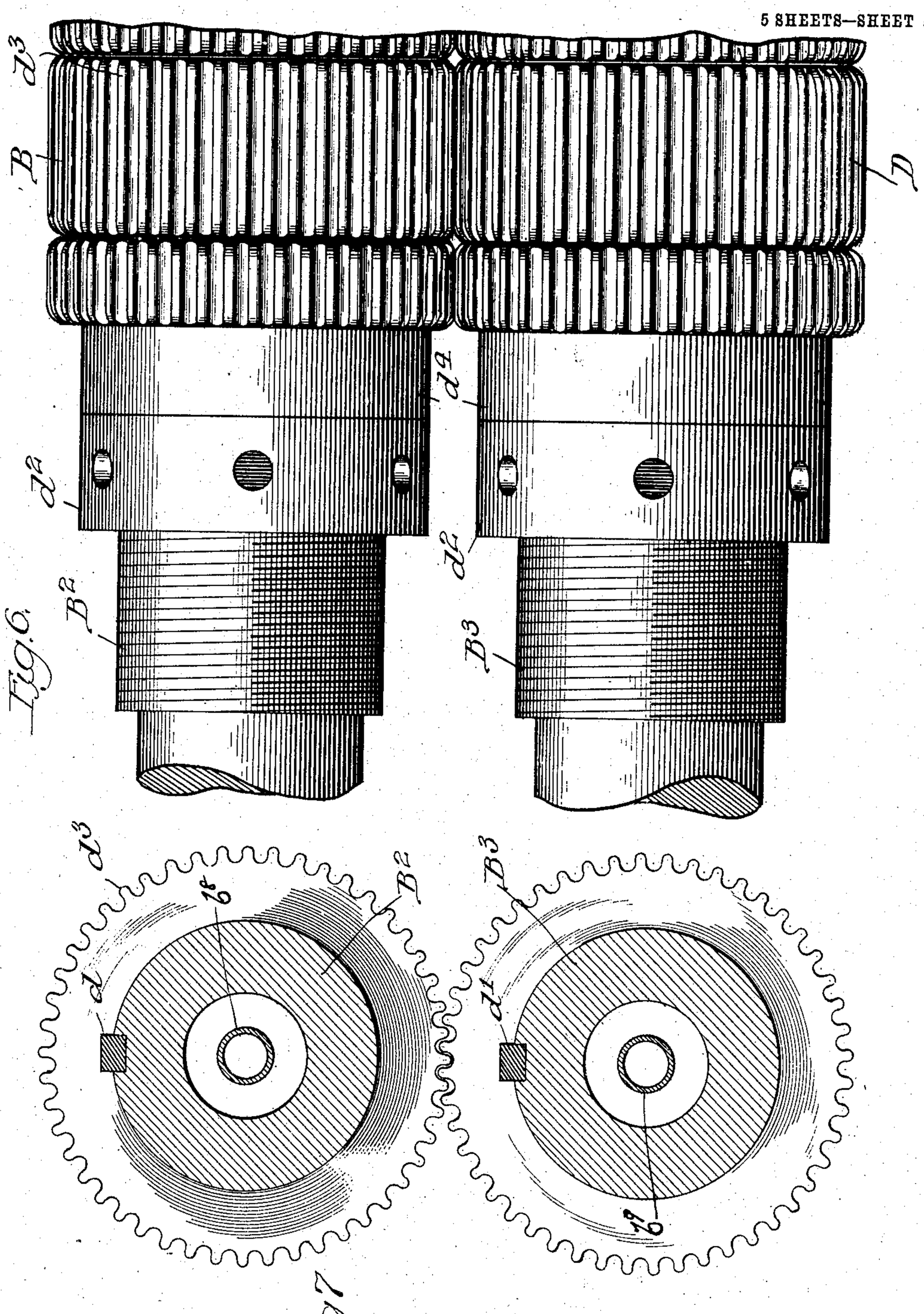
No. 780,656. PATENTED JAN. 24, 1905.

P. HINKEL.

CRIMPING MACHINE.

APPLICATION FILED OCT. 14, 1903.

5 SHEETS—SHEET 5.



Witnesses
Edw. Barrett
L. Alter.

Inventor
Peter Hinkel
By Charles W. Hills
Atty.

No. 780,656. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

PETER HINKEL, OF CHICAGO, ILLINOIS.

CRIMPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 780,656, dated January 24, 1905.

Application filed October 14, 1903. Serial No. 176,964.

To all whom it may concern:

Be it known that I, PETER HINKEL, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Crimping-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates more particularly to a machine designed to crimp paper or other material and to provide a plurality of longitudinal lines of relatively short corrugations, which extend transversely of the sheet and in which the corrugations in one longitudinal line are staggered with the corrugations in adjacent longitudinal lines, providing between the same a continuous uncrimped web.

The object of the invention is to enable material of any desired width to be rolled continuously through the machine either directly as the paper comes from the calendering-machine or, if preferred, independently thereof.

It is also an object of the invention to provide a construction adapted to afford means for heating the crimping-rolls during the operation.

The invention consists in the matters hereinafter described, and more fully pointed out and defined in the appended claims.

In the drawings, Figure 1 is a front elevation with the guards and the guide-rolls broken away of a machine embodying my invention. Fig. 2 is a central vertical section of the same, illustrating the construction and adjustment of the roller-bearings and showing the same in conjunction with a fragmentary view of a calendering-machine. Fig. 3 is a central longitudinal section, but showing the pulleys, gears, and shafts in elevation. Fig. 4 is a view in elevation of the drive end of the machine. Fig. 5 is a vertical section taken outside the end frame member at the drive end of the machine. Fig. 6 is an enlarged fragmentary detail of the crimping-rolls. Fig. 7 is a transverse section of the same. Fig. 8 is a fragmentary detail of construction.

As shown in said drawings, the frame of said machine comprises upright end frame members A and A′, rigidly connected near their bases by the bottom longitudinal frame members or beams *a*. Supported on the top of said end frame members is a longitudinal beam *a*′, which is rigidly bolted to said end frame members and in which is secured the adjusting means for the crimping-rolls B. Rigidly bolted to and between said end frame members and supported thereon is a beam a^2, which affords a support for the central roller-bearing for the lower roll. All of said frame members are, as shown, constructed of metal, cored to avoid excessive weight, while affording maximum strength. The beams *a*′ a^2 are each provided with parallel longitudinal webs integral therewith and which are broadened at the center and afford, in effect, a truss to support the center of the same against the thrust of the bearings carried thereon. Journaled in said end frame members and longitudinally of the frame is the driving-shaft C, the outer end of which is journaled on a bracket *c*, rigidly bolted to the base of the end frame member A′ and between which and said end frame member are provided the usual tight and loose pulleys *c*′ c^2 for engagement with a driving-belt. Intermediate the pulley *c*′ and the end frame member is a pinion c^3, rigidly secured on said shaft and which drives the crimping-rolls. Each of said end frame members is provided in its top with a vertical slot at the center and extending downwardly therein and affording a rectangular seat adapted to receive a sliding box *b b*′ for each shaft. Said boxes, as shown, are of a familiar type and provided with end flanges engaging on each side of the seat to hold the same from movement longitudinally of the frame and which are adjustable toward and from each other by means of the adjusting bolts or screws b^2, which have threaded engagement in the ends of the beam *a*′ and are rotatively engaged on the box *b* and act to lift the same from or force the same down upon the lower box *b*′, which is supported positively on the end frame members. As shown, a set-nut b^3 is provided on each bolt b^2 and acts to lock the same in the desired adjustment. Journaled in said boxes are tubular shafts B^2 B^3, which, as shown, are each

provided at the drive end of the machine with intermeshing pinions b^4 b^5, on the lower shaft B^3 of which is rigidly secured a gear-wheel b^6, which meshes with the pinion c^3 and acts to communicate power from the driving-shaft to said rolls.

The shafts B^2 B^3 are each provided at the end thereof opposite the driving end with an aperture. Cap b^7, which is rigidly secured upon the sliding box b b', completely closes said ends of the shafts. Steam-supply pipes b^8 and b^9 fit closely in the apertures in said caps and extend axially into the shafts B^2 and B^3, respectively, and are adapted to admit steam thereinto, which, passing from the inner ends of said pipes, returns through said shafts and escapes through the pipes b^{10} and b^{11}, which lead from said caps to any convenient point of exhaust, thus permitting, if preferred, a continuous flow of steam or hot air through said shaft during the crimping operation, heating said crimping-rolls, and facilitating the crimping operation. Each of said shafts is provided for approximately its entire length intermediate its bearings with a spline or feather d d' and is threaded, as shown, at one end to receive a nut d^2, which, as shown, is cylindric and is provided with apertures to receive a spanner for adjustment on the shaft. Secured on each of said shafts B^2 B^3 are the crimping disks or dies D, which are seated to slide on the said splines d d' of said shafts. The periphery of each die or disk is provided with longitudinal ribs d^3, with concave grooves between the same, affording crimping-corrugations, as shown in Fig. 7, and which mesh with the corresponding corrugations of the disks or dies on the other shaft. Said ribs d^3 are rounded over at their ends, affording elongated crimps, which run out at their ends in material passed between the rolls. Said crimping dies or disks are key-seated, so that the ribs d^3 on one die or disk come in alinement with the groove of the adjacent dies of the same shaft, as shown in Figs. 1, 3, and 6. On the power end of each of said shafts and adjacent the bearing a collar d^4 is rigidly secured in any desired manner and affords a stop for the crimping-dies on each shaft. For the purpose of affording a positive support and adjustment for the said shafts at their middle hardened-steel collars d^5 d^6 are secured, each as shown in Figs. 1 and 3, which are of slightly less diameter than the crimping dies or disk, and roller-bearings are provided for each. That for the collar d^5 on the shaft B^2 is carried on the beam a' and that for the collar d^6 on the shaft B^2 is carried on the beam a^2. Said bearings, as shown in Figs. 1, 2, and 3, each comprise the radially-adjustable carriage F F′ F^2 for the upper shaft and F^3 F^4 F^5 for the lower shaft, each of which is secured in a suitable recess in the respective beams and are provided at the inner end with rollers f^2, which track in said collars and afford a positive bearing above the upper shaft and below the lower and also laterally thereof. Means are provided for actuating said carriages, comprising in each instance a screw-bolt f^3, bearing at its inner end against the carriage and provided with a set-nut f^4, which acts to hold the same from movement when once adjusted. A stud-bolt f^5 extends through a slotted aperture in each of said carriages, as shown in Fig. 2, and has threaded engagement with the beam and permits the adjustment of said carriage radially of the shaft without the removal of said stud-bolts.

Said machine is provided with guide-rolls G and G′, which are journaled on the front of said frame in position to guide or direct paper or the like into the crimping-rolls. Supported on brackets g^2, bolted on the ends of the beam a^2, are upper and lower guards g g', which are spaced a distance apart sufficient to permit the material to be operated upon to pass readily therebetween, but prevent the hands or clothing of the operator to contact with or be caught by the crimping-rolls.

The operation is as follows: The machine if adjusted as shown in Fig. 2—that is to say, positioned to receive the paper direct from a calendering-machine X—passes the sheet X′ between the guide-rolls, guards, and crimping-rolls while still warm and more or less moist, and it will not be necessary to provide for steam connection to heat the crimping-rolls, as before described. If, however, the machine is used separately from a calendering-machine, the steam connection admits of heating the rolls to any preferred temperature, such heating not only facilitating the crimping of the sheet, but also serves to more perfectly set or form the sheet, making the crimps more permanent and somewhat stronger than if the rolls were used cold. The crimping disk or dies on the respective shafts being arranged and shaped as described, a plurality of longitudinal lines of short transverse corrugations are formed in the sheet, of which those of one line are staggered with those of adjacent lines, as shown, thus forming a plurality of relatively short alternate staggered ridges and depressions. Inasmuch as the ribs d^3 are rounded over at the end a longitudinal web is left between the lines of corrugations, which serves to very greatly stiffen the material, while permitting the same to readily bend or roll either transversely or longitudinally. The arrangement of the crimping dies or disks on each shaft is such as to permit the same to be readily removed and other dies of different thickness or length or face conformation to be inserted thereon. The crimping-rolls are readily adjusted to each other, and it is obvious that the ends of the rolls are held in positive adjustment by means of the set-screws b^2, while the middle part of said rolls are held in positive alinement with the ends by the roller-bearing afforded by the rollers f^2, which track on the steel rings

d^5 d^6 and which act to hold said rollers from springing during the passage of material when crimping. Said central adjusting means, owing to the position of the carriages and the rollers carried thereby, hold said rolls in adjustment laterally against any pressure capable of being brought thereon by the operation of the machine. The collars d^5 d^6 may be corrugated to correspond with the corrugations in the crimping-dies, and like corrugations may be provided in the rollers which track thereon, thus enabling the sheet to be crimped at said collars.

Obviously, while I have described my invention as provided with crimping-dies having corrugations such as described, crimping-dies having different faces may be employed and many details of construction may be varied without departing from the principles of this invention.

I claim as my invention—

1. In a crimping-machine the combination with coacting rolls, of crimping-dies removably secured thereon and having longitudinally-corrugated faces arranged staggering with respect to each other, means for adjusting said rolls with respect to each other, a plurality of roller-bearings adjustable with respect to said rolls and means for conveying steam into the rolls.

2. In a crimping-machine a rigid frame, a plurality of tubular shafts journaled therein, means for adjusting said shafts with respect to each other, a plurality of dies removably secured on said shafts and provided with longitudinal corrugations arranged alternately with those of adjacent dies, means for conveying steam through said shafts and adjustable roller-bearings arranged centrally on said shafts.

3. In a device of the class described, the combination with a rigid frame having longitudinal frame members, of a plurality of hollow shafts journaled in said frame, means for adjusting said shafts with respect to each other, a plurality of dies non-rotatively secured on the shaft and provided with longitudinal ribs arranged staggering with respect to those of adjacent dies, a plurality of carriages adjustably secured in said longitudinal members, roller-bearings therein adapted to firmly support said shafts, a steam-pipe extending axially of said shafts and adapted to carry steam thereinto, a closed casing on the open end of each shaft and exhaust-pipes leading therefrom.

4. In a device of the class described, the combination with a rigid frame, of a plurality of tubular shafts journaled therein, means for adjusting said shafts with respect to each other, a plurality of coacting dies removably secured on said shafts and provided with longitudinal ribs arranged staggering with respect to those of adjacent dies, a centrally-disposed bearing-carriage on each shaft, a plurality of adjustable carriages carried in said frame, a roller in each carriage adapted to contact with said bearings and means for rotating said shaft.

5. In a device of the class described the combination with a rigid frame, of a plurality of adjustable crimping-rollers centrally-disposed bearing-surfaces thereon, a plurality of independently-adjustable roller-bearings adapted to contact with said bearings, means for conveying steam through said crimping-roller, means for rotating said roller, a plurality of guide-rolls journaled in said frame and adapted to direct material to the crimping-rollers and a guard extending longitudinally of said guide-rolls.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

PETER HINKEL.

Witnesses:

CHARLES W. HILLS,

ALFRED C. ODELL.