

990,256.

Fig. 1.

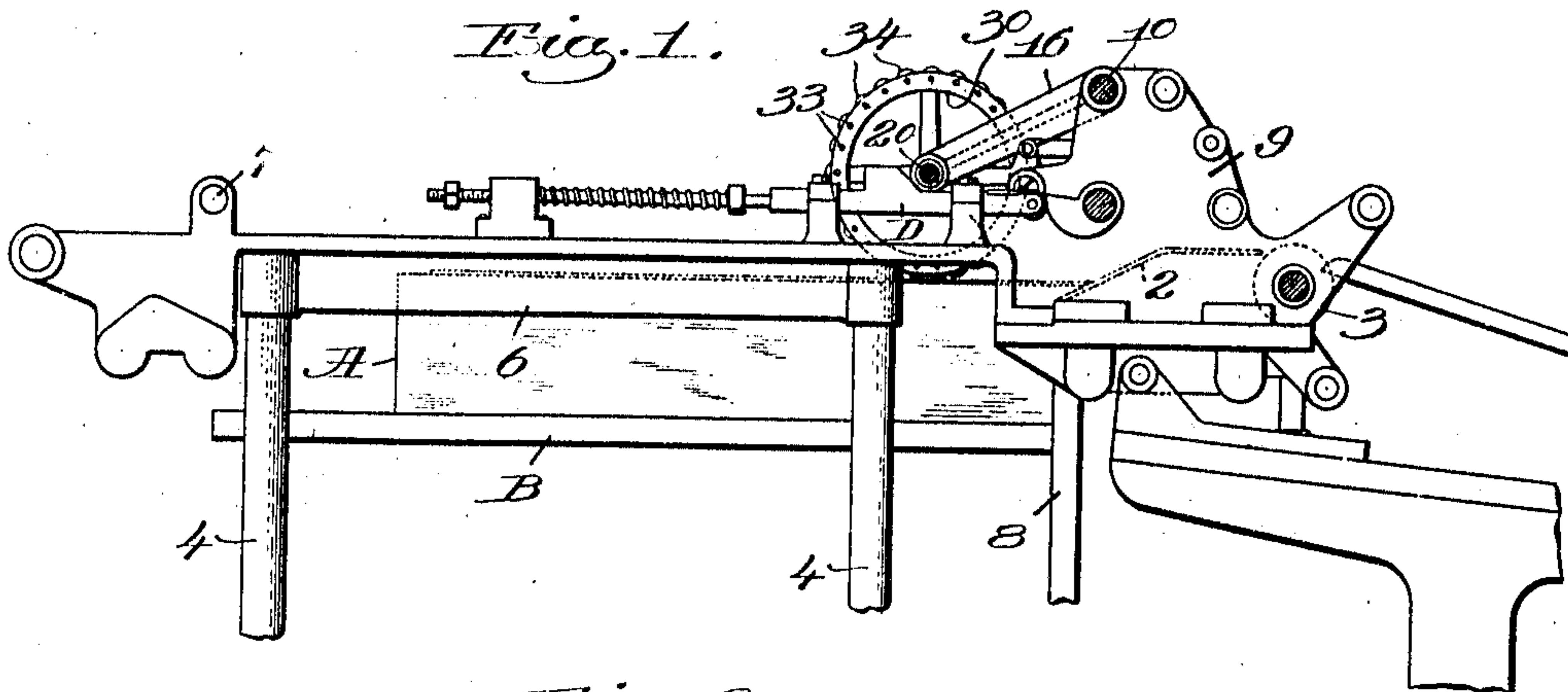


Fig. 2.

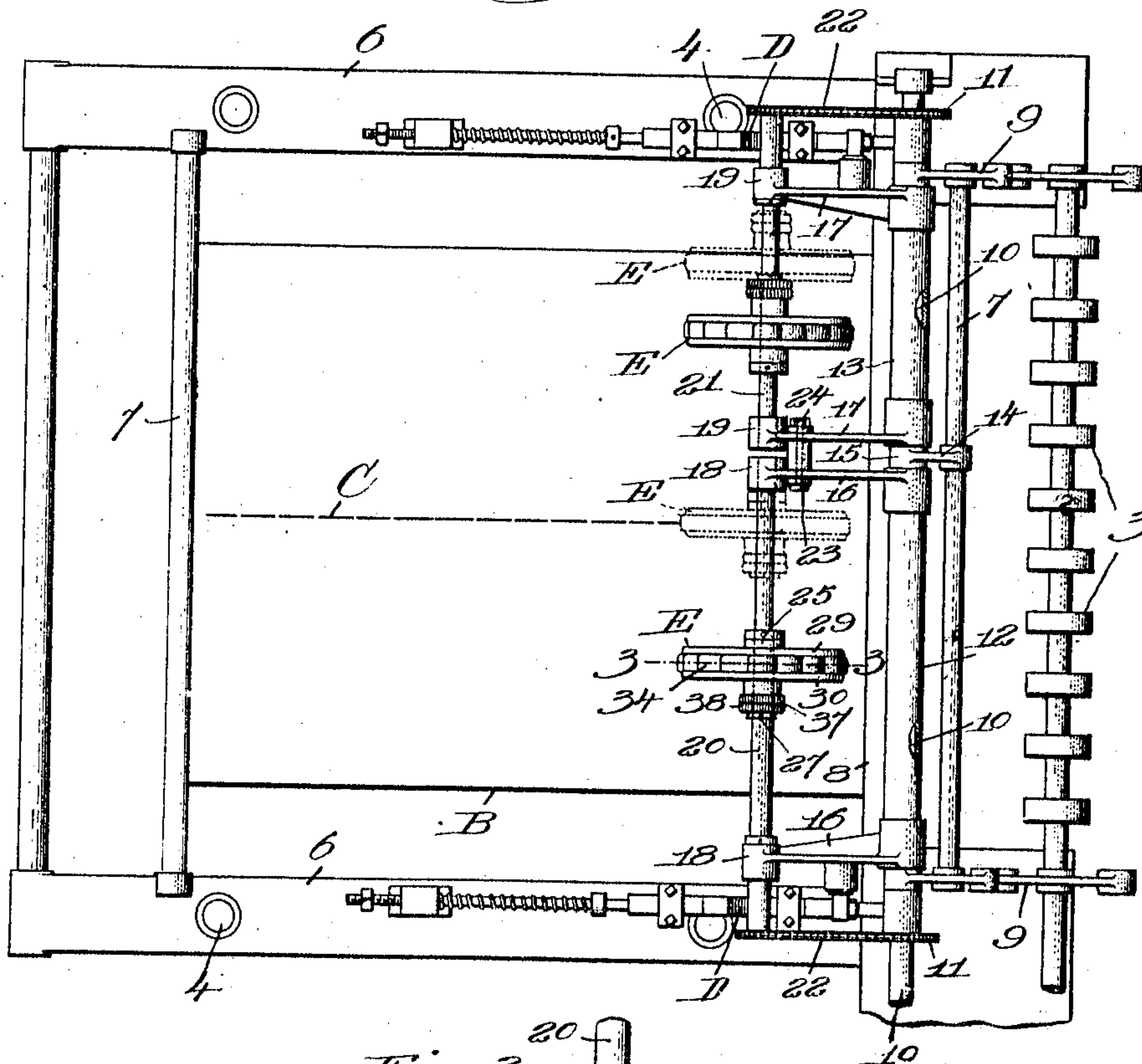
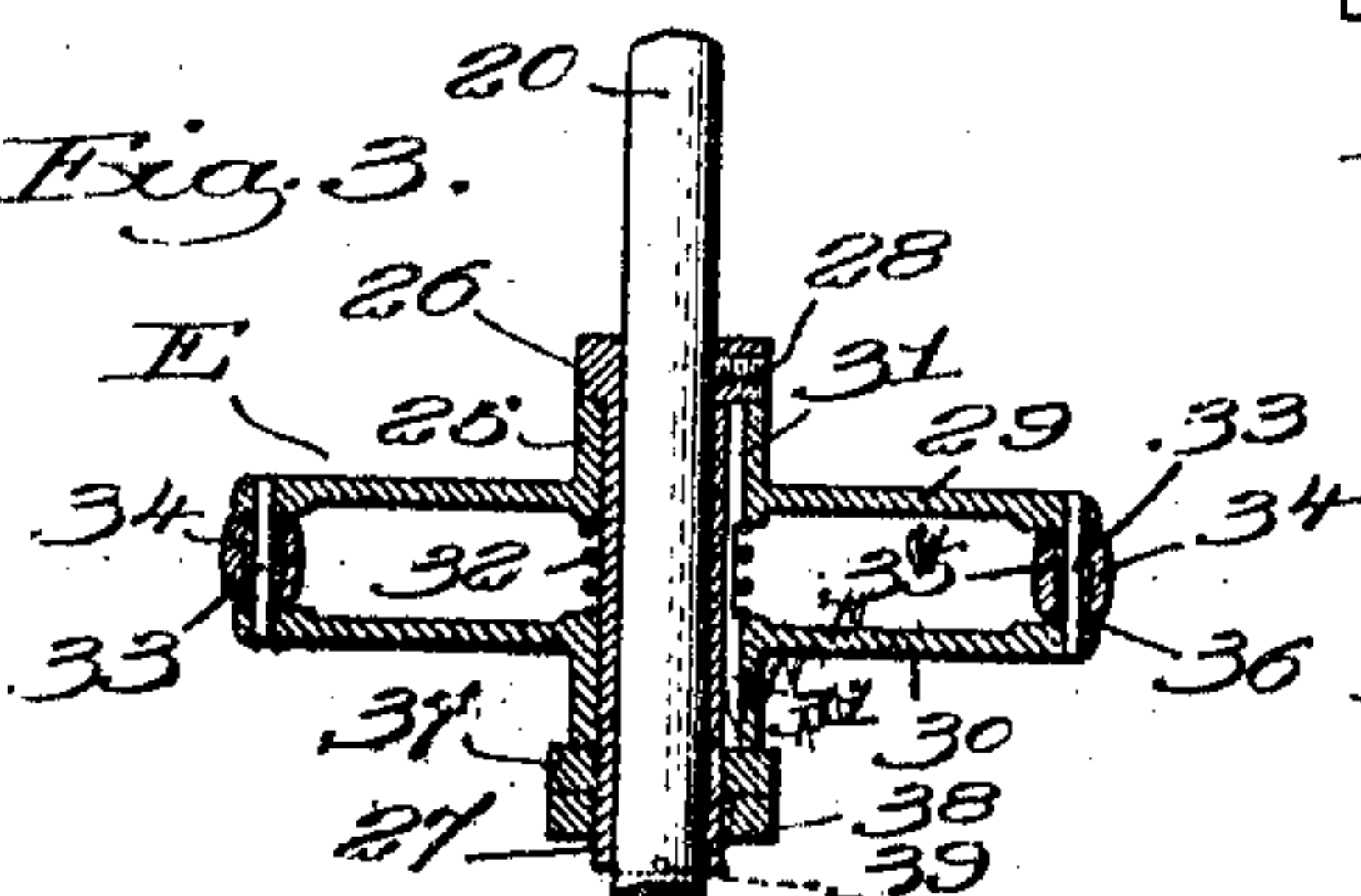


Fig. 3.



Witnesses:  
Fried. S. Grunkaf.  
Joseph M. Ward.

Exverton.  
Beard & Gustafson.  
Crosby & Gregory attys.



# UNITED STATES PATENT OFFICE.

BERNHARD GUSTAFSON, OF PLAINFIELD, NEW JERSEY.

## SHEET-SEPARATING MEANS.

990,256.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed June 23, 1910. Serial No. 568,478.

*To all whom it may concern:*

Be it known that I, BERNHARD GUSTAFSON, a citizen of the United States, and resident of Plainfield, county of Union, State of New Jersey, have invented an Improvement in Sheet-Separating Means, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to sheet separating or segregating devices of the type wherein the sheets at the top of a pile of sheets are segregated and delivered one by one to the feeding means of a printing press or other mechanism by the coöperation of a combing wheel, or wheels, with the uppermost sheet of the pile.

With certain grades of paper it is very often necessary to vary the frictional capacity of the segregating member, owing to the roughness or weight of the paper to be acted upon and also because of the fact that on some kinds of work only one segregating or separating member can be used.

My present invention accordingly has for one of its objects the production of a sheet separating device so constructed and arranged that the frictional capacity of the segregating member, or members, can be readily and effectively varied and adjusted in accordance with the particular requirements of the material to be acted upon.

Another object of my invention is the production of means whereby a single segregating member, or a plurality of such members, can be used, the change from a plurality of segregating members to a single member, or vice versa, being effected with ease and rapidity.

These and other novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a side elevation of a sheet separating device embodying one form of my invention, a portion of the sheet conveying mechanism being shown in connection therewith; Fig. 2 is a top plan view of the apparatus illustrated in Fig. 1; Fig. 3 is an enlarged sectional detail, on the line 3—3, Fig. 2, of one of the segregating members forming a part of my invention.

Referring to Figs. 1 and 2 the sheet separating or segregating device is conveniently mounted on the upper portion of the frame

of the pile elevating mechanism, of skeleton construction and comprising upright posts 4, cross-bars 6 connecting them at the top, at each side, and transverse braces 7, and usual feed-rolls 3 are shown, to which the segregated sheets are passed up an incline 2, see dotted lines Fig. 1, the pile of sheets being therein indicated at A, and supported upon a vertically-movable pile-table or elevator B, of any suitable or usual construction and forming no part, *per se*, of my present invention. Any usual edge-guide for the pile of sheets is indicated at 8 on the side of the frame from which the sheets are fed.

The general structure of the sheet separating device embodying a part of my invention will now be described, after which the novel structure of the combing wheel used in connection therewith will be explained in detail.

Suitable upright brackets 9, 9 on the frame-work support the main driving shaft 10 driven from any suitable source of power (not shown) and carrying suitable sprockets, as 11, outside the brackets, and between the latter rocking sleeves 12, 13, Fig. 2, are loosely mounted on said shaft. A fixed bracket 14 provides an intermediate bearing 15 for the shaft 10, which bearing is interposed between the adjacent ends of the two sleeves, and at one side of the center line C of the table or elevator B, as shown in Fig. 2, the sleeve 12 being the longer of the two and having radial arms 16 fixedly attached to it, it being noted that the inner one of said arms is laterally offset from the center line C. The shorter sleeve 13 has fixedly attached to it a similar pair of radial arms 17, and in practice all four of said arms 16, 17 are of the same radial length, and provided at their free ends with bearings 18, 19 which can be alined when desired, as will be explained hereinafter. Each sleeve and its attached arms constitute a rocking carrier, said carriers being adapted to rock on a common fulcrum, viz: the main driving shaft 10, the carrier arms extending rearward above the pile of sheets, as will be apparent. The two carriers support rotatable shafts 20, 21, driven by suitable chains 22 from the sprockets 11 heretofore referred to, and by inspection of Fig. 2 it will be seen that the said shafts 20, 21 extend transversely of the skeleton frame and above the pile of sheets A, the combing wheels being mounted on such shafts.



In a sheet separating device it is necessary to provide means whereby the combing wheels can be shifted laterally to various positions, to conform to the nature of the work to be done, and this is herein provided for by mounting such wheels in a longitudinal adjustable manner upon the shafts 20, 21. Under normal conditions when two wheels are used, as indicated by full lines, Fig. 2, they will be rotated independently of each other by the said shafts 20, 21 and they are held out of contact with the paper by suitable slides D, D operated automatically at required intervals, as set forth in a co-pending application filed by me May 3, 1910.

Certain classes of work require the use of but one combing wheel, and in such case the single wheel must always be positioned to cooperate with the sheet along the center line thereof. For this reason I have herein shown the bracket 14 laterally offset a sufficient distance from the center line C to enable the combing wheel on the shaft 20 to be shifted thereon to the exact center of the pile of sheets, as indicated by dotted lines Fig. 2. When the apparatus is so adjusted the combing wheel on the shaft 21 can be removed therefrom or it can be moved close to the outer carrier arm 17 beyond that side of the pile of sheets, as shown by dotted lines Fig. 2.

It is desirable, when operating with a single segregating member or combing wheel, to couple or lock together the two carriers in order to thereby increase the pressure of the single member on the sheet, and also to provide for the cooperation of both the slides D in lifting the added weight of the coupled carriers. This coupling or locking is effected by passing a pin 23 through bosses in the adjacent inner carrier arms 16, 17 and holding the pin in place by a nut 24 screwed thereon, whereby the two carriers will be locked together to rock in unison and at such time the shaft 21 will run idle, as will be manifest.

Having now described the means for sustaining and effecting rotation of the combing wheels I will describe the construction of my improved combing wheel whereby the frictional action thereof upon the paper can be regulated, having reference more particularly to the enlarged sectional detail, Fig. 3, the combing wheel being indicated as a whole at E in the drawing.

The ordinary combing wheel comprises a rotatable supporting member carrying a series of independently rotatable rolls at its periphery, said rolls acting successively upon the top-most sheet of the pile as the wheel revolves, to thus effect the separation or segregation of the sheets one by one from the pile.

Manifestly there is no variation in the frictional action of the rolls upon the paper in the common type of combing wheel, but

by my novel construction I can vary this frictional action in a very simple and efficient manner.

Upon the revolving carrier shaft (20 or 21) I mount a sleeve 25 having an annular shoulder 26 at one end, and an external screw thread 27 at its opposite end, the sleeve being securely held in laterally adjusted position on the shaft and to rotate therewith by a set-screw 28. The hubs of separable spiders or wheel frames 29, 30 are mounted on said sleeve, the frame 29 being fitted tightly thereon against the shoulder 26 while frame 30 is longitudinally slidable on the sleeve, but said frames or spiders are maintained in alinement by a key 31, a spring 32 interposed between said frames and shown as coiled about the sleeves tending to separate the frames. A series of circularly arranged pins 33 are fixed in the frame 29 adjacent its periphery, parallel to the axis of rotation thereof and said pins slidably enter holes in the opposite frame 30. Each pin carries upon it between the frames a friction roll 34, preferably provided with an oilless bushing 35, such for instance as wood or other fibrous material impregnated with a suitable lubricant, and between the wheel frame 30 and the adjacent end of each roll is interposed a washer 36 of some yielding material. These washers serve to take up any unevenness in the rolls when in clamped position and when the spring 32 is permitted to separate the wheel frames 29, 30 the rolls 34 revolve axially as they are revolved bodily about the axis of the wheel. When it is desired to increase the frictional action of the combing wheel upon the paper the frames 29, 30 are pressed together more or less, by means of an adjusting nut 37 screwed onto the threaded end of the sleeve 25, and held in adjusted position by a check-nut 38. The more the nut 37 is set up the closer will the frame 30 press the washers 36 against the rolls 34, retarding rotative movement thereof about their own axes, and if necessary such pressure can be increased sufficiently to lock said rolls from any axial rotation whatever, the frictional action of the rolls at such time being at its maximum. To release the rolls the nuts 37, 38 are turned back and the spring 32 at once separates the wheel frames to free the rolls from retardation, the backing off of the nuts being limited by a stop-pin 39 in the sleeve 25. The regulation or adjustment of the frictional action of a combing wheel is thus effected by means mounted wholly on the sleeve 25, while the lateral adjustment of the combing wheel on its shaft is effected by shifting the said sleeve lengthwise of the shaft, whereby one adjustment is entirely independent of the other and a change in one adjustment does not in any way interfere with the other adjustment.



The operation of the apparatus as a whole and in detail will be clear from the foregoing description taken in connection with the drawing, hence no additional explanation of the mode of operation in separating or segregating the sheets of the pile of sheets will be necessary for those skilled in the art to obtain a clear and comprehensive understanding of my invention.

While I have shown herein one practical embodiment of my invention it is to be understood that it is illustrative only and various changes or modifications in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the claims annexed hereto.

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

1. In sheet separating apparatus, a revoluble shaft, a combing wheel revoluble therewith and adjustable longitudinally thereof, said wheel having a circularly-arranged series of axially-rotatable sheet-engaging members, and manually adjustable means cooperating with all of said members to vary equally and simultaneously the frictional action of each of said members upon the sheet irrespective of the position of the combing wheel upon the shaft.

2. In sheet separating means, a table for a pile of sheets, two revoluble, independently mounted shafts above said table and transverse to the direction of feed of the sheets, one of said shafts extending beyond the longitudinal center of the table, and a sheet segregating member revoluble with and longitudinally adjustable on each shaft, the extension of one of the shafts beyond the center of the table permitting the segregating member on said shaft to be adjusted thereon coincidently with the center of the table.

3. In sheet separating means, in combination, a table for a pile of sheets, a plurality of revoluble shafts located above the table transversely to the direction of feed of the sheets, a separate rocking carrier for each shaft, a sheet segregating member longitudinally adjustable on each shaft, one of the shafts extending beyond the longitudinal center of the table, whereby the segregating member thereon may be adjusted to act upon the sheets in the center line thereof, and means to lock together the shaft-carriers when a single, centrally acting segregating member is in use.

4. In sheet separating means, in combination, a table for a pile of sheets, two rocking carriers above said table and having a common fulcrum transverse to the line of feed of the sheets, a revoluble segregating member sustained by each carrier and laterally adjustable thereon, one of said carriers ex-

tending beyond the longitudinal center of the table, whereby the segregating member sustained by said carrier can be adjusted to act upon the sheets at the center thereof, and a device to couple said carriers to rock in unison when a single, centrally acting segregating member is in use.

5. In sheet separating means, a pile table, a main driving shaft above it and transverse to the direction of feed of the sheets, two rocking carriers mounted on said shaft, a shaft rotatably mounted in each carrier over and transverse to the table, driving connections between said shafts and the main shaft, a segregating member mounted upon and to rotate with each carrier-shaft and adjustable longitudinally thereon, one of said shafts extending at its inner end beyond the longitudinal center of the table, whereby the segregating member on said shaft can be adjusted for center feed, the other segregating member being idle at such time, and means to couple the carriers to rock in unison when center feed is employed, to thereby impart to the single segregating member in operation the combined weight of both carriers.

6. In sheet separating means, a revoluble combing wheel having a circularly-arranged series of individually rotatable sheet-engaging members, and means acting simultaneously and equally upon all of said members to vary the frictional action of the said members upon the sheet.

7. In sheet separating means, a revoluble segregating member having a circularly-arranged series of rotatable sheet-engaging rolls, and adjustable means to retard the rotation of said rolls about their own axes.

8. In sheet separating means, a circularly-arranged series of sheet-engaging members revoluble bodily in unison about a common center and also capable of rotation on their own axes, and manually adjustable means to effect a predetermined and simultaneous retardation of the axial rotation of said members.

9. A combing wheel for sheet separating means, comprising two opposed and laterally separable supporting members adapted to revolve in unison, a series of sheet-engaging rolls mounted between said members at their periphery and rotatable about their own axes, and means to press said supporting members together to thereby retard simultaneously the axial rotation of said rolls.

10. The combination, with a revoluble shaft, of a sleeve mounted thereon and rotatable therewith, opposite and laterally separable wheel members carried by said sleeve to revolve therewith, a series of pins fixed on one member adjacent the periphery thereof and in sliding engagement with the other member, sheet-engaging rolls rotatably mounted on the pins between said members,



and means on the sleeve to move one of the wheel members toward its fellow to cramp and prevent axial rotation of the interposed rolls.

- 5 11. In a segregating member for sheet separating means, a sleeve shouldered at one end and threaded at its opposite end, opposite and laterally separable supporting members thereon and rotatable therewith, a  
10 spring to separate said members, a circularly-arranged series of axially rotatable sheet-engaging rolls carried by and between the wheel members, an adjusting nut on the threaded end of the sleeve to press the adjacent wheel member toward its fellow, the  
15 latter fixed against the shoulder of the sleeve, movement of the wheel members toward each other retarding axial rotation of the rolls, and a check-nut on the sleeve to maintain the  
20 adjusting nut in fixed position.

12. The combination, with a sleeve, of op-

posed wheel members thereon one of which is fixed on the sleeve and the other of which is slidable longitudinally thereupon, a spring to separate said members, a series of circularly-arranged pins on one member adjacent its periphery and in sliding engagement with the other member, sheet-engaging rolls rotatably mounted on the pins between the wheel members, a yielding washer interposed  
25 between one end of each roll and the adjacent wheel member, and means to move the slidable member along the sleeve toward the fixed member, to thereby retard axial rotation of the rolls.  
30 35

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

BERNHARD GUSTAFSON.

Witnesses:

GORDON W. WALLER,  
GEORGE P. CLARK.