(No Model.) 3 Sheets—Sheet 1.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 534,096. Patented Feb. 12, 1895.

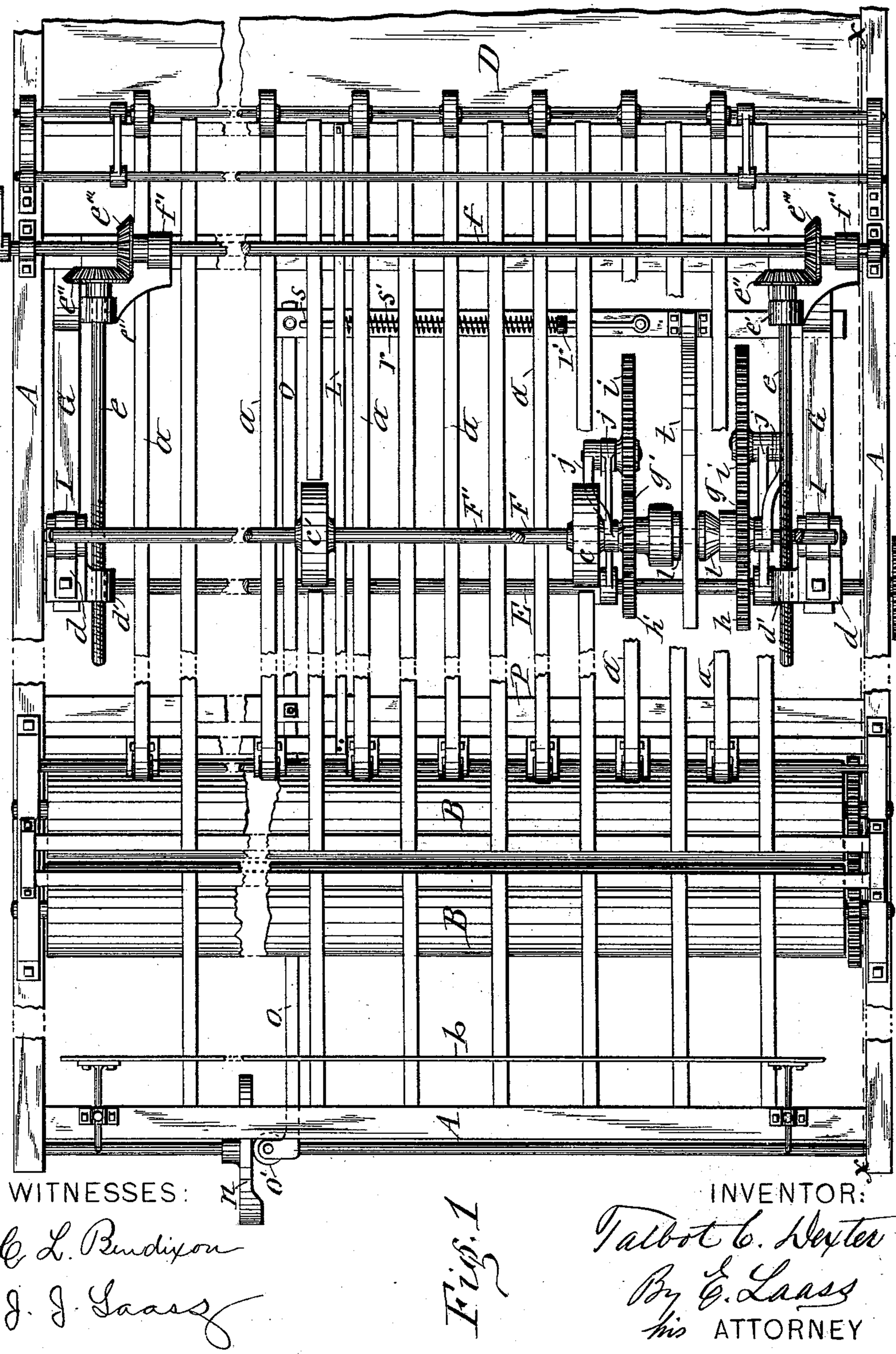


Fig. 1.

WITNESSES:
C. L. Bundixon
J. J. Laass

INVENTOR:
Talbot C. Dexter
By E. Laass
his ATTORNEY

(No Model.) 3 Sheets—Sheet 2.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 534,096. Patented Feb. 12, 1895.

Fig. 2

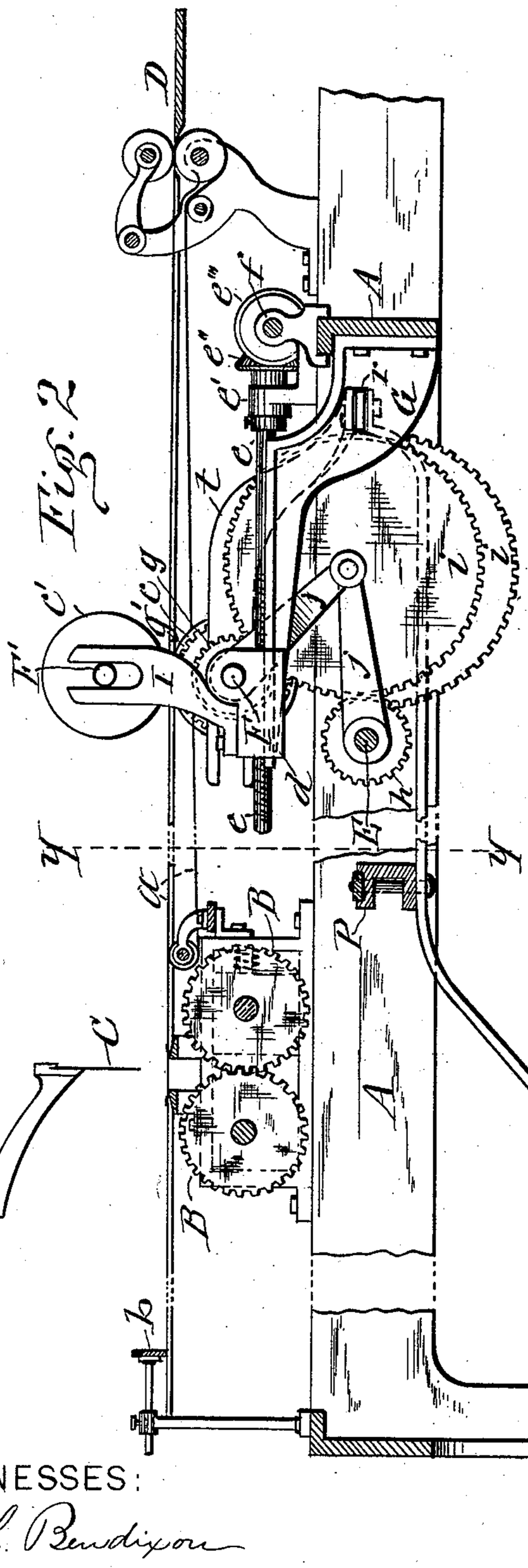
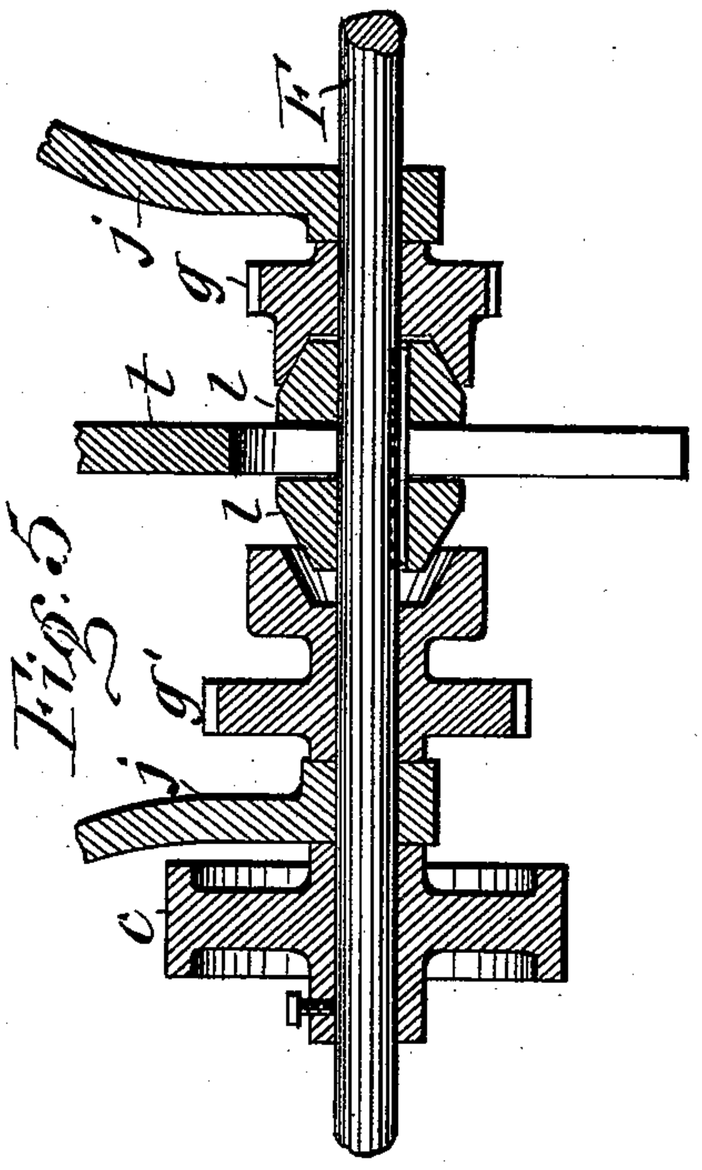


Fig. 5



WITNESSES:

E. L. Bendixon

J. J. Saaz

INVENTOR:

Talbot C. Dexter

By E. Laaz

his ATTORNEY

(No Model.) 3 Sheets—Sheet 3.

T. C. DEXTER.

PAPER FEEDING MACHINE.

No. 534,096. Patented Feb. 12, 1895.

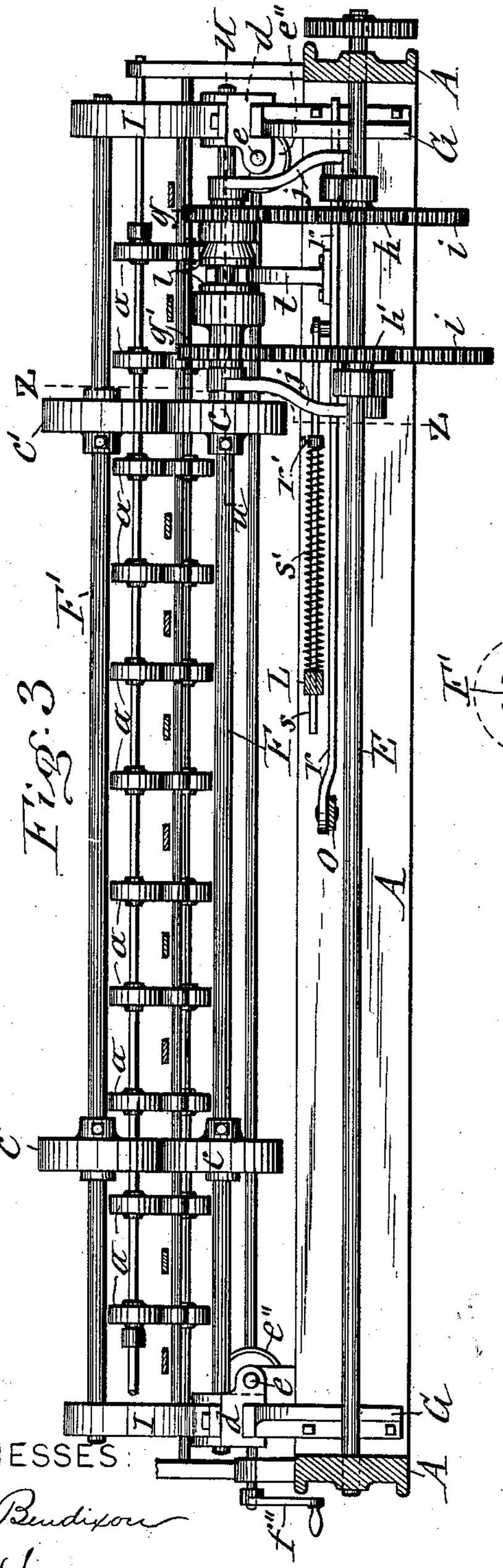


Fig. 3

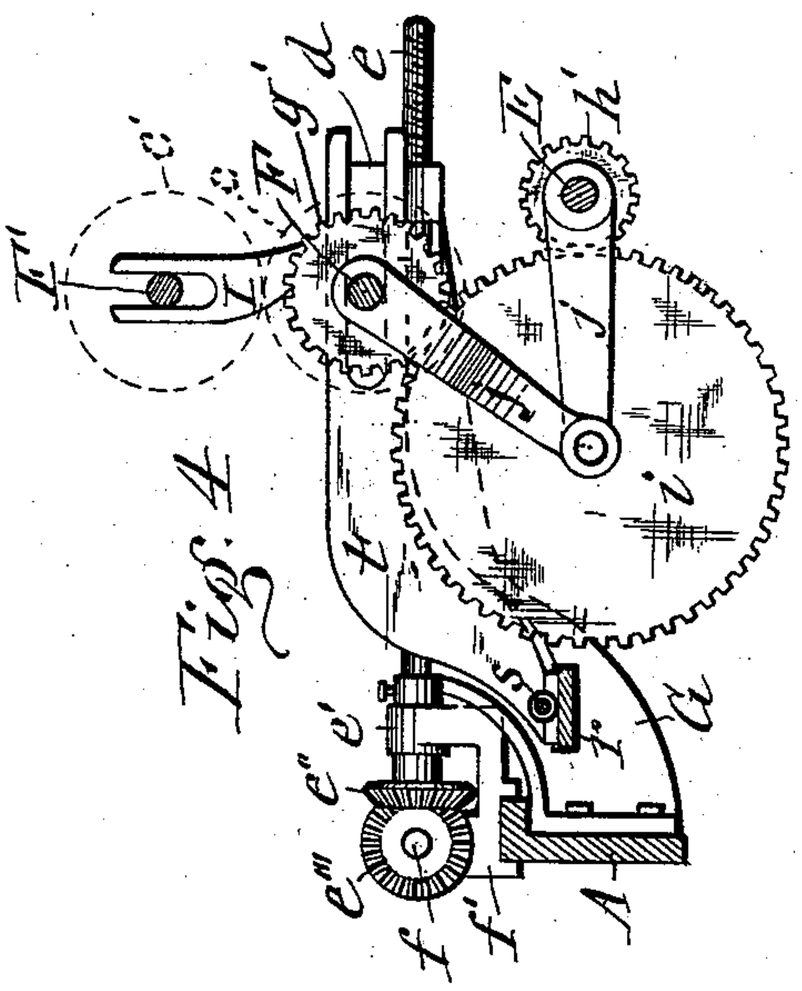


Fig. 4

WITNESSES:

C. L. Bundyson

J. J. Saass

INVENTOR:

Talbot C. Dexter

By E. Saass

his ATTORNEY

UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF FULTON, NEW YORK, ASSIGNOR TO THE DEXTER FOLDER COMPANY, OF SAME PLACE.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 534,096, dated February 12, 1895.

Application filed January 17, 1894. Serial No. 497,149. (No model.)

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, of Fulton, in the county of Oswego, in the State of New York, have invented new and useful Improvements in Paper-Folding Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to mechanisms employed in connection with paper-folding machines for carrying the unfolded sheets of paper to a gage which by contact with the advance edge of the sheet arrests the movement thereof in time to be passed between the first set of folding rolls.

Although my invention is designed chiefly for paper-folding machines, yet I wish it to be understood that it is not limited to the application to such machines. Its object is to allow the sheets of paper to be rapidly introduced in the machine and to be arrested in their introduction in proper time to be operated on without danger of crimping or injuring the advance edge of the sheet by its contact with the gage or stop which arrests the movement of said sheet.

My invention is specially desirable in paper-folding machines that are operated at a very high speed, and particularly on machines that have an attachment known as side register. It is necessary to carry the sheets into the machine very rapidly in order to afford the necessary time for the sheets to be side-guided after they have come in contact with the first fold-gage which arrests the advance movement of the sheets. Experience has proven the fact that it is not practicable to advance a sheet at a very rapid speed and arrest its movement by the contact of its advance edge with the first fold-gage without injuring said edge, unless some means are employed for retarding the movement of the sheet in its near approach to the aforesaid gage and thus preventing the rebounding of the sheet. This is specially necessary in operating on soft flimsy sheets of paper.

The object of my present invention is to effect the retarding of the advancing sheet at the proper time and in a more positive manner, and to that end the invention consists first and mainly in the combination with the sheet conveyers, sheet-stopping gage and a driving shaft, of a roller engaging by its periphery the surface of the sheet in transit, a sheet depressor over said roller, two sets of gears adapted to transmit different speeds of rotation to the aforesaid roller, and clutch mechanism adapted to throw the roller in and out of gear alternately with the two sets to impart variable rates of speed to the roller and to the sheet in contact therewith; and the invention also consists in the combination with the folding rollers, sheet-conveyers, sheet-stopping gage and a driving shaft, of a counter-shaft at right angles to said conveyers and supported adjustably toward and from the folding-rollers according to the length of the sheets to be operated on, gripping rollers fixed to said counter-shaft and sustained with their peripheries in contact with the sheet in transit, gears on the driving shaft and counter shaft, and intermediate gears pivoted to movable supports and held thereby in engagement with the gears of the aforesaid shafts; and the invention furthermore consists in novel features of the details of the aforesaid combination of mechanisms and auxiliary devices employed in connection therewith all as hereinafter described and set forth in the claims.

In the annexed drawings Figure 1 is a plan view of my invention in connection with the sheet-conveying mechanisms of a paper-folding machine. Fig. 2 is a vertical longitudinal section on line —X—X— in Fig. 1. Fig. 3 is a vertical transverse section on line —Y—Y— in Fig. 2 viewed toward the sheet-receiving end of the machine. Fig. 4 is a transverse section on line —Z—Z—, in Fig. 3, and Fig. 5 is a longitudinal section on line —U—U— in Fig. 3.

Similar letters of reference indicate corresponding parts.

A— represents the main supporting frame of the paper-folding machine.

—B—B— denote the folding-rollers, which impart the first fold to the sheets fed to the machine.

—C— denotes the blade which introduces the sheet between the folding-rollers.

—*a*—*a*— are the endless tapes which convey the sheet from the feed-table —D— to its requisite position over the folding-rollers and

—*b*— represents the gage which by contact with the advance edge of the sheet in transit serves to arrest the movement of said sheet. It is to guard more effectually against injury to the advance edge of the sheet by its contact with the said gage which is the object of this invention. To attain this object, I employ the following mechanisms to check the movement of the sheet before its advance edge comes in contact with the stopping-gage —*b*—.

A horizontal counter-shaft —F— extends across the machine at right angles to the sheet-conveying tapes —*a*—*a*— and beneath the same. This shaft receives rotary motion of varying speeds from the driving-shaft —E— by suitable gears preferably by two trains or sets of gears of different diameters, which by the shifting of suitable clutch-mechanism, are caused to alternately transmit motion to the counter-shaft —F—. On said counter-shaft are rigidly mounted the paper-gripping rollers —*c*—*c*— which have the tops of their peripheries in the plane of the paper-passage from the feed-table —D— to the folding-rollers —B—B— so as to come in contact with the sheet in transit and thereby check the motion of said sheet when the peripheries of said rollers travel slower than the conveying-tapes —*a*—*a*—. To increase the efficiency of said rollers, I arrange directly over the same presser-rollers —*c*′—*c*′— which serve to press the sheet down upon the lower rollers so as to enable them to obtain the necessary frictional hold on the sheet. In order to allow the rollers to be adjusted in their positions so as to cause them to check the motion of the sheet at the proper time and operate on sheets of different lengths I mount the counter-shaft —F— in suitable bearings which are supported movably toward and from the folding-rollers —B—B— and retained in their desired position by means of suitable adjustable holders. The detail construction of these bearings and their adjusting devices admits of many modifications, and I therefore do not wish to be limited specifically to the construction shown in the annexed drawings, which however illustrate my preferred construction, and is as follows:

To the frame —A— are firmly secured horizontal guides —G—G— which are parallel with the tapes or conveyers —*a*—*a*— and carry riders —*d*—*d*— which are movable lengthwise of said guides and are provided with journal bearings in which the counter-shaft —F— is mounted. Each of said riders has also affixed to it or integral with it a nut —*d*′— which is axially parallel with the conveyers —*a*—*a*—. In said nut works a screw —*e*— which is journaled in a stationary bracket —*e*′— and prevented from moving longitudinally. By means of this screw the rider —*d*— can be moved to carry the counter-shaft —F— toward or from the folding-rollers —B—B— and retain said shaft in its adjusted position to cause the rollers —*c*—*c*— to check the motion of the sheets of paper at the proper time. Said adjustability is necessary to allow the rollers to operate as aforesaid on sheets of different lengths. From each of the aforesaid riders rises a post —I— the upper end of which is slotted vertically for receiving through it one end of the upper roller-shaft —F′— which is thus adjusted simultaneously with the counter-shaft —F—. The slots of the aforesaid posts extend below the shaft —F′— to cause the upper rollers —*c*′—*c*′— to ride by gravity upon the lower rollers —*c*—*c*—.

In order to allow the two riders —*d*—*d*— to be adjusted simultaneously, I attach to each screw —*e*— a miter-pinion —*e*″— which meshes with one of the pinions —*e*‴— fixed to a shaft —*f*— extending across the machine at right angles to the tapes or conveyers —*a*—*a*— and journaled in brackets —*f*′— secured to the frame —A—. To the end of the shaft —*f*— is attached a hand-wheel or crank —*f*″— by which to turn said shaft.

For transmitting motions of varying speeds from the driving-shaft —E— to the counter-shaft —F— I mount loosely on the latter shaft, two gears —*g*— and —*g*′— of different diameter, and to the driving-rhaft —E— I fasten two gears —*h*— and —*h*′— which are also of different diameters, and arranged to drive the large gear —*h*— by the small gear —*g*—, and the small gear —*h*′— by the large gear —*g*′—. Said motion is transmitted by intermediate gears —*i*—*i*— each of which is pivoted to and supported independently of the other on the free ends of arms —*j*—*j*— hung respectively on the counter-shaft —F— and driving-shaft —E—. Said arms are of such lengths from center to center of their bearings as to maintain the intermediate gears in engagement with the gears on the driving shaft and counter shaft. Between the gears —*g*—*g*′— is a shifting clutch —*l*— feathered on the shaft. This clutch has its ends provided with suitable means for engaging or interlocking with the adjacent faces of the hubs of the gears —*g*—*g*′— and the clutch is of such a length as to cause one end thereof to release the adjacent gear, while the opposite end of the clutch engages with the gear adjacent thereto. Hence, by shifting said clutch into engagement with the small gear, the counter-shaft partakes motion from the said gear which causes the rollers —*c*—*c*— to revolve at a speed correspondingly to that of the travel of the tapes —*a*—*a*— and by shifting the clutch into engagement with the large gear the motion of the aforesaid rollers is reduced to such a degree as to cause the motion of the sheet carried by the tapes —*a*—*a*— to be materially checked by the frictional contact of the roller with said sheet. This retarding of the travel of the sheet is designed to be effected at a time when the advance edge of the sheet is in such a proximity to the gage —*b*— as to effectually guard against the rebounding of the sheet and injury to the ad-

vance edge thereof by its contact with the said gage.

For shifting the clutch —*l*— automatically, I employ a rotary cam —*n*— which may be driven by any suitable and well known mechanism connecting with said cam any actuating part of the folding-machine. With this cam engages one end of the lever —*o*— pivoted to a cross-bar —P— attached to the frame —A—. To the opposite end of this lever is connected a pitman —*r*— which in turn is connected to an arm —*t*— extended from the clutch —*l*—. A rod —*s*— is connected at one end to the pitman —*r*— and has its opposite end sliding in an aperture in a cross-bar —L— fixed to the frame —A—.

A spiral spring *s'* surrounding the rod —*s*— and bearing with one end on a collar —*r'*— fixed to the rod, and with the opposite end against the cross-bar —L—, serves to normally hold the clutch in engagement with one of the gears and also hold the lever —*o*— in engagement with the cam —*n*—. To avoid friction between said lever and cam, I pivot to the lever a roller —*o'*— by which it bears on the cam.

What I claim as my invention is—

1. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, a roller disposed with its periphery in contact with the under side of the sheet in transit, a sheet depressor over said roller, two sets of gears adapted to transmit different speeds of rotation to the aforesaid roller, and clutch-mechanism adapted to throw the roller in and out of gear alternately with the two sets to impart variable rates of speed to the roller and to the sheet in contact therewith as set forth.

2. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, a gripping-roller disposed with its periphery in contact with the under side of the sheet in transit, a pressing roller directly over said gripping roller to press thereon the aforesaid sheet, two sets of gears adapted to impart different speeds of rotation to the lower roller, a clutch adapted to throw the roller in and out of gear alternately with the two sets to impart variable speed to the roller, and a lever automatically shifting the clutch as set forth.

3. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, a counter-shaft transversely under the conveyers, gears of different diameters mounted on said counter-shaft, a roller mounted rigidly on said shaft and having its periphery in contact with the under side of the sheet in transit, a sheet-depressor over said roller a longitudinally movable clutch feathered on the counter-shaft between the aforesaid gears and adapted to engage the same alternately, gears of different diameters on the driving-shaft imparting motion to the gears of the counter-shaft, and a lever automatically shifting the clutch as set forth.

4. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, a counter-shaft transversely under the conveyers, gears of different diameters mounted loosely on said counter-shaft, a roller fixed to said shaft and having its periphery in contact with the paper in transit, a clutch feathered on the counter-shaft between the gears and adapted to engage the same alternately, gears on the driving-shaft imparting motion to the gears on the counter-shaft, a lever pivoted to the main frame, a pitman connected at one end to said lever, a clutch-shifting arm attached to the opposite end of the pitman, and a rotary cam actuating the lever as set forth.

5. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, guides parallel with the aforesaid conveyers, riders mounted on said guides, a counter-shaft at right angles to the conveyers and journaled in the riders, rollers fixed to the latter shaft and having their peripheries in contact with the under side of the paper in transit, sheet-depressors over said rollers, two pairs of gears of different diameters respectively on the driving-shaft and counter-shaft, arms mounted loosely on said shafts, intermediate gears pivoted to and supported by the free ends of said arms, and screws sustaining the riders longitudinally adjustable on the guides to carry the aforesaid rollers to their requisite position for operating on the sheet in transit at the proper point in the length thereof, as set forth.

6. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, guides parallel with the sheet-conveyers, riders mounted on said guides, a counter-shaft at right angles to the conveyers and mounted in the riders, rollers fixed to said shaft and having their peripheries in contact with the under side of the paper in transit, a shaft over the counter-shaft parallel therewith and carried on the aforesaid riders, rollers on said upper shaft directly over the rollers on the counter-shaft, gears mounted rigidly on the driving shaft and loosely on the counter-shaft, arms loosely connected to said shafts, intermediate gears pivoted to said arms, nuts fixed to the riders axially parallel with the aforesaid conveyers, screws working in said nuts, miter-pinions on the screws, a shaft at right angles to the conveyers, miter-pinions on said shaft meshing with those of the screws, and a hand-wheel or crank attached to the latter shaft, as set forth.

7. In combination with the sheet-conveyers, sheet-stopping gage and a driving-shaft, guides parallel with the said conveyers, riders on said guides, a counter-shaft at right angles to the conveyers and journaled in the riders, rollers fixed to the counter-shaft and having their peripheries in contact with the under side of the paper in transit, a shaft over the counter-shaft parallel therewith and carried on the riders, rollers on said upper shaft directly over the rollers of the counter-shaft, gears of different diameters mounted

rigidly on the driving-shaft gears of different diameters mounted loosely on the counter shaft and disposed reverse in relation to the gears on the driving shaft, arms hung loosely on said shafts, intermediate gears pivoted in and supported by said arms, a clutch feathered on the counter-shaft between the gears and adapted to engage the same alternately, a lever pivoted to the main frame, a pitman connected at one end to said lever, a clutch-shifting arm attached to the opposite end of the pitman, a rotary cam actuating said lever, nuts fixed to the riders axially parallel with the sheet-conveyers, screws working in said nuts, miter-pinions on the screws, a shaft at right angles to the sheet-conveyers, miter-pinions on said shaft meshing with those of the screws, and a hand-wheel or crank attached to the shaft, all combined as set forth.

In testimony whereof I have hereunto signed my name this 16th day of November, 1893.

TALBOT C. DEXTER. [L. S.]

Witnesses:

JOHN J. LAASS,

C. L. BENDIXON.