T. C. DEXTER & W. M. McCAIN.

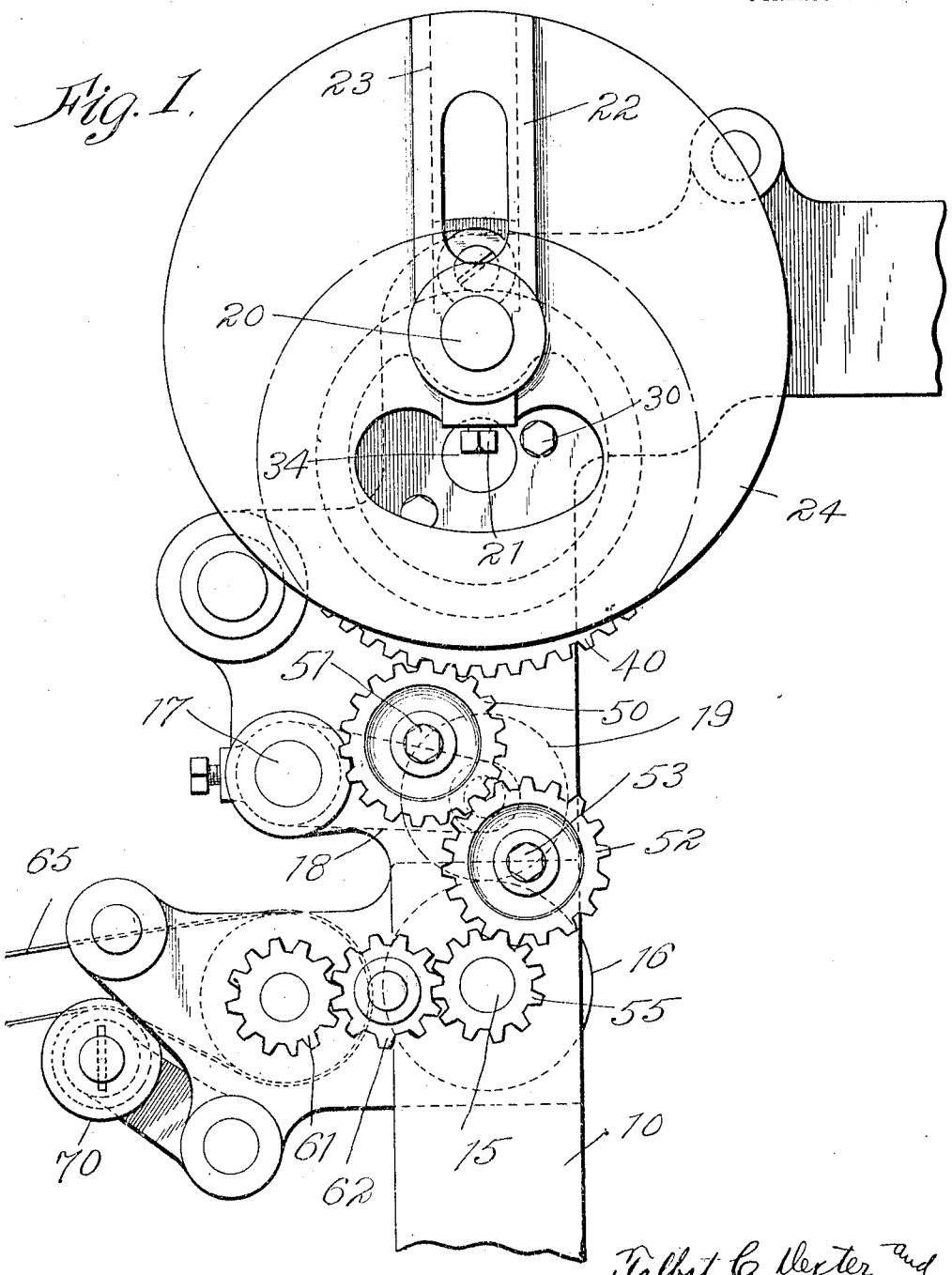
DRIVING MECHANISM FOR SHEET CONVEYERS.

APPLICATION FILED MAY 7, 1909.

950,374. Patented Feb. 22, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
C. A. Johnston
Marion Gifford.

Talbot C. Dexter, and
William M. McCain
Inventors,
By their Attorneys Knight Bros.

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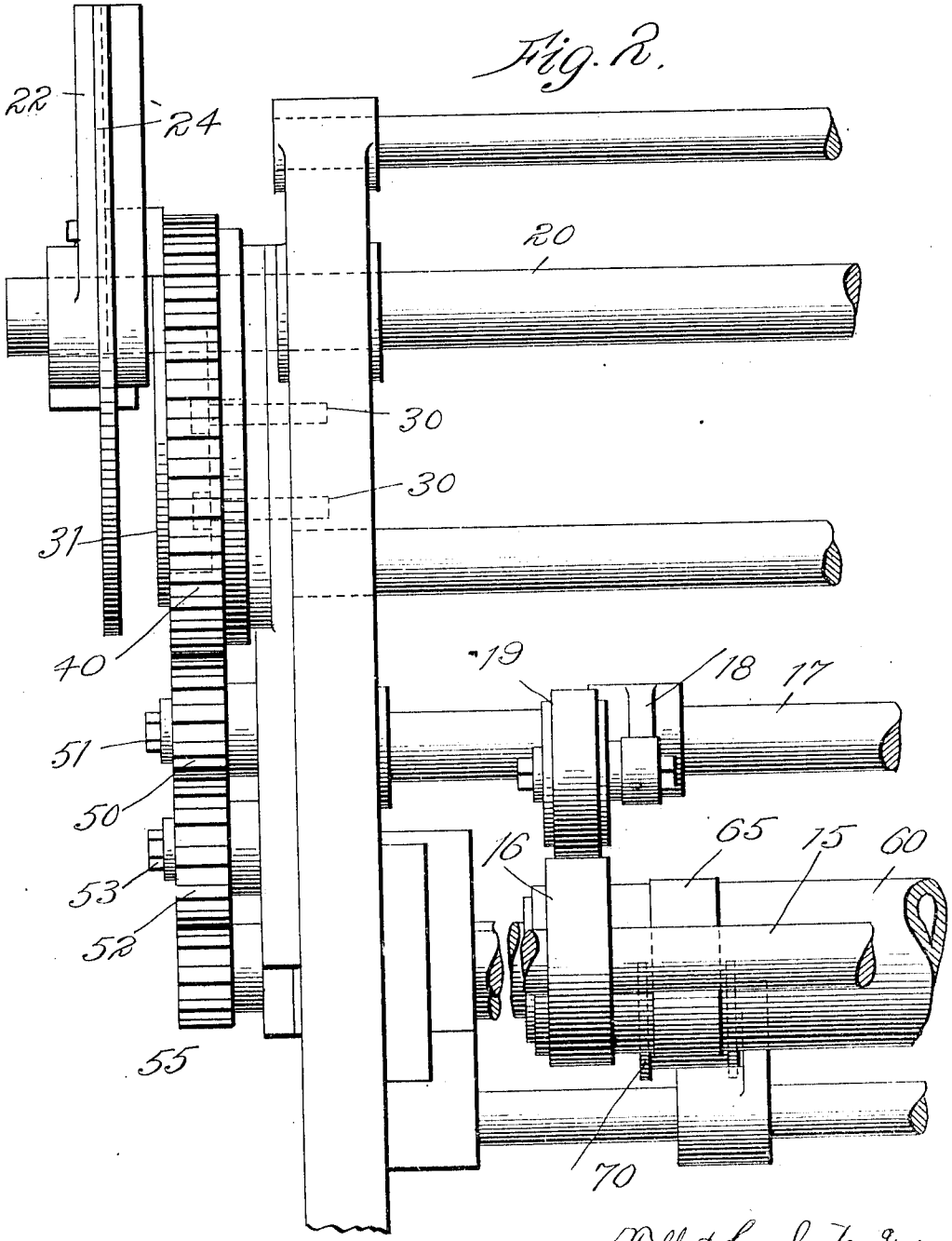
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

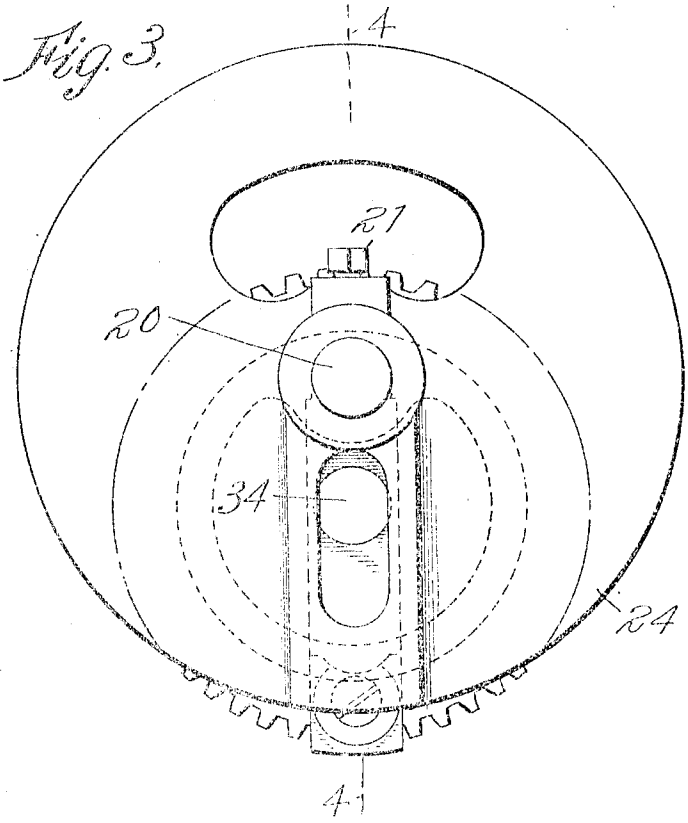


Fig. 4.

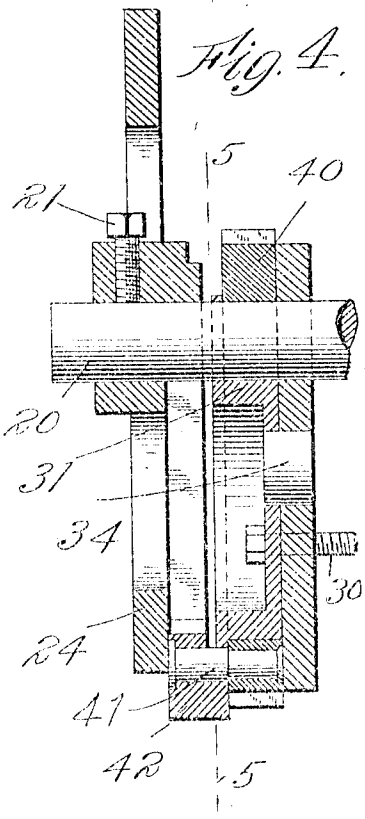


Fig. 5.

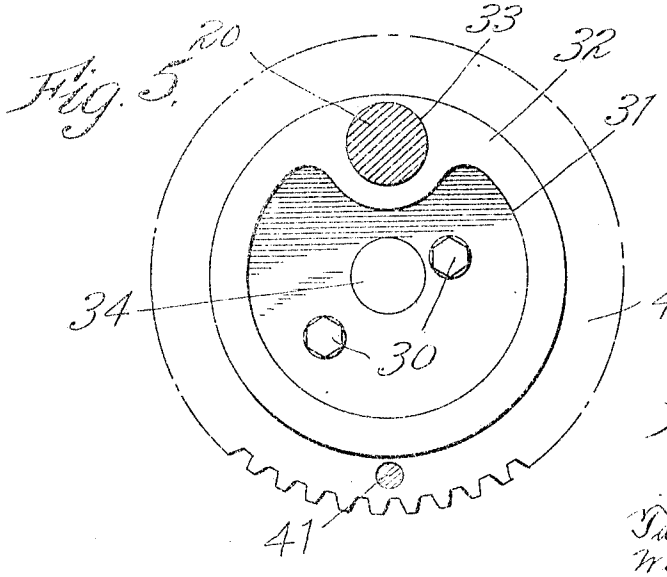


Fig. 6.

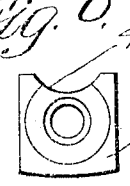
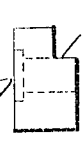


Fig. 7.



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Talbot C. Dexter and
William M. McCain,
Inventors,
By their Attorneys Kingsley & Bros.

UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER AND WILLIAM M. McCAIN, OF PEARL RIVER, NEW YORK; SAID McCAIN ASSIGNOR TO SAID DEXTER.

DRIVING MECHANISM FOR SHEET-CONVEYERS.

950,374. Specification of Letters Patent. Patented Feb. 22, 1910.

Application filed May 7, 1909. Serial No. 494,582.

To all whom it may concern.

Be it known that we, TALBOT C. DEXTER and WILLIAM M. McCAIN, both citizens of the United States, residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Driving Mechanism for Sheet-Conveyers, of which the following is a specification.

In feeding sheets to a printing press from an automatic paper feeding machine, it is necessary to move the sheets very rapidly through the greater part of their travel toward the front gages of the press and then slow them down as they approach the gages so as to prevent the rebound of the sheets from the gages or the injury of the leading edge of the sheet.

The present invention relates to improvements in driving mechanism for the sheet conveyers or forwarding devices which take the successive sheets from an automatic paper feeding machine and deliver them to the front gages of a press, at which point the side registering mechanism upon the conveyer frame operates to place the successive sheets in registered position just prior to the action of the press grippers in taking the sheets from the conveyer frame.

In our improved driving mechanism, we provide a simple and effective eccentric crank gear between the driving shaft and the sheet forwarding devices so that the successive sheets will be taken from the pile at a relatively low speed and moved through the greater part of the distance from the feeding machine to the front gages of the press at a relatively high speed, and finally delivered at the gages of the press at a relatively low speed. By reason of the employment of the eccentric crank driving gear, the variable motion of the sheet forwarding devices or conveyers is constantly and gradually changing from low to high speed and from high to low speed so that the mechanism and the sheets carried thereby are not subjected to any shocks or sudden changes of motion.

In order that our invention may be fully understood, we will first describe the same with reference to the accompanying drawings, and afterward point out the novelty more particularly in the annexed claims.

In said drawings: Figure 1 is a detail side elevation of the front portion of an automatic paper feeding machine having our improved slow-down driving mechanism applied thereto. Fig. 2 is a detail rear elevation of the same. Fig. 3 is a side elevation of the main parts of the mechanism shown in Fig. 1 showing the parts in a different position. Fig. 4 is a vertical transverse sectional view taken on the line 4—4 of Fig. 3. Fig. 5 is a detail vertical longitudinal sectional view taken on the line 5—5 of Fig. 4. Figs. 6 and 7 are detail views of the sliding block of the crank pin.

In illustrating our improved slow-down driving mechanism for sheet conveyers, we have shown only the forward part of an automatic paper feeding machine and the receiving end of the sheet conveyer to which the successive sheets which are separated from the pile or bank are passed from the feeding machine. It will of course be understood that our improved driving mechanism may be applied to any form of automatic paper feeding machine to operate a sheet conveyer or sheet forwarding device of any approved construction, the illustration of a part of a particular paper feeding machine and of the ordinary tape conveyer being intended as illustrations of said mechanisms only in a broad sense.

10 represents a part of the upright frame of any suitable paper feeding machine which is ordinarily provided with means for separating sheets from the bank or pile and for moving them forwardly to suitable delivery mechanism which takes the successive sheets and passes them to the conveying mechanism which leads the sheets to the front gages of a press or other machine which is designed to operate upon the sheets.

15 is a shaft extending from side to side and journaled at its opposite ends in the frame of the automatic paper feeding machine at the delivery end thereof. The shaft 15 carries a plurality of constantly running under feed rollers 16 over which the successive sheets are passed from the pile or bank of the feeding machine to the sheet conveyer.

17 is a rock shaft suitably journaled in the feeding machine frame and carrying rock arms 18 supporting in their free ends

the drop rollers 19. Suitable cam mechanism (not shown) is provided for intermittently raising and lowering the rollers 19 with relation to the under feed rollers 16. The constantly driven under feed rollers 16 and drop rollers 19 constitute the ordinary form of drop roller delivery mechanism.

20 is a shaft suitably journaled in the feeding machine frame and constituting in the particular illustration the cam shaft of a Dexter automatic paper feeding machine. This shaft 20 has secured to its outer end by means of a key or set screw 21 a heavy crank arm 22 formed with a guideway or slot 23 extending radially of the shaft 20. For the purpose of stiffening and balancing the crank arm 22, we prefer to form it integral with a disk 24 as shown, so that in effect the crank arm and disk are a driving wheel having a radial guide-way or slot.

Rigidly secured to the side frame of the machine by bolts 30 or other suitable securing means, is an eccentric bearing ring 31 formed with an annular flange 32. This bearing ring 31 has an eccentric opening 33 through which the driving shaft 20 extends and is properly centered upon the machine frame by a short cylindrical stud 34 engaging the bearing ring and frame.

40 is the ring gear freely journaled upon the bearing ring 31 and confined thereon against the frame by the annular flange 32 of the bearing ring 31. This ring gear 40 carries a crank pin 41 upon which is journaled a bearing block 42 which engages and slides in the radial slot 23 of the driving crank arm 22, said block 42 being cut out at 42^a to freely pass the flange 32 of bearing ring 31 at one point in the stroke, and cut out at 42^b to pass around the driving shaft 20 at another point in the stroke. The cut-out portion 42^a of block 42 passes under the flange 32 when the block is in the position shown in Figs. 3 and 4 of the drawings, the cut-out portion 42^b passes around the driving shaft 20 when the parts are in the position shown in Fig. 1 of the drawings. The gear ring 40 meshes with and drives an intermediate gear 50 journaled upon a stud 51 upon the machine frame, said intermediate gear 50 driving a similar gear 52 journaled upon stud 53 upon the machine frame. This gear 52 meshes with and drives a gear 55 keyed to the projecting end of the constantly driven under feed shaft 15 of the drop roller delivery mechanism. By this means, said shaft 15 and feed rollers 16 are driven.

60 is the drum or large tape roller extending transversely of the machine parallel with the shaft 15 and having keyed to one end of its supporting shaft a gear 61 which is driven by an intermediate gear 62 meshing with and driven by the gear 55 on shaft 15. This drum 60 supports the receiving end of a series of conveyer tapes, one of which is shown at 65.

70 is one of a series of the ordinary belt tightening rollers or pulleys engaging the tapes 65 for holding them taut.

It will be understood without further illustration that the series of conveyer belts or tapes 65 pass from the delivery end of the feeding machine toward the front gages of a printing press or other machine to which the conveyer is applied, the office of the conveyer tapes being to supply the successive sheets as they are fed from the feeding machine, in proper time for the operation of the press or other machine.

It will be observed from the above description that our improved slow-down delivery mechanism operates not only the constantly driven under rollers of the drop roller delivery mechanism, but also the driving drum or roller of the belt conveyer mechanism. This mechanism is so timed with relation to the operation of the automatic paper feeding machine and the printing press or other machine to which sheets are delivered, that the drop rollers 19 will engage the leading edge of the sheet above the under rollers 16 when the variable speed driving mechanism is operating at its lowest speed. This position of the parts is shown in Figs. 1 and 2 of the drawings. The sheet is taken by the drop roller delivery mechanism running at said slow speed and delivered to the tapes of the sheet conveyer, the speed of the drop roller delivery mechanism and the tapes gradually increasing as the sheet leaves the pile or bank of the feeding machine until it is moving at its greatest rate of speed, at which time the sheet is approximately half way to the front gages of the press. The position of the parts at the highest rate of speed is shown in Figs. 3 and 4 of the drawings. The speed of the conveyer then gradually reduces to its lowest speed at which point the sheets are delivered to the front gages of the press and the ordinary sheet registering gages are thrown into action and the sheets taken by the grippers of the press.

It will be observed that the variable speed of our improved driving mechanism is due to the eccentric position of the crank gear 40 with relation to the driving shaft 20 which carries the driving crank arm 22, the crank block 42 sliding inwardly and outwardly in the guide-way or slot of the driving crank arm and transforming the regular speed of the driving crank arm into a variable speed.

What we claim is:

1. The combination of a shaft carrying a slotted crank arm, a rotary power transmitting ring gear mounted eccentrically with relation to said shaft and carrying a crank pin which is engaged by said slotted crank

arm, suitable sheet forwarding means, and gearing between said sheet forwarding means and said power transmitting member.

2. The combination of a shaft carrying a driving crank arm which is slotted radially with relation to said shaft, a ring gear journaled eccentrically with relation to said shaft, a crank pin mounted upon said ring gear, a bearing block journaled upon said crank pin and engaging the slot of said driving crank arm, suitable sheet forwarding means, and gearing between said sheet forwarding means and said ring gear.

3. In a paper feeding machine, the combination of suitable delivery mechanism including the under feed roll and the coöperating drop rollers, a driving shaft, a driving crank arm mounted upon said shaft, a power transmitting gear mounted eccentrically with relation to said shaft, and geared to said under feed roll, a crank pin carried by said gear and engaged by said driving crank arm, and sheet conveying tapes or belts driven by said under feed roll.

4. The combination of a driving shaft, carrying a driving member, a fixed bearing member mounted eccentrically with relation to said driving shaft, a rotary power transmitting member journaled upon said bearing member and carrying a crank pin, means of engagement between said driving member and said crank pin, and suitable sheet forwarding means driven by said power transmitting member.

5. The combination of a shaft carrying a driving crank arm which is slotted radially with relation to said shaft, a ring gear journaled eccentrically with relation to said shaft, a crank pin mounted upon said ring gear, a bearing block journaled upon said crank pin and engaging the slot of said driving crank arm and movable inwardly and outwardly therein, suitable sheet forwarding means, and gearing between said sheet forwarding means and said ring gear.

6. The combination of a shaft carrying a driving crank arm which is slotted radially with relation to said shaft, a bearing member mounted eccentrically with relation to said shaft, and formed with an annular flange, a ring gear journaled upon said bearing member and confined by said annular flange, a crank pin mounted upon said ring gear, a bearing block journaled upon said crank pin and engaging the slot of said driving crank arm, suitable sheet forwarding means, and gearing between said sheet forwarding means and said ring gear.

TALBOT C. DEXTER.
WILLIAM M. McCAIN.

Witnesses:
A. C. HAMMOND,
IRVEN H. DEXTER.