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PATENTED NOV. 20, 1906.

T. C. DEXTER.

COMBINED PAPER CUTTING AND SMASHING MACHINE.

APPLICATION FILED AUG. 7, 1906.

3 SHEETS—SHEET 1.

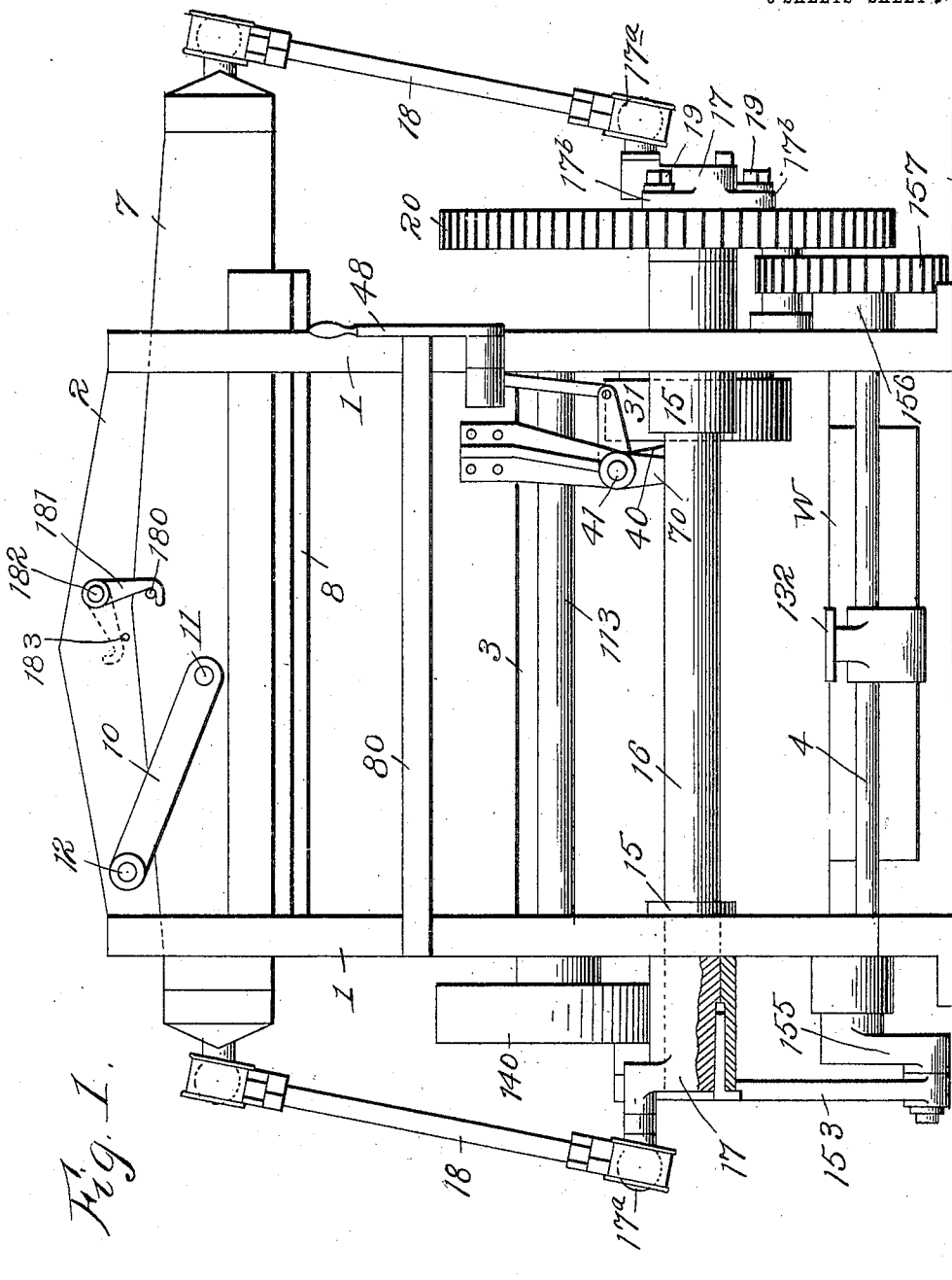


Fig. 1.

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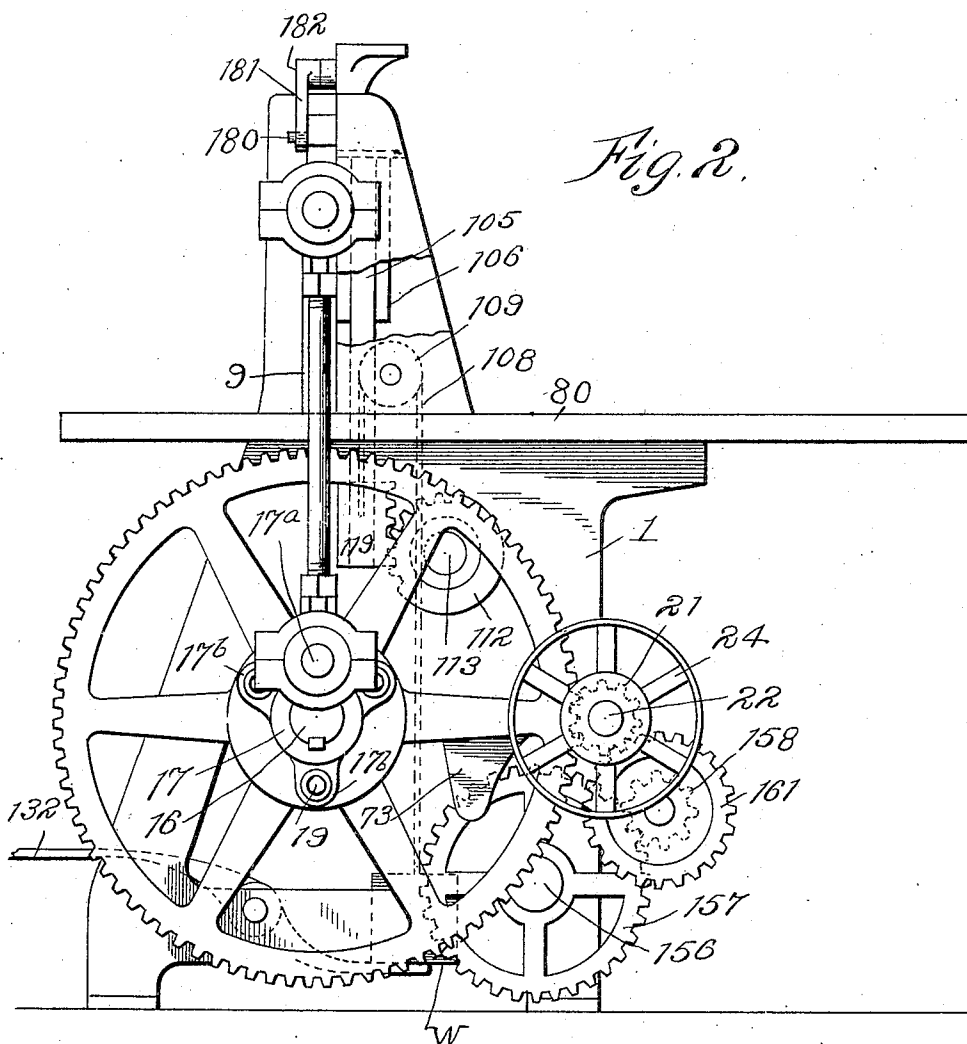
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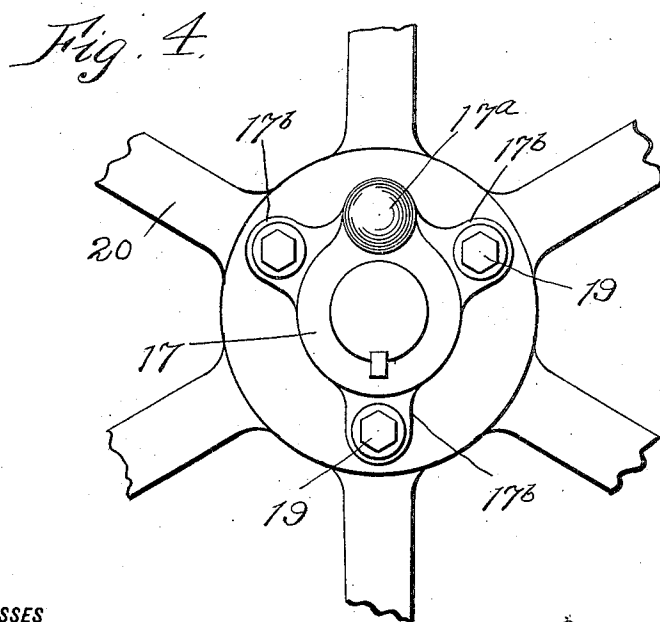
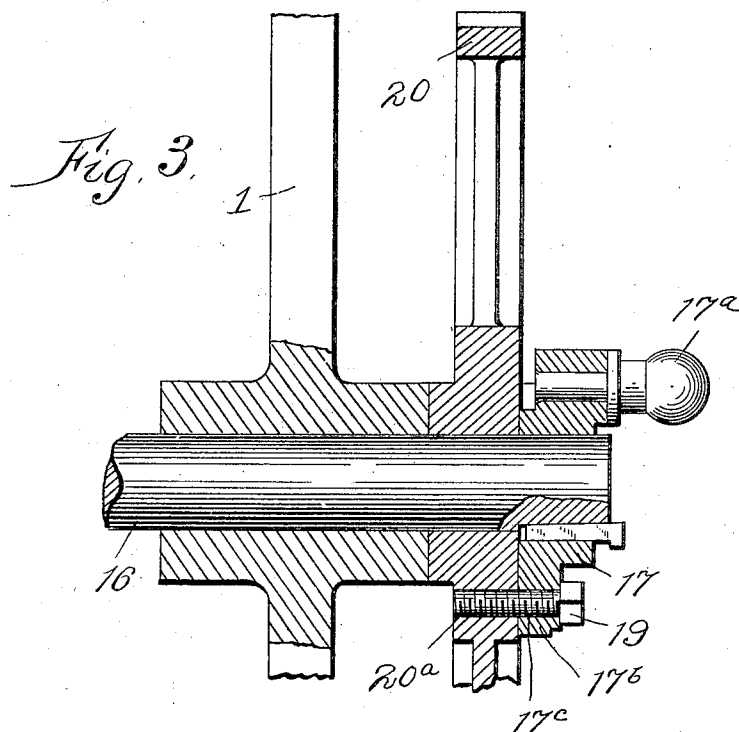
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3 SHEETS—SHEET 3.



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COMBINED PAPER CUTTING AND SMASHING MACHINE.

No. 836,637.

Specification of Letters Patent.

Patented Nov. 20, 1906.

Application filed August 7, 1906. Serial No. 329,561.

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, a citizen of the United States, residing at Pearl River, county of Rockland, State of New York, have invented certain new and useful Improvements in a Combined Paper Cutting and Smashing Machine, of which the following is a specification.

The desirability of constructing a power paper-cutting machine to adapt it for use as a smashing-machine in binderies has frequently been suggested, but so far as I am aware, no one up to the present time has devised a simple and effective mechanism which will adapt a paper-cutting machine of ordinary construction to be quickly changed into a smashing-machine. Paper-cutters have heretofore been used to a limited extent for smashing folded work by adjusting the back gage so as to allow the pile of work to be pushed into the machine far enough to be missed by the cutting-knife, thereby allowing the clamp to come down to smash the folded backs without cutting them. This use of the ordinary paper-cutting machine is not entirely satisfactory, not only because of the care required in so operating the machine for smashing, but also on account of the unnecessary wear upon the machine and loss of power in working the knife when the knife is not utilized.

I have devised a simple arrangement in a paper-cutting machine by which the operator is enabled to disconnect the knife mechanism entirely from the rest of the machine, so that the power-clamp can be utilized for smashing without the operation of the knife, the knife being positively secured in its elevated position so as to avoid all possible danger from its accidental descent.

To this end my invention consists in providing a power cutting-machine with means for detachably connecting the knife and its operating mechanism with the power mechanism of the machine. This mechanism may be arranged in numerous ways; but I have found the simplest form of such mechanism to be the loosely mounting of the main knife-operating gear upon the knife-operating shaft and the keying or rigidly mounting of the knife-operating cranks upon said shaft and some detachable securing means for locking one of said cranks to the knife-operating gear. In addition to this I prefer to provide some form of hook or fastening means upon the top rail or other suitable part of the cutter-frame to engage the knife-bar or part con-

nected therewith for securing the knife-bar in elevated position when the knife-operating mechanism is disconnected from the power mechanism of the machine. With such an arrangement it is only necessary in order to use the machine as a smashing-machine to disconnect the knife-operating gear from the knife-crank, so as to allow it to rotate freely upon the crank-shaft, and then fasten the knife in an elevated position.

In order that my invention may be fully understood, I 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 front elevation of the paper-cutting machine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is an enlarged detail vertical sectional view showing the detachable connection between one of the knife-cranks and the knife-operating gear. Fig. 4 is a detail side elevation of the same.

For the purpose of illustrating my invention I have shown it applied to the paper-cutting machine covered by Letters Patent No. 807,730, granted to me December 19, 1905. I would have it understood, however, that I do not limit my invention to this particular type of paper-cutting machine.

The operating parts of the herein-described paper-cutting machine are supported in a suitable framework of any desirable construction best adapted for such purpose. A heavily built framework is shown comprising the side frames or standards 1, firmly braced and connected by the top rail 2, the center rail 3, the bottom rock-shaft or rod 4, and the transverse shafts hereinafter referred to. The reciprocating cross-head 7, carrying the cutter-blade 8, is mounted to slide vertically and transversely of the machine in the guide-slots 9, formed in the side frames or standards 1. The cross-head 7 is anchored to the top rail 2 by means of an ordinary link 10, which is pivotally connected at its opposite ends 11 and 12 to the knife-supporting cross-head and the top rails, so as to cause the cross-head and knife-blade carried thereby to move laterally of the machine as it reciprocates vertically to impart to the knife a shearing cut.

Suitably journaled in the side frames or standards 1 in the bearings 15 is the knife-operating crank-shaft 16. This shaft 16 has keyed or otherwise rigidly secured to its

outer ends the crank-hubs 17, carrying the rounded crank-pins 17^a, which are connected in the usual way through the links 18 with the opposite ends of the knife-supporting cross-head 7. When the knife-operating shaft 16 is rotated, the jointed links 18 will cause the cross-head and cutter-blade to reciprocate vertically and transversely of the machine in the slotted guides formed in the side frames or standards 1 in a manner well understood in the art.

20 is a large knife-operating gear freely journaled upon the crank-shaft 16 just inside of one of the crank-hubs 17. The crank-hub 17 at the right-hand side of the machine, as shown in Fig. 1, is formed with integral radial lugs or ears 17^b, which are presented in contact with the outer face of the hub of the knife-operating gear 20. These ears or lugs 17^b and the hub of the gear 20 are correspondingly drilled to form registering threaded openings 17^c and 20^a for the reception of screw-bolts 19, which are threaded into these openings for securely locking the gear 20 to the crank-hub 17 for the purpose of securing the gear 20 upon the crank-shaft 16. This connection between the gear 20 and shaft 16 is effected when the machine is operated as a paper-cutter and connection is broken by the removal of the bolts 19 when the machine is to be operated as a smasher; as more particularly described later.

The large gear 20 meshes with a driving-pinion 21, loosely journaled upon the main power or driving shaft 22. The main driving or power shaft 22 is suitably journaled in the side frames or standards of the machine, said shaft carrying upon one end thereof the driving-pulley 24. This shaft is driven by any suitable power through the medium of a belt operating the pulley 24. The driving-pinion 21 is formed integral with or rigidly secured to an elongated hub or sleeve, (not shown,) said hub having also mounted thereon at its opposite or inner end a clutch rim or wheel 31. The elongated hub is journaled within one of the frame-bearings, while the power or driving shaft 22 is journaled within said hub. The clutch-wheel 31 and the pinion 21, forming part of or secured to the elongated hub, are loosely mounted upon the power-shaft 22. The clutch-wheel 31 forms one part of an ordinary expansion-rim clutch the other part being preferably a split-clutch ring (not shown) which is rigidly secured to the power-shaft 22. Journaled at one end of the split ring is an operating-finger, formed with a heel, adapted to engage the other end of the split ring, so that when the finger is moving outwardly the split ring will be expanded to frictionally engage the interior surface of the clutch rim or wheel 31. Carried on the free ends of the finger is an adjustable screw-bolt, which is adapted to be engaged by an operating-spool mounted to slide

longitudinally upon the power-shaft 22 and formed with an annular groove in which engage the inwardly-projecting pins carried by the yoke 40, secured on the end of the operating-rod 41. These parts are not shown in detail, but are fully illustrated in my above-named Patent No. 807,730, and are not shown in detail in the present case, since they form no part of the present invention.

48 is the clutch-operating lever, suitably connected, through links and levers, with the clutch-operating rock-arm 41.

In addition to the hand-operated mechanism for throwing the main clutch into and out of action the machine should be provided with an automatic device for throwing out the main clutch at the completion of every operation of the machine. Such mechanism may be the same as fully disclosed in my above-named patent, of which I show only the cam 73, mounted upon the large gear-wheel 20.

80 is the paper-supporting table or platform, which is rigidly mounted between the side frames or standards 1 above the center rail 3.

105 is the paper holding and smashing bar, the ends of which are secured to the downwardly - extending guide - bars 106, which operate in vertical grooves formed in the inner faces of the side frames 1. Secured to the lower ends of the guide-bars 106 are the sprocket-chains 108, which pass up over sprocket-wheels 109 on the inside of the side frames 1. The opposite ends of the sprocket-chains are connected to a counterweight W for balancing the weight of the clamping and smashing bar and attached parts.

119 represents rack-bars secured to the lower ends of guide-bars 106, and 112 represents mutilated gears meshing with the rack-bars 110 and keyed to the opposite ends of the transverse shaft 113, suitably journaled in the machine side frames and driven by the mechanism now to be referred to.

132 is a treadle-lever by which the bar 105 may be lowered by foot-power.

The transverse shaft 113 has secured to its outer end one member of the friction-clutch 140, the other or driving member of said clutch being operated by a pitman 153, extending from the crank 155, secured to the outer end of a shaft 156, which extends across the machine and is suitably journaled in the side frames. The opposite end of the shaft 156 carries a gear-wheel 157, which meshes with a pinion 158, secured to a larger gear-wheel 161, which in turn meshes with pinion 21, above referred to. The operation of the bar 105 by this mechanism is exactly as described in my above-named Patent No. 807,730.

The knife-carrying bar 7 has a central pin or lug 180, with which is adapted to engage a heavy hook 181, which is journaled at 182

upon the top rail 2 of the machine-frame. When the machine is operated as a paper-cutting machine, the hook 181 is thrown back out of engagement with the pin upon the knife-carrying bar, as shown in dotted lines in Fig. 1, the said hook resting in its disengaged position upon a pin 183.

The improved machine may be operated for cutting paper exactly as described in my above-named Letters Patent. To use the said machine for smashing the folded edges of sheets, it is only necessary to remove the screw-bolts connecting the crank-hub 17 with the hub of the gear 20 and engage the knife-carrying bar with the hook 181. This permits the gear 20 to rotate freely upon crank-shaft 16 to perform the clamping or smashing functions of the machine, while the knife and its connected operating parts, including the cranks and the shaft, are held out of operation. In the operation of smashing the bar 105 descends and applies the requisite pressure to which the main clutch has been adjusted and holds said pressure momentarily and then releases automatically and moves back to its initial position, when the main power-clutch is thrown out exactly as this part of the operation is performed when the machine is operating for cutting paper.

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

1. In a combined paper cutting and smashing machine, the combination of a driving-shaft, a paper clamping and smashing bar, a paper-cutting knife, means driven from said shaft for operating said clamping and smashing bar, and means also driven from said shaft for operating said knife, the said knife-operating means including a detachable connection by which the knife can be detached from its operating means.

2. In a combined paper cutting and smashing machine, the combination of suitable power mechanism, a paper clamping and smashing bar suitably operated from said power mechanism, a paper-cutting knife also operated from said power mechanism, and means for detaching the knife from the power mechanism.

3. In a combined paper cutting and smashing machine, the combination of a driving-shaft, a paper clamping and smashing bar, a paper-cutting knife, means driven from said shaft for operating said clamping and smashing bar, means driven from said shaft for operating said knife, a detachable connection included in the knife-operating means whereby the knife can be disconnected from its op-

erating means, and means for securing the knife against movement in its inactive position.

4. In a combined paper cutting and smashing machine, the combination of a driving-shaft, a paper clamping and smashing bar, a paper-cutting knife, power-transmitting mechanism, including a clutch for transmitting motion from the driving-shaft to the clamping and smashing bar and the knife, means detachably connecting two parts of the power-transmitting mechanism between the driving-shaft and the knife, means for operating said clutch at will, and means actuated by part of the power-transmitting mechanism for automatically throwing out said clutch.

5. In a combined paper cutting and smashing machine, the combination of a driving-shaft, a paper clamping and smashing bar, a paper-cutting knife, mechanism including a friction-clutch for transmitting motion from the driving-shaft to the clamping and smashing bar, mechanism driven by said shaft for operating the knife, and a detachable connection between two parts of said knife-operating mechanism by which the knife can be detached from its operating mechanism.

6. In a combined paper cutting and smashing machine, the combination of a driving-shaft, a paper clamping and smashing bar, means driven from said driving-shaft for operating said clamping and smashing bar, a paper-cutting knife, a knife-operating crank-shaft suitably connected with the knife, a knife-operating gear freely journaled upon the crank-shaft and driven from said power-shaft, and detachable means for securing said knife-operating gear upon the crank-shaft, for the purpose set forth.

7. In a combined paper cutting and smashing machine, the combination of a driving-shaft, a paper clamping and smashing bar, mechanism driven from said driving-shaft for operating said bar, a paper-cutting knife, a knife-operating crank-shaft carrying rigidly-mounted cranks, connections between said cranks and the paper-cutting knife, a gear-wheel freely journaled upon the crank-shaft, means operating said gear-wheel from the driving-shaft, detachable means for securing said gear-wheel to one of the cranks, and a hook upon the machine-frame adapted to engage a projection upon the knife-bar for supporting it in inactive position.

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Witnesses:

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