

J. LIGHTBURNE.
 AUTOMATIC FEEDER FOR PRINTING PRESSES.
 APPLICATION FILED AUG. 3, 1911.

1,187,435.

Patented June 13, 1916.
 3 SHEETS—SHEET 1.

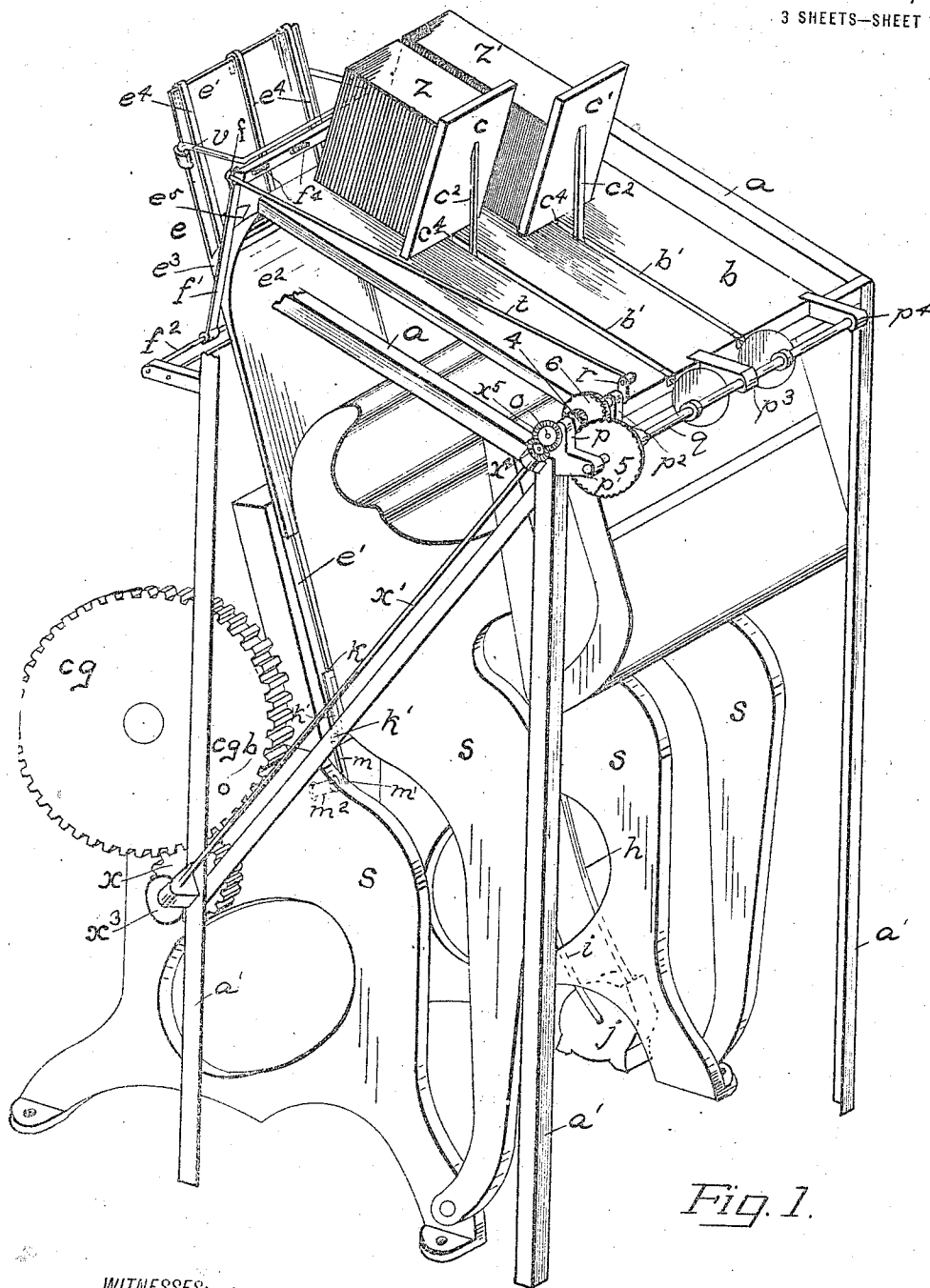


Fig. 1.

WITNESSES:

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 W. Lewis Corp.

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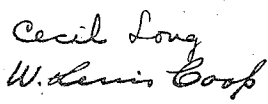
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3 SHEETS—SHEET 2.



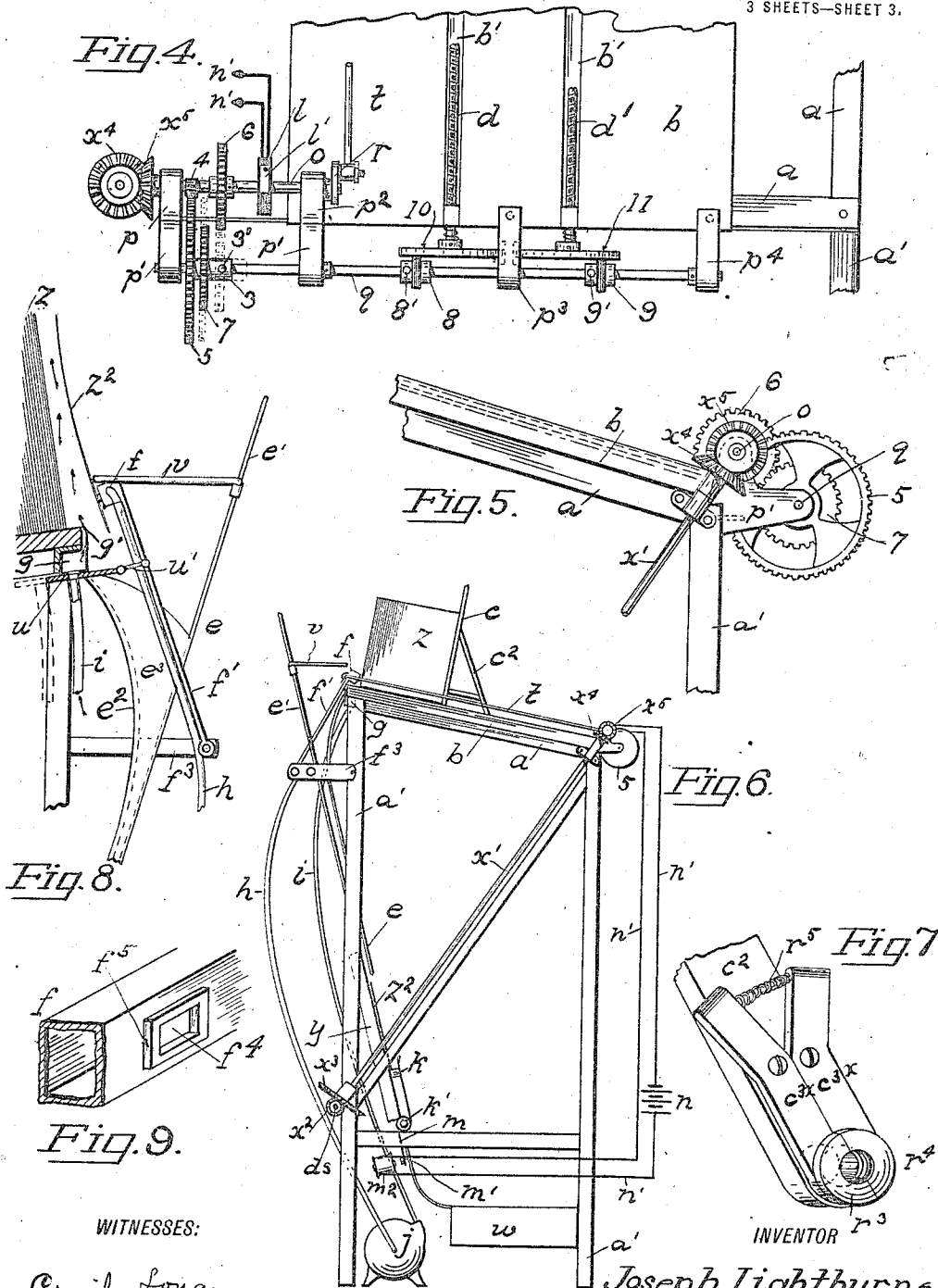
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WITNESSES:

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JOSEPH LIGHTBURNE, OF PORTLAND, OREGON.

AUTOMATIC FEEDER FOR PRINTING-PRESSES.

1,187,435.

Specification of Letters Patent. Patented June 13, 1916.

Application filed August 3, 1911. Serial No. 642,166.

To all whom it may concern:

Be it known that I, JOSEPH LIGHTBURNE, a citizen of the United States, and a resident of Portland, county of Multnomah, and State of Oregon, have invented a new and useful Improvement in Automatic Feeders for Printing-Presses, of which the following is a specification.

My invention relates to improvements of the means for feeding sheets of paper, or other material, to a printing press.

The object of my invention is to provide printing presses of the platen type with improved automatic means for periodically seizing and removing the uppermost of the sheets of the stack and dropping it on the platen in position for receiving the impression.

My invention further has for its object to use pneumatic means for accomplishing my purpose, also to make the devices by which the removing and placing of the sheet is done of as simple a type and also with as few motions as possible, at the same time assuring efficiency, so as to accurately time the feeding of the press.

The means by which I accomplish these results, and the incidental features of my invention are hereinafter fully described.

In the drawings: Figure 1 is a rear elevation, in perspective, of the right side of a platen press embodying my invention; Fig. 2 is a front end perspective view of part of the feeding mechanism of my attachment; Fig. 3 is a diagrammatic longitudinal vertical section taken approximately on the line pointed by the arrow in Fig. 2; Figs. 4 and 5 are partial detail views showing the motion transmitting devices of my attachment; Fig. 6 is a diagrammatic elevation of the right side of my attachment, particularly showing the pneumatic and electrical connections, the "driving shaft" of the press being seen, but the "cam-gear" and meshing pinion on the driving shaft being omitted; Fig. 7 is a detail of construction of one of the arms of the traveling carrier of my attachment, hereinafter fully described; Fig. 8 is a diagrammatic longitudinal section similar to that shown in Fig. 3, except that the parts shown are viewed from the opposite side; this figure illustrates the operation of the feeding device of my attachment,

and also shows the use of an auxiliary slide valve for controlling the outlet of the pressure chamber of my attachment, as will be explained below; Fig. 9 is a sectional detail, in perspective, of the casing of the "vacuum pick-off" of my device; Fig. 10 is a perspective elevation of the chute-like feeding mechanism of my attachment, also illustrating the operation of the tiltable stop by which the sheet is held on the platen of the press while being printed; and Fig. 11 is a diagrammatic view illustrating one of the operations of my device.

The press illustrated in the drawings represents that class in which the platen and "back-frame"—the latter carrying the type—both have movement. The press operating mechanism is not shown, excepting such parts as are necessary to the understanding of my device. The gear *cg* is to be understood as representing the "cam-gear" of the "cam movement" of the kind of press referred to. The cam-gear *cg* is driven by the pinion *x*, which is understood to be on the driving shaft, which is only seen at *ds* in Fig. 6; in the latter, however, as mentioned, the pinion *x* and cam-gear *cg* are omitted. It will be remembered that in the style of press referred to the cam-gear *cg* is operatively connected with the platen *y*, the connecting means including a bolt inserted at *c-g-b*; and by the removal of the latter, the platen *y* is caused to remain at rest during the operation of the press, while the "back-frame" does the printing work. This release of the platen is necessary to the operation of my device, as will become apparent.

My attachment consists of a frame, *a*, comprising legs *a'* supporting an inclined top *b*, the frame being adapted to be set over a press of the class mentioned, as illustrated in Figs. 1 and 6; the frame of the press being indicated by the letter *s*. The inclined top, *b*, is formed with longitudinal slots *b'*, *b''* for the tongues *c'* on the bottom of the carriers *c*, *c'*, traveling on the top *b* and supporting the stacks of paper *z*, *z'*. The carriers are supported by the arms *c''*, the lower ends of which extend into the longitudinal slots *b'*, *b''* and are formed with perforated knuckles *c'''* to receive the worm-screws *d*, *d'*. Said lower ends are preferably made with releasable jaws *c''' x*, *c''' x*, as shown in

Fig. 7, and below more fully described, so as to be adapted for engaging with said worm-screws at any convenient point.

At the front edge of the inclined top *b* is supported a guide-way *e*, serving to feed the removed sheets of the stack to the printing mechanism, of which the platen *y* alone is shown. The guide-way, *e*, as represented, shows a chute-like structure comprising a front *e'*, a back *e''* and sides *e'''*. From the front wall *e'* may be suspended a bar or bars as *e⁴* (compare Figs. 1 and 10) for guiding the sheet dropped into guide-way to the platen *y*, the bars *e⁴*, placed at the sides, being made with shields as *e⁵*.

A vacuum chamber, or what I will term a pick-off *f*, is supported on arms *f'*, which are pivotally mounted on a rod *f''*, held rigidly by members *f'''* attached to the front pair of legs *a'*. The vacuum pick-off is moved by a rod *t* attached to a crank *r* (see Figs. 1 and 4) and said vacuum pick-off is provided with apertures *f⁴*, through which the air is sucked by some suitable type of fan, indicated by *j* in Fig. 6, but omitted from the other views. The fan is connected to the vacuum pick-off by a tube *h*, and it is operatively connected in any convenient manner (not shown) with the driving mechanism of the press. A stationary pressure chamber *g* is located at the front end of the top *b* and is also connected by a tube *i* to the fan *j*. Said pressure chamber *g* is provided with a longitudinal outlet *g'*, through which the air is forced by the fan *j*. In order to reduce the marginal surface of the aperture *f⁴*, and correspondingly reduce the contact between the sheet picked-off the stack, by my described pneumatic means, and such marginal surface, I prefer to make the latter with a boss, as shown at *f⁵* in Fig. 9.

In Fig. 11 is diagrammatically illustrated how the initial contact of my vacuum pick-off causes the bottom edge of the outer sheet of the stack of paper to be slightly curled away from the underlying sheet of the stack, and in so doing giving the air access to the underside of said outer sheet.

The lower end of the guide-way, *e*, rests on the platen *y* of the printing press of which the frame is represented by *s*, as mentioned. In order to properly support the sheet on the platen *y*, in position for receiving the impression, a cleat-like tiltable stop *h* is provided (see Figs. 1, 6 and 10) pivoted at *h'* and provided with a pendent arm *m*, the extremity *m'* of which is adapted to constitute an armature for the electromagnet *m²* when the latter is energized by being thrown in circuit through circuit wires *n*, *n'*, with the battery *n*. The battery and wire connections are not shown in Fig. 1. The making and breaking of the electric circuit is accomplished by the rotation of the timer *l* rigidly mounted on the axle *o* (see Figs. 1,

4 and 6). Said timer *l* consists of a revolving wooden disk on which is peripherally fastened a plate of copper *l'*, for establishing a period electric connection between the terminals of the circuit wires *n'*, *n'*, which are shown diagrammatically in Figs. 4 and 6, it being understood that in actual practice they would be led along some convenient part of the frame and not be exposed to view.

My attachment is connected with the pinion *x* of the press mechanism by the shaft *x'*, and the gears *x²*, *x³*, *x⁴* and *x⁵*, as more clearly shown in Fig. 6; the gear *x²* being rigid on the shaft of the pinion *x*. The shaft *o* is journaled in the brackets *p* and *p²*, attached to the frame *a*, and on said shaft *o* are the crank *r*, the release timer *l*, and the gears 4 and 6. The shaft *q* is journaled in the projecting arms *p'* of the brackets *p*, *p²*, and in the brackets *p³* and *p⁴*, see Figs. 1 and 4; and said shaft *q* is driven at variable speed by the gears 5 and 7, mounted on a movable sleeve 3, longitudinally adjustable on the shaft *q*, but secured in place by means of the set-screw 3'.

On the shaft *q* are mounted friction drive wheels 8 and 9 (see Fig. 4) which are adjustable longitudinally by means of the set-screws 8' and 9'. Said friction drive wheels 8 and 9 bear respectively on the friction disks 10 and 11, rigidly mounted on the worm-screws *d*, *d'*; and thus the rotation of these worm-screws *d*, *d'* moves the carriers *c*, *c'* forward. By making the friction drive wheels 8 and 9 adjustable the worm-screws *d*, *d'* may be made to rotate with different speeds, so that cards of different thicknesses (as shown at *z*, *z'* in Fig. 1) may be printed at the same time; and when the cards or papers are arranged in a single stack against both carriers *c*, *c'*, as in Fig. 2, then the devices are adjusted to cause the carriers to travel at the same speed.

Each of the carriers *c*, *c'* is preferably provided with a pair of spring-controlled threaded jaws *c³*, *c³*, normally engaging the worm-screw *d* or *d'*. Said jaws (see Fig. 7) are so arranged that pressure on their upper ends will open them, allowing the arms *c²*, and consequently the carriers, to be released from and moved longitudinally along the worm-screw *d* or *d'* to any convenient position.

By reason of stacking my sheets in approximately vertical position, my attachment is especially adapted for use in printing envelops. The vertical position of the sheets gives me the advantage of gravity in the operation of my attachment, and eliminates carrier devices. In order to prevent any lateral displacement of the outer-most sheets of the stack, laterally disposed guide-rods, as shown at *z⁴* in Fig. 2, may be provided.

In operation, the stack of cards or paper, z , to be printed is placed on the frame-top b , against the carriers c, c' . It is moved toward the guide-way, e , by the worm-screws d, d' at the rate of one sheet for each impression of the press. The top sheet, z^2 , (see Figs. 2 and 8) is drawn by suction against the vacuum pick-off f , and during the outward movement of the latter, due to the rocking of the arms f' by the rod t and crank r , the sheet of paper z^2 so picked up is carried outward, as shown in Fig. 8. It is released from its contact with the pick-off f by impact with the stationary rod v fastened to the back e' of the guide-way e . As soon as it is detached from the pick-off f , air is sucked through the latter and thence through the tube h by the fan j , with which the tube h connects, and the air is then forced up through the tube i from the fan j into the chamber g , and out through the opening g' , as shown by the arrows in Fig. 8. This current of air prevents the sheet z^2 from falling back against the remaining sheets z , and hence the sheet z^2 drops by gravity through the guide-way e on the platen y into the position shown in Fig. 6. It is held on the platen y while the impression is being made, by being supported on the tiltable stop k , as mentioned. The devices are so timed that after the impression has been taken the electric circuit is closed, causing the magnet m^2 to attract arm m of the tiltable stop k and rock the latter, and drop the sheet of paper into a suitable box w .

In Fig. 8 is shown a slide valve u , attached by a link u' to the arm f' supporting the vacuum pick-off f . This slide valve is opened by the outward movement of the vacuum pick-off, but prevents any air from escaping from the tube i through the outlet g' of the pressure chamber g , during the initial contact of the vacuum pick-off with the outer sheet of the stack, as illustrated in Fig. 3. The blowing of an air current through the compression chamber behind the sheet seized by the vacuum pick-off also assists in separating said sheet from the stack.

I claim:

1. The combination with a printing press of the character stated, of an automatic feeding attachment comprising a table top supported over the press; a carrier adapted for supporting vertically stacked sheets, said carrier being movable over the table top; means for moving the carrier progressively over the table; pneumatic means for picking off, by suction, the outer of said stack of sheets; a gravity guide-way for guiding the picked off sheet to the platen of the press; a bar arranged to have impact with said picked off sheet and release it from said pneumatic holding means when alined with

said guide-way; means for blowing a stream of air behind the picked off sheet; and means for driving all the described operating devices synchronously with the driving mechanism of the printing press.

2. The combination with a printing press of the character stated, of an automatic feeding attachment comprising a table top supported over the press; a carrier adapted for supporting vertically stacked sheets, said carrier being movable over the table top; means for moving the carrier progressively over the table; pneumatic means for picking off, by suction, the outer of said stack of sheets; a gravity guide-way for guiding the picked off sheet to the platen of the press; a tiltable rest adapted for supporting the sheet dropped on the guide-way on the platen of the press in position for being imprinted; means for blowing a stream of air behind the picked off sheet; and means for driving all the described operating devices synchronously with the driving mechanism of the printing press.

3. The combination with a printing press of the character stated, of an automatic feeding attachment comprising a table top supported over the press; a carrier adapted for supporting vertically stacked sheets, said carrier being movable over the table top; means for moving the carrier progressively over the table; pneumatic means for picking off, by suction, the outer of said stack of sheets; a gravity guide-way for guiding the picked off sheet to the platen of the press; a tiltable rest adapted for supporting the sheet dropped on the guide-way on the platen of the press in position for being imprinted; means for automatically releasing the sheet from the platen of the press; means for blowing a stream of air behind the picked off sheet; and means for driving all the described operating devices synchronously with the driving mechanism of the printing press.

4. A feeding attachment for a printing press of the character stated comprising a frame including a table top; a carrier slidably mounted on the latter adapted for supporting vertically stacked sheets; means for moving the carrier progressively; a vacuum pick-off consisting of a chambered, apertured bar and a pivoting support therefor adapted to impinge the bar against the bottom of the sheets stacked upon the carrier; a gravity guide-way adapted for guiding the sheet picked off the stack unto the platen of the press; means for releasing the picked off sheet from said pneumatic holding means when alined with said guide-way; an apertured compression chamber adapted to eject a stream of air behind the sheet picked off the stack; a fan element, air ducts connecting the latter with the chamber of the vacuum pick-off and the compression chamber; a

valve in the air duct of the compression chamber operated to shut off the stream of air ejected from the latter until the vacuum pick-off has engaged the outer sheet of the stack; and means for driving all the described operating devices synchronously with the driving mechanism of the printing press.

5. A feeding attachment for a printing press of the character stated comprising a frame including a table top; a carrier slidably mounted on the latter adapted for supporting vertically stacked sheets; means for moving the carrier progressively at variable speed; a vacuum pick off consisting of a chambered, apertured bar and a pivoting support therefor adapted to impinge the bar against the bottom of the sheets stacked upon the carrier; a gravity guide-way adapted for guiding the sheet picked off the stack

unto the platen of the press; means for releasing said picked off sheet from said pneumatic holding means when alined with said guide-way; a tiltable rest adapted for supporting the sheet dropped on the guide-way on the platen of the press in position for being imprinted; means for automatically tilting said rest; the last mentioned means including an electro-magnet element and a make and break for the magnet circuit operated from the driving mechanism of the press; and means for driving all the described operating devices synchronously with the driving mechanism of the printing press.

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Witnesses:

PRESTON CAMPBELL,
CECIL LONG.