

No. 705,097.

Patented July 22, 1902.

E. E. KOKEN.
COPYING PRESS.

(Application filed July 20, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

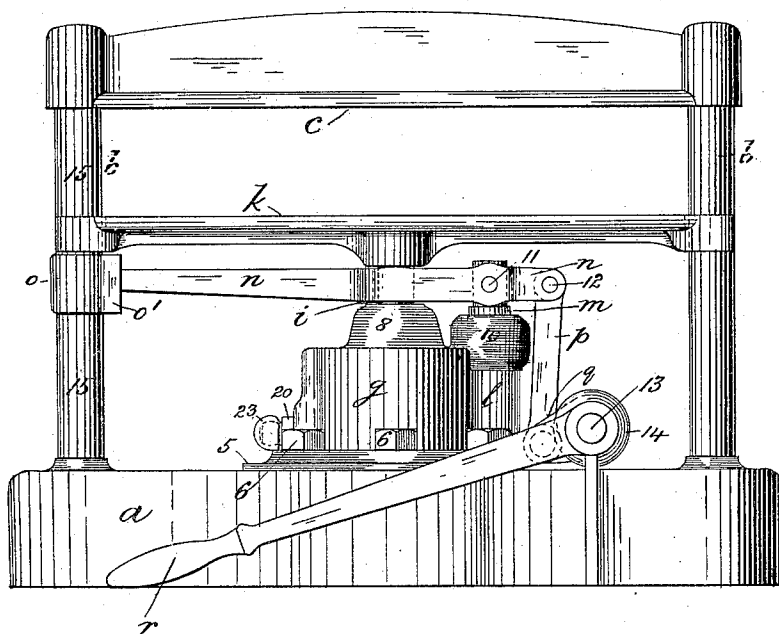
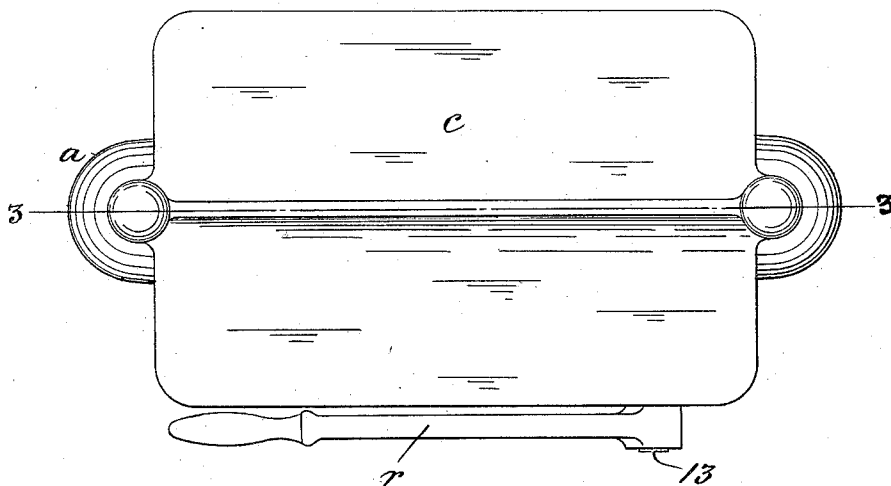


Fig. 2.



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Fig. 3.

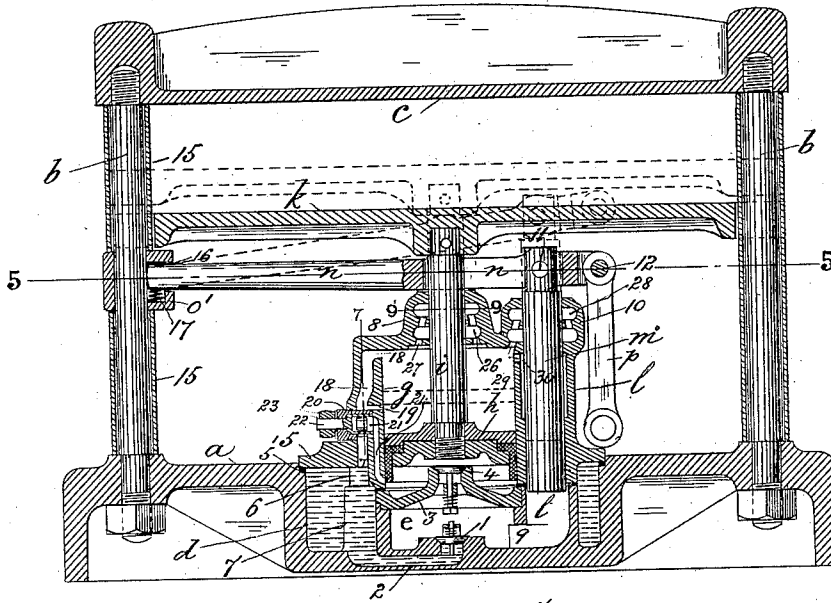


Fig. 4.

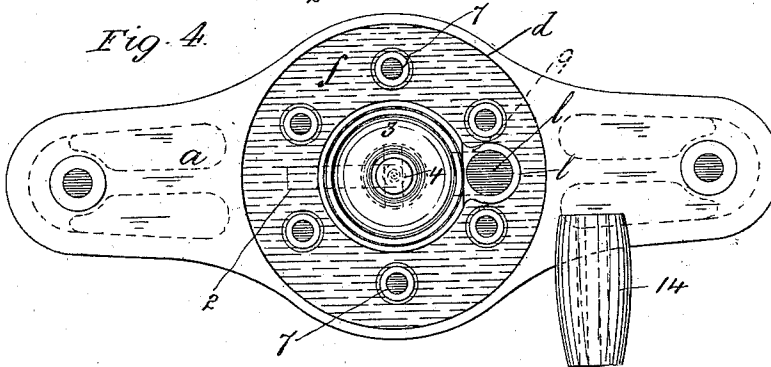
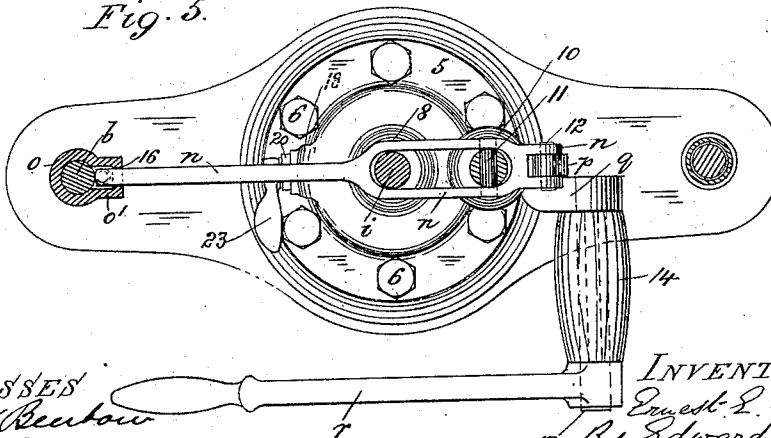


Fig. 5.



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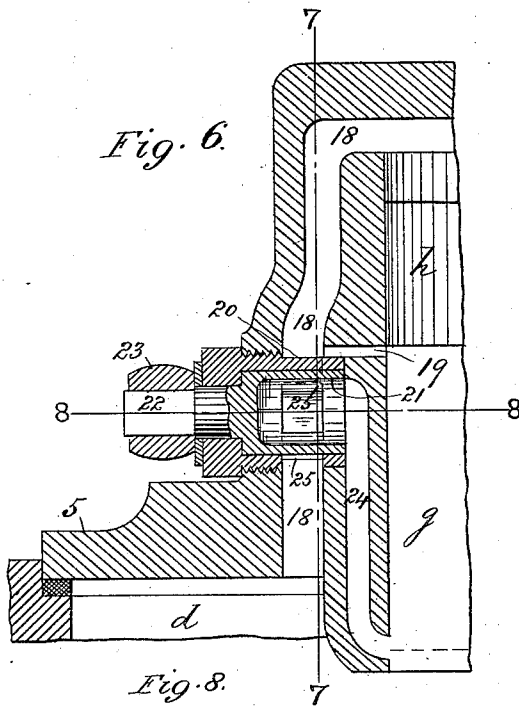
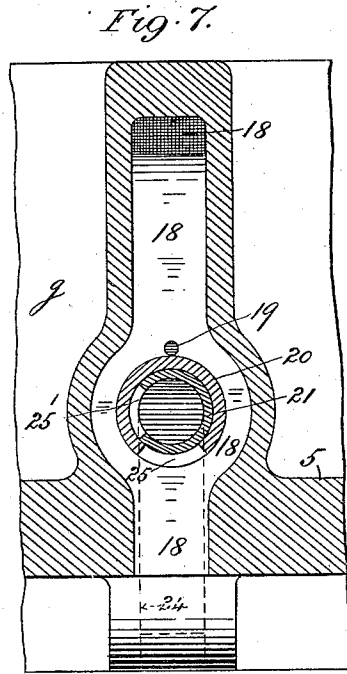
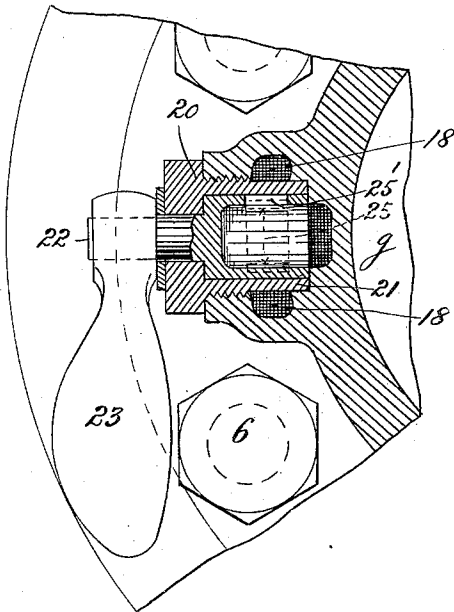
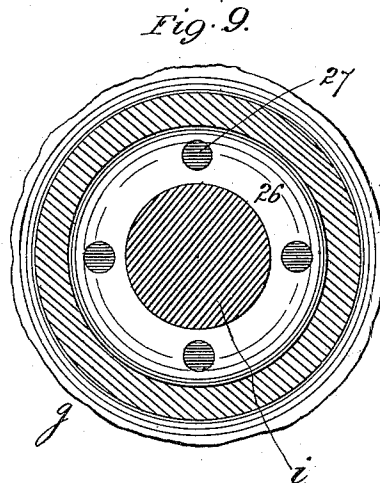
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

ERNEST E. KOKEN, OF ST. LOUIS, MISSOURI.

COPYING-PRESS.

SPECIFICATION forming part of Letters Patent No. 705,097, dated July 22, 1902.

Application filed July 20, 1901. Serial No. 69,070. (No model.)

To all whom it may concern:

Be it known that I, ERNEST E. KOKEN, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented a new and useful Improvement in Copying-Presses, of which the following is a specification.

My invention relates to an improvement in that class of copying-press in which the movable platen or pressure-plate is operated by hydraulic or other suitable liquid pressure, and has for its object to enable the initial movement of the platen before pressure is applied thereto to be rapidly effected without the delay of working the pump and to prevent leakage of the liquid from the operating parts.

The invention consists in features of novelty, as hereinafter described and claimed, reference being had to the accompanying drawings, forming part of this specification, whereon—

Figure 1 is a side elevation of my improved copying-press; Fig. 2, a top plan thereof; Fig. 3, a vertical longitudinal section through the press on line 3 3 in Fig. 2; Fig. 4, a top plan of the base detached; Fig. 5, a horizontal section through the press on line 5 5 in Fig. 3; Fig. 6, a vertical section, to enlarged scale, through the release-valve and passages combined with the pressure-cylinder as seen in Fig. 3; Fig. 7, a vertical transverse section thereof on line 7 7 in Figs. 3 and 6; Fig. 8, a horizontal section thereof on line 8 8 in Fig. 6; and Fig. 9, a horizontal section, to enlarged scale, through the piston-rod gland of the pressure-cylinder on line 9 9 in Fig. 3.

Like letters and numerals of reference denote like parts in all the figures.

My improved copying-press consists of the base *a*, having the upright rods or posts *b*, to the upper ends of which the stationary platen *c* is fixed. In the base *a* is formed a preferably circular tank or well *d* of suitable depth, which surrounds a preferably central and circular valve-chamber *e* and is adapted to hold the liquid *f*, (preferably oil,) which is used in operating the press. In the bottom of the valve-chamber *e* is a valve 1, which is in communication with the tank *d* by the passage 2 and opens into the valve-chamber

e. The top of the valve-chamber *e* is closed by a removable cover 3, having a valve 4, which opens from the valve-chamber *e* into the lower part of a preferably upright cylinder *g*, having its bottom edge bearing upon the outer face of the cover 3, which thereby tightly closes the valve-chamber *e*, and having a surrounding bottom flange 5, which bears upon the surrounding recessed edge 5' of the tank *d*, and thereby closes the latter at the top, the cylinder *g* being firmly secured to the base *a* in this position by screws 6, which pass through the flange 5 and are screwed into studs 7, which project from the bottom of the tank *d*, or the cylinder *g* may be otherwise secured to the base *a*, as found most suitable.

Within the cylinder *g* is fitted a piston *h*, having a rod *i*, which is adapted to slide closely through a gland 8 in the upper closed end or head of the cylinder *g*. The outer end of the piston-rod *i* is fixed or otherwise connected to the movable platen *k*, which is arranged horizontally between and guided by the uprights *b*, parallel to the fixed platen *c*.

Adjoining the cylinder *g* is an upright cylinder *l*, which communicates at the bottom with the valve-chamber *e* by a passage 9, and within the cylinder *l* is fitted the pump-plunger *m*, which is adapted to slide closely through a gland 10 in the top of the cylinder *l*, the outer end of the plunger *m* being coupled by a pin 11 to a lever *n* of the second order, which extends from the plunger *m* past the piston-rod *i* and is fulcrumed at one end preferably to a block *o*, which is secured to one of the upright rods *b*. To the outer free end of the lever *n* is coupled by a pin 12 one end of a link *p*, which is jointed at its other end to a crank *q*, having its shaft 13 mounted in a suitable bearing 14, formed on or attached to the base *a*. On the other end of the crank-shaft 13 is fixed a hand-lever *r*, whereby the lever *n* is manipulated for operating the press and which may be arranged therefor in any desired direction.

The fulcrum-block *o* of the lever *n* is fitted around the upright rod *b* and held thereto preferably between the abutting ends of two tubes or sleeves 15, which surround the rod *b* above and below the block *o*, respectively.

The block *o* is formed on one side with a hollow projecting box portion *o'*, having a hole 16 through its outer wall, into which hole the end of the lever *n* is freely inserted, and thereby fulcrumed, the hole 16 allowing sufficient play for the vibration of the lever *n*. Between the floor of the box portion *o'* and the under side of the lever *n* is preferably a spiral spring 17, which normally holds the end of the lever *n* steadily against the top of the hole 16 and prevents rattling of the lever when vibrated.

The lever *n* at its junction with the pump-plunger *m* and where it passes the piston-rod *i* is preferably slotted or yoke-shaped, so as to surround these parts, as shown in Fig. 5, whereby the upper convex edge thereof of the lever *n* at each side of the piston-rod *i* has a uniform bearing against the under side of the movable platen *k* when so engaged, as hereinafter more particularly referred to.

In the wall of the cylinder *g* is formed a preferably upright passage 18, which opens at its upper end into the cylinder *g* at the top or above the piston *h* and at its lower end into the tank *d*, so that any liquid which in the operation of the press escapes past the piston *h* is returned by the latter on its upward stroke through the passage 18 into the tank *d*. Through the wall of the cylinder *g*, immediately below the piston *h* when at top stroke, is a passage 19, which opens from the cylinder *g* into the passage 18 for the purpose hereinafter described.

In the outer wall of the passage 18 is preferably fixed a cylindrical tube or casing 20, which extends across, but without obstructing, the passage 18 and is open at its inner end, where it enters and forms a tight joint with the wall of the cylinder *g*.

Within the tube 20 is fitted a corresponding hollow plug 21, open at its inner end conformably to the inner end of the tube 20 and having at its other end a shank 22, which passes through the outer closed end of the tube 20 and is provided on the outside of the wall of the passage 18 with a handle 23, whereby the plug 21 may be partly rotated within the tube 20. The inner end of the plug 21 opens into the upper end of a passage 24, formed in the wall of the cylinder *g* and opening at its lower end into the latter below the piston *h*. Through the circumferential wall of the tube 20 is a port 25, opening into the passage 18, and through the wall of the plug 21 is a corresponding port 25', which is normally at right angles to the port 25 or so as to close communication between the passages 18 and 24.

The gland 8 of the cylinder *g* is preferably formed internally with one or more circular recesses 26, which open from the inside face of the gland 8 and communicate with each other and with the interior of the cylinder *g* by passages 27, whereby any liquid escaping

from the cylinder *g* between the piston-rod *i* and gland 8 is intercepted by and drained off through the recesses 26 and passages 27 into the cylinder *g*, and from the latter on the upward stroke of the piston *h*, through the passage 18 into the tank *d* without passing through the gland 8, to the outside in the vicinity of the platen *k*, whereby danger of soiling the object to be pressed is prevented.

Similar recesses and passages 28 and 29, respectively, are formed in the gland 10 of the pump-plunger *m* for a like purpose. A passage 30 is also formed from the cylinder *l* into the cylinder *g* for allowing the escape of any liquid which may pass between the plunger *m* and wall of the cylinder *l* into the piston-cylinder *g*, and thence through the passage 18 into the tank *d*.

In operation, assuming that an object to be pressed is placed on the movable platen *k* beneath the fixed platen *c*, by moving the hand-lever *r* so as to raise the corresponding end of the lever *n*, which bears against the under side of the platen *k*, the latter, with the piston-rod *i*, piston *h*, and pump-plunger *m*, will be thereby rapidly raised without pumping to an extent, say, equal to the space between the said object and the fixed platen *c* or into the position indicated by dotted lines in Fig. 3, (which in this case is the maximum height allowed by the throw of the crank *q*,) and in so doing the liquid *f* contained in the tank *d* will pass through the valve 1 into the chamber *e* and thence through the valve 4 into the cylinder *g* beneath the piston *h*, when by moving the hand-lever *r*, so as to lower the lever *n*, the platen *k* in the meantime being supported in the position indicated by the liquid occupying the cylinder *g*, the plunger *m* will be lowered by the lever *n*, and thereby force liquid through the valve 4 into the cylinder *g*, and so slightly raise the piston *h*, rod *i*, and platen *k* and produce a corresponding pressure on the object between the platens *k* and *c*. By reversing the movement of the hand-lever *r*, so as to raise the lever *n* and plunger *m*, liquid from the tank *d* will enter the valve-chamber *e* through the valve 1, so that on a second descent of the plunger *m* a further raising of the piston *h*, rod *i*, and platen *k* will be effected and a corresponding increase of pressure produced on the object, and so on until the maximum pressure is obtained. The limit or capacity of the press is reached when the piston *h* is sufficiently raised so as to uncover the port 19, when further movement upward by liquid-pressure of the piston *h* is prevented by the return of the liquid through the passages 19 and 18 to the tank *d* at every stroke of the plunger *m*. For relieving the pressure and enabling the object to be withdrawn from the press the plug 21 is partly rotated by its handle 23 through a quarter-circle or so that its port 25' registers with the port 25 of the tube 20, when the piston *h*, rod

i, platen *k*, and the object thereon will by their combined weight descend and force the liquid from the cylinder *g* through the passage 24, plug 21, and ports 25' and 25 into the passage 18 and tank *d*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a copying-press of the class described, the combination of the base, a fixed platen, a tank containing liquid, a cylinder fixed on the base and containing a piston having its rod connected to the movable platen, a valve opening from the tank into a chamber and a valve opening from the chamber into the said cylinder, a cylinder containing a plunger and having an opening into the said chamber, a lever fulcrumed to a fixed part of the press and coupled to the said plunger, the said lever being adapted to bear against the movable platen, means for vibrating the said lever about its fulcrum, and means for returning the liquid from the cylinder containing the piston, into the tank, substantially as described.

2. In a copying-press of the class described, the combination of the base, a fixed platen, a tank containing liquid, a cylinder fixed to the base and containing a piston, a rod projecting from the piston and connected to the movable platen having the object to be pressed thereon, a valve opening from the tank into a chamber, and a valve opening from the chamber into the cylinder, a lever fulcrumed to a fixed part of the press and adapted to bear against the movable platen, and means for raising the said lever about

its fulcrum, substantially as described and for the purpose set forth.

3. In a copying-press of the class described, the combination of a movable platen, a tank containing liquid, a cylinder containing a piston having its rod connected to the said platen, a lever fulcrumed to a fixed part of the press and adapted to raise the said platen, means for admitting the liquid to the cylinder, means for increasing the pressure of the liquid within the cylinder and for releasing the liquid therefrom, substantially as described.

4. In a copying-press of the class described, the combination of the base having a tank or well surrounding a valve-chamber, the said chamber having a removable cover, and a cylinder bearing upon the said cover and having a bottom flange fixed to, and forming a cover to the said tank, substantially as described.

5. In a copying-press of the class described, the combination with the lever *n* of a block *o*, having a projecting hollow portion *o'* and fixed to the upright rod *b*, a hole 16 through the wall of the said portion *o'*, and a spring 17 adapted to engage the said lever, substantially as described.

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

ERNEST E. KOKEN.

Witnesses:

G. L. BELFRY,
EDWARD W. FURRELL.