July 12, 1938. F. S. THOMPSON 2,123,516

PLATEN PRINTING PRESS

Filed April 30, 1937 5 Sheets-Sheet 1

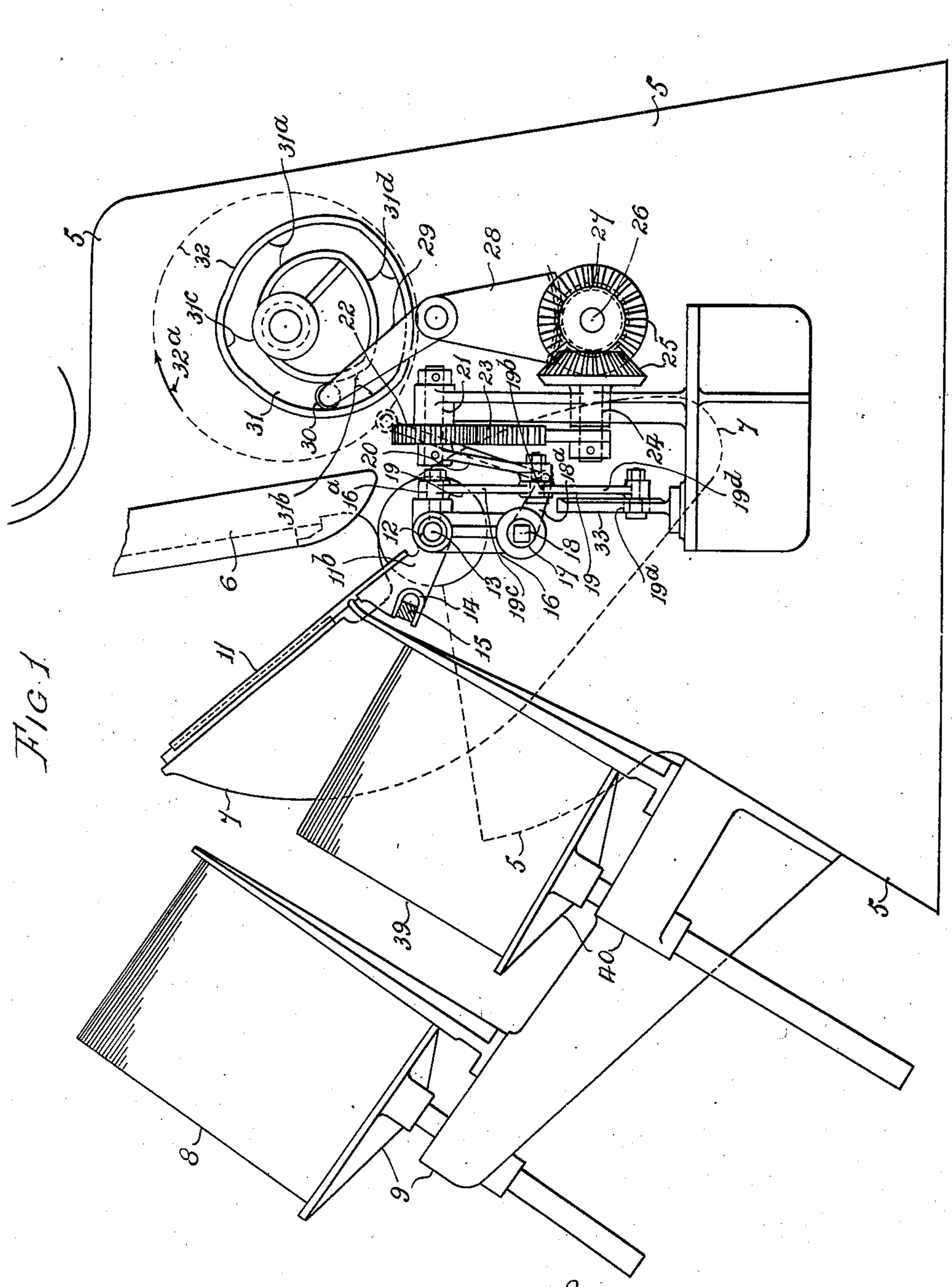

FIG. 1.

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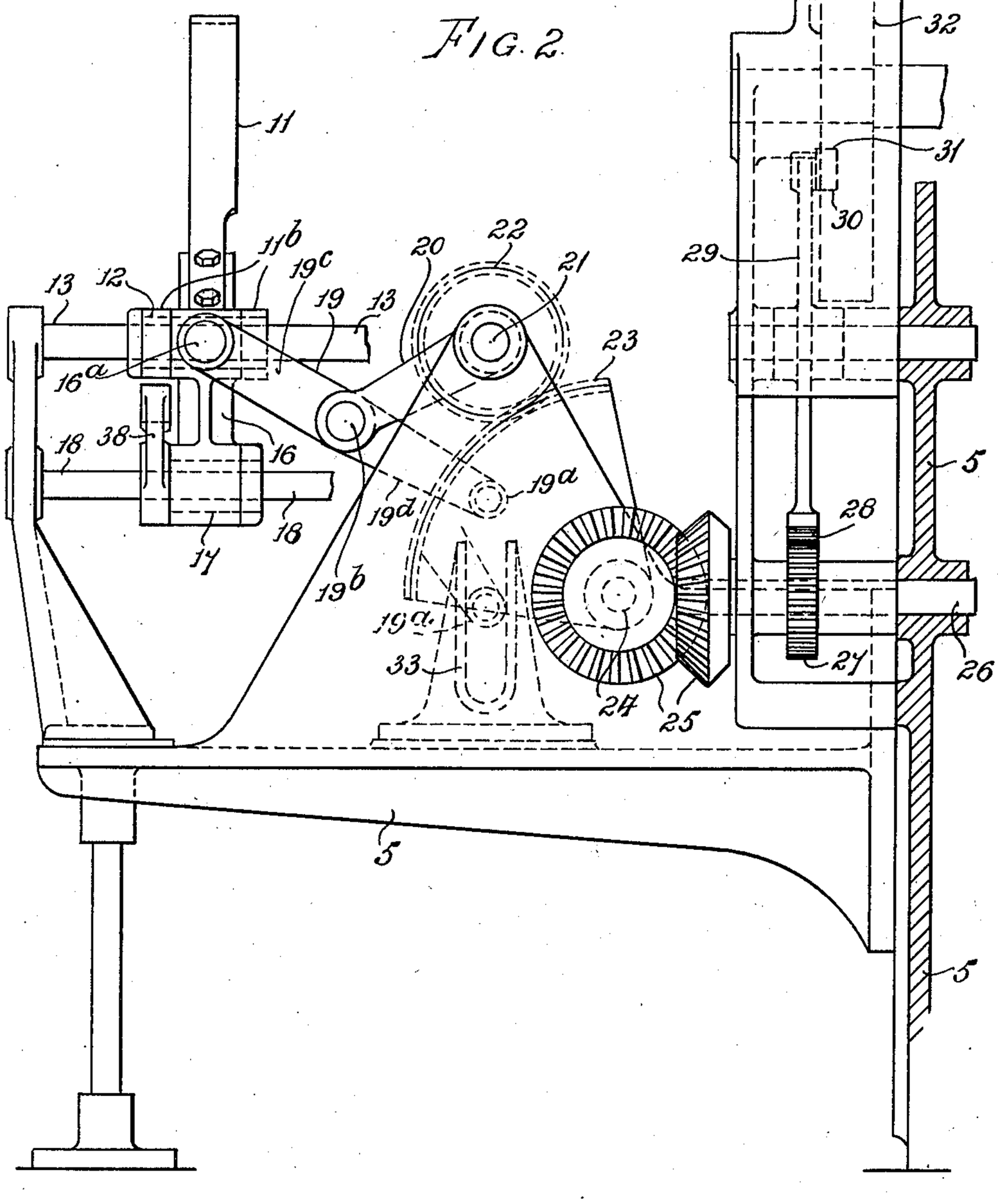
PLATEN PRINTING PRESS

Filed April 30, 1937 5 Sheets-Sheet 2

FIG. 2.



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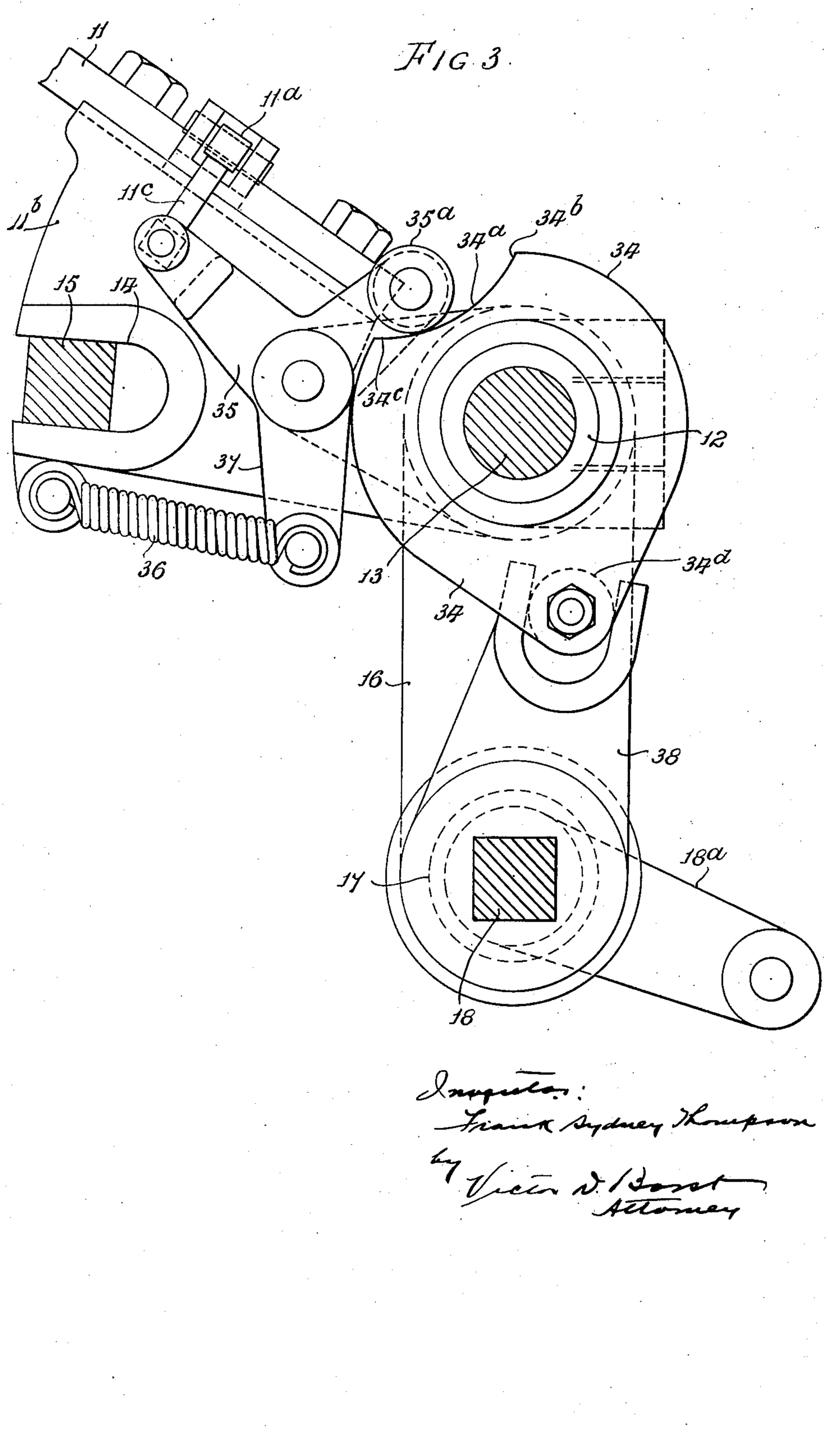
July 12, 1938. F. S. THOMPSON 2,123,516

PLATEN PRINTING PRESS

Filed April 30, 1937 5 Sheets-Sheet 3

FIG 3.



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PLATEN PRINTING PRESS

Filed April 30, 1937 5 Sheets-Sheet 4

FIG. 4.

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July 12, 1938. F. S. THOMPSON 2,123,516

PLATEN PRINTING PRESS

Filed April 30, 1937 5 Sheets-Sheet 5

FIG. 5.

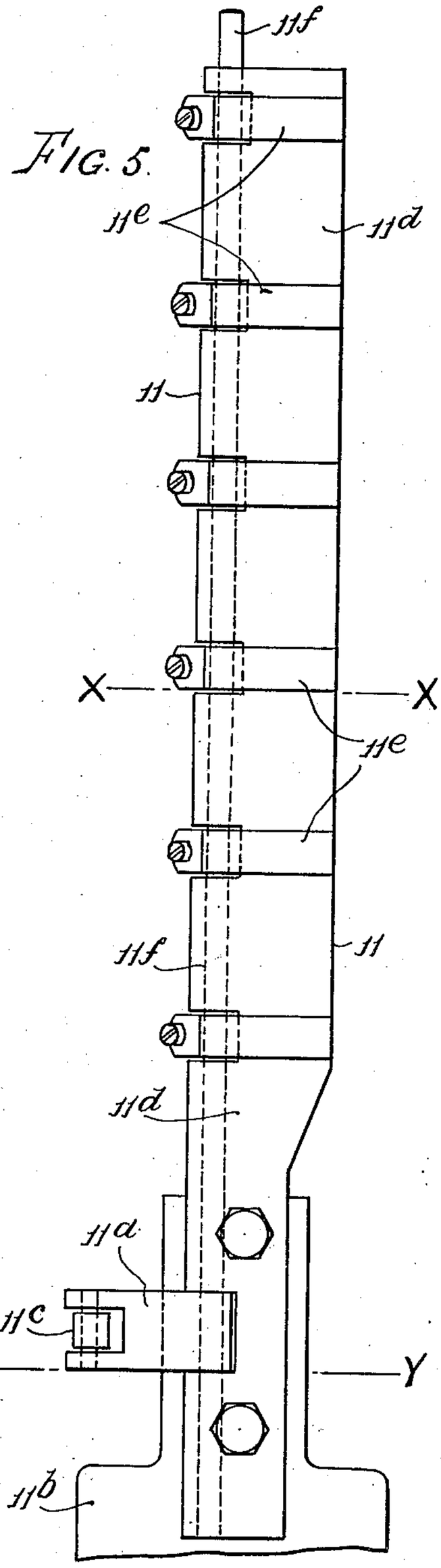


FIG. 6.

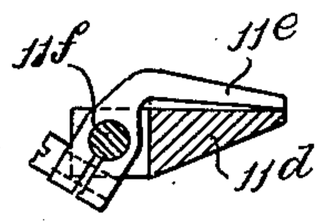


FIG. 7.

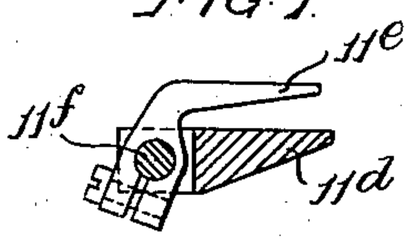


FIG. 8.

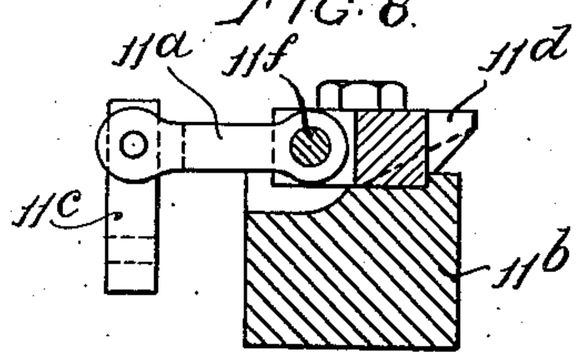
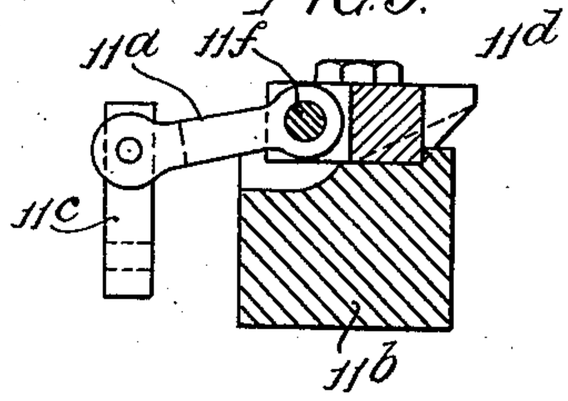


FIG. 9.



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Patented July 12, 1938 2,123,516

UNITED STATES PATENT OFFICE

2,123,516

PLATEN PRINTING PRESS

Frank Sydney Thompson, Manchester, England, assignor to T. C. Thompson & Son, Limited, Manchester, England

Application April 30, 1937, Serial No. 139,934
In Great Britain May 31, 1935

4 Claims. (Cl. 101—287)

This invention has reference to platen printing presses and to such presses wherein the printed sheets are removed from the movable platen by automatic means comprising a gripper device mounted and adapted to be reciprocated laterally of the platen, and which advances and seizes the printed sheet on the platen and then recedes and removes the sheet which it subsequently releases and deposits.

In a known platen printing press of the kind referred to the delivery gripper device is mounted independently, and reciprocates laterally, of the movable platen and the seizing of the printed sheet by the device necessarily takes place when the platen has, or has nearly, reached the end of its return movement following the printing operation.

The object of the present invention is to provide in a platen printing press of the said kind, an improved arrangement of reciprocatory delivery gripper device whereby the device may seize the sheet as soon as the printing pressure has been applied to same, and during the return movement of the movable platen strips the printed sheet from the fixed platen and effects its removal from the movable platen.

According to the invention, the reciprocatory delivery gripper device is adapted to also oscillate about an axis, preferably the same axis as the movable platen, parallel to its reciprocatory movements. By this means the gripper device can advance and be opened ready to seize the sheet during the movement of the platen to the printing position, be closed to grip the sheet as soon as the printing pressure has been applied and there is no danger of the register of the sheet being in any way affected, and after stripping the printed sheet from the fixed platen can recede and remove the sheet, during the return movement of the movable platen.

The invention is hereinafter fully described with reference to the accompanying drawings in which Fig. 1 is a part side of a platen printing press comprising one embodiment of the invention, Fig. 2 is a rear view (i. e. looking on the right hand side of Fig. 1) of the mechanism for actuating the delivery gripper device and Figs. 3 and 4 are elevations at right angles to each other to a larger scale than Figs. 1 and 2 showing details of the gripper-actuating mechanism not shown in such views. Fig. 5 is a plan of the gripper device, Figs. 6 and 7 are sections on the line X—X in Fig. 5 showing the hinged jaw of the gripper device closed and opened, respectively, and Figs. 8 and 9, are like sections to Figs. 6 and 7, respectively, on the line Y—Y in Fig. 5. On the drawings and in the following description like numerals of reference indicate like parts.

Referring to the drawings, **5**, Fig. 1, indicates the frame of the machine, **6** indicates the stationary platen and **7** indicates the movable platen which is shown in the lowered or normal position in which the sheets to be printed are fed on to it. **8** indicates the pile of sheets to be printed carried on a support **9** arranged at the front of the machine. **10** indicates a feeding gripper device of the sucker type for feeding the sheets from the pile **8** on to the platen **7**. **11** indicates the delivery gripper device which is of the known kind comprising a fixed jaw and a hinged jaw normally closed against the fixed jaw. The fixed jaw of the gripper device consists of a blade **11d** (Figs. 5–9) secured at its lower end to a support **11b**. The hinged jaw of the device is constituted by a plurality of fingers **11e** clamped on a rod **11f** rotatably mounted in the blade **11d**. The gripper device is in this particular embodiment of the invention arranged on the right-hand side of the movable platen as viewed from the front and, of course, on the left-hand side as seen from the rear as in Fig. 2. The support **11b** of the gripper device is bifurcated and is pivotally mounted knuckle-joint fashion on a bush **12** slidable on a slide bar **13** constituted by an extension of, or aligned with, the fulcrum shaft of the movable platen **7**. The support **11b** of the gripper device is formed with a guide member **14** which co-acts with a guide bar **15** carried by and extending laterally from the movable platen **7**, the co-operation of the guide member **14** and bar **15** causing the gripper device **11** to partake of the oscillations of the platen **7**.

The bush **12** is mounted in the upper end of a slide **16** the lower end of which has rotatably mounted in it a sleeve **17** adapted to slide on a slide bar **18** of square cross-section and mounted in the frame of the machine vertically below the slide bar **13**.

To the slide **16** is pivotally connected at **16a** one end of a lever **19** which at the midle **19b** of its length has pivoted to it the free end of an arm **20**, of length equal to half that of the lever, fixed on a shaft **21** on which is also fixed a gear wheel **22** gearing with a toothed quadrant **23** adapted to be oscillated from the main shaft of the machine by suitable means. The arm **19c** of the lever **19** and the arm **20** constitute a toggle the opening and closing of which cause the slide **16** to reciprocate on the two slide bars **13**, **18** and carry with it the gripper device **11**. Conveniently,

and as shown, the quadrant **23** is fixed on a shaft **24** geared by means of bevels **25** with a shaft **26** carrying a toothed wheel **27** with which gears a quadrant **28** adapted to be oscillated by means of an arm **29** the free end of which carries a bowl **30** which co-operates with a cam groove **31** in a cam disc **32** suitably driven from the main shaft of the machine.

The wheel **22** is adapted to be oscillated by the quadrant **23** through 180° so that the arm **20** oscillates from a position in which it is horizontal on the left-hand side of the shaft **21**, as viewed in Fig. 2, to a position in which it is horizontal on the right-hand side of the shaft, and vice versa, and the toggle members **20**, **19c** are fully opened and closed, and vice versa, on each side of the shaft **21**, alternately. In order to ensure that when the slide **16** reaches its mid-position in either direction of travel, and the toggle members **20**, **19c** are closed and the pivot **16a** coincides with the shaft **21**, the toggle member **19c** shall not then move with the member **20** about the centre of the shaft **21**, but that the toggle members **19c**, **20** shall open on the other side of the shaft to continue the travel of the slide **16**, the free end of the arm **19d** of the lever **19** is provided with a bowl **19a** adapted to enter and co-act with a vertical guide **33** arranged below and in vertical alignment with the shaft **21**. The co-operation of the bowl **19a** with the guide **33** prevents the bowl from moving angularly about the centre of the shaft **21** and so causes the lever **19** to turn on its pivot **19b** and the toggle members **20**, **19c** to open on the slide of the shaft **21** opposite to that on which they have just previously closed. In this way the toggle members during oscillation of the gear wheel **22** from one extreme position to the other, as aforesaid, first close on one side of the shaft **21** and then open on the other side of the shaft, and reciprocate the slide **16** and gripper device **11** accordingly. The described construction of toggle has the advantage of enabling a maximum reciprocation of the slide **16** and gripper device to be obtained with a minimum length of the toggle members **20**, **19c**. The arrangement is such that while the gripper device **11** partakes of the oscillations of the movable platen **7**, as before described, it advances towards the platen during the upward movement of the latter from the normal to the printing position and recedes from the platen during the return movement of the latter.

On the bush **12** on the upper slide bar **13** is mounted a cam disc **34** having a cam cavity **34a** with which is adapted to co-operate a bowl **35a** on one arm of a bell-crank lever **35** the other arm of which is connected with and adapted to open the hinged jaw of the gripper device **11** against the action of a spring **36** by means of which said jaw is normally kept closed. One end of the spring **36** is connected to an arm **37** fixed on the fulcrum boss of the bell-crank lever **35** and its other end is anchored on the guide member **14**. The cam disc **34** carries a bowl **34d** which co-operates in the bifurcated free end of an arm **38** fixed on the sleeve **17** mounted on the lower square slide bar **18** which latter has fixed on it an arm **18a** adapted to be operated through suitable means from the main cam of the machine, to rock the slide bar **18** to alter the angular position of the cam disc **34** and of the cam cavity **34a** therein relatively to the bowl **35a** which co-operates with same.

When, during the upward movement of the platen **7** with a sheet to be printed upon it, the platen nears the printing position, the bowl **35a** engages the upper part **34b** of the cavity **34a** in the cam **34** and operates the bell-crank lever **35** which through a link **11c** and an arm **11a** on the rod **11f** operates the latter to open the hinged jaw of the gripper device **11** against the action of the spring **36**, the hinged jaw remaining open while the sheet is being registered and until the application of the pressure of printing has actually commenced. The arm **18a** on the lower square slide bar **18** is then actuated to rock the bar to cause the cam disc **34** to be so adjusted (clockwise as viewed in Fig. 3) relatively to the bowl **35a** as to allow the hinged part **11a** of the gripper device **11** to be closed on the sheet by the action of the spring **36**. During the subsequent return movement of the movable platen **7** the gripper device **11** first oscillates therewith and strips the printed sheet from the type on the stationary platen **6** and then reciprocates away from the platen **7** and removes the printed sheet and the lower slide bar **18** is rocked in the opposite direction to formerly (i. e. in an anti-clockwise direction as viewed in Fig. 3) to restore the cam disc **34** to its original position. When the movable platen **7** reaches the end of its return movement and the gripper device **11** the end of its outward reciprocation, the bowl **35a** engages the lower part **34c** of the cam cavity **34a** and effects the opening of the hinged jaw of the gripper **11** to release the removed sheet and deposit same on a delivery pile **39** carried by a support **40**.

I claim:—

1. In a platen printing press, the combination comprising an oscillatable platen, a gripper device for removing a printed sheet from the platen, means directly connecting the platen and the gripper device for effecting oscillation of the gripper device with the platen and means for reciprocating the gripper device along its axis of oscillation.

2. In a platen printing press, the combination comprising an oscillatable platen, a gripper device for removing a printed sheet from the platen, a member carried by the platen and slidably mounted in the gripper device for effecting oscillation of the gripper device with the platen, and means for reciprocating the gripper device along its axis of oscillation.

3. In a platen printing press the combination comprising a frame, an oscillatable platen mounted on the frame, a gripper device for removing a printed sheet from the platen, a member carried by the platen and slidably mounted in the gripper device for effecting oscillation of the gripper device with the platen, and means for reciprocating the gripper device along its axis of oscillation including a toggle and a guide mounted on the frame and positioned to engage one element of the toggle.

4. In a platen printing press the combination comprising an oscillatable platen, a gripper device for removing a printed sheet from the platen, means directly connecting the platen and the gripper device for effecting oscillation of the gripper device with the platen, means for reciprocating the gripper device along its axis of oscillation, and means for actuating the grippers of the gripper device including a cam mounted for reciprocating movement with the gripper device and means for effecting angular movement of the cam.

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