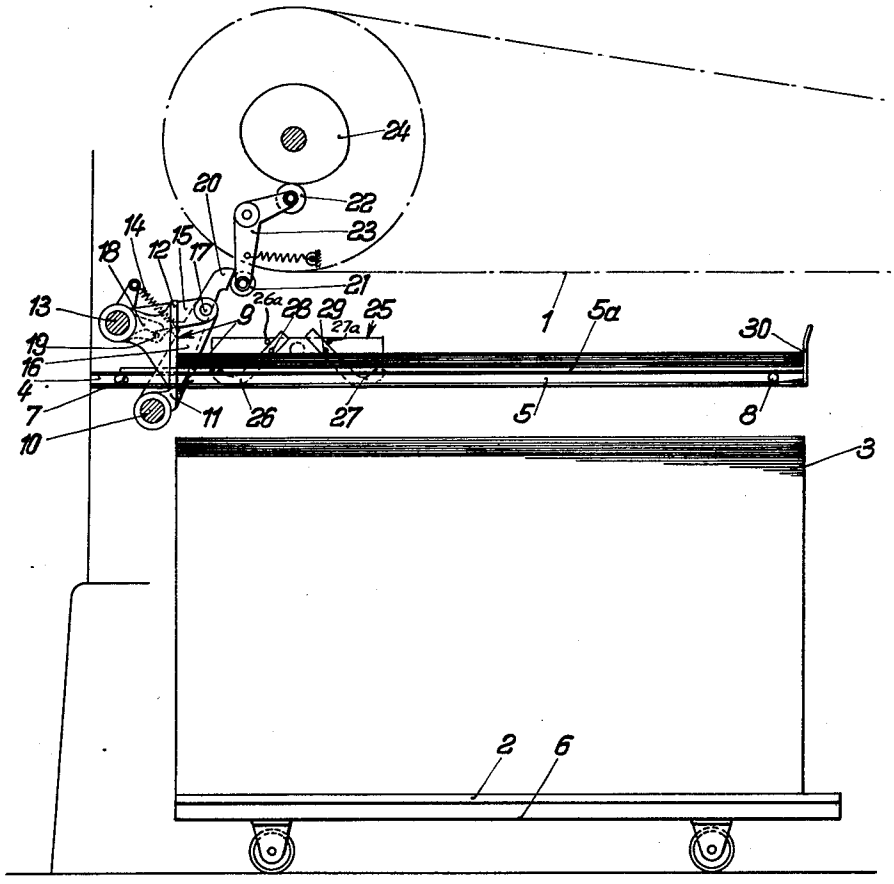
March 20, 1956 W. KOCH 2,738,973

STACKING DEVICE FOR MACHINES WORKING ON SHEETS, PARTICULARLY PRINTING MACHINES

Filed Jan. 27, 1953 3 Sheets-Sheet 1

Fig. 1



Inventor
WERNER KOCH
By Friedrich L. Haug
ATTORNEY

March 20, 1956 W. KOCH 2,738,973

STACKING DEVICE FOR MACHINES WORKING ON SHEETS, PARTICULARLY PRINTING MACHINES

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Fig. 2

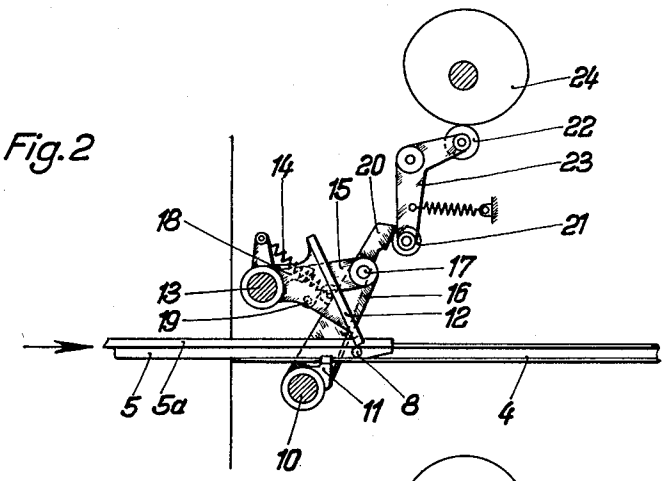


Fig. 3

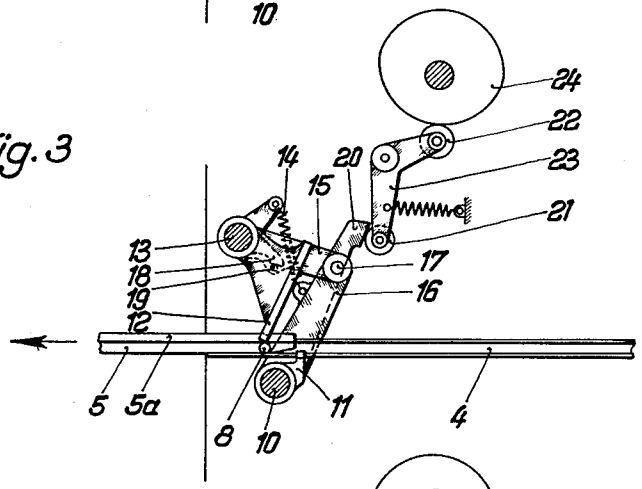
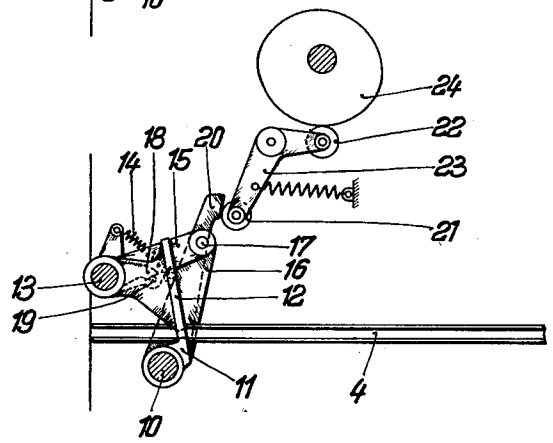


Fig. 4



Inventor:
WERNER KOCH
By Rudolph E. Hane
ATTORNEY

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STACKING DEVICE FOR MACHINES WORKING ON SHEETS, PARTICULARLY PRINTING MACHINES

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Fig. 5

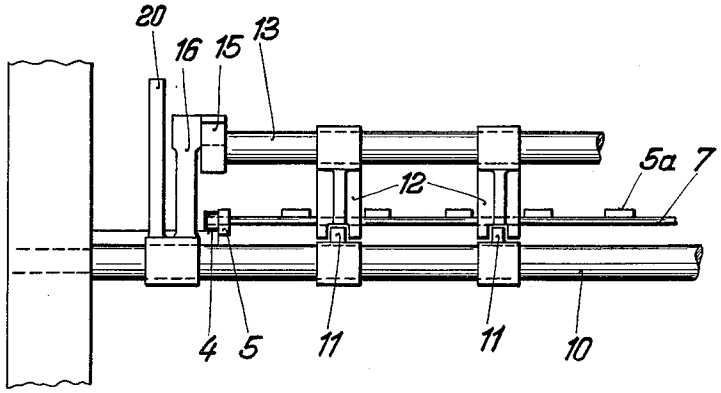
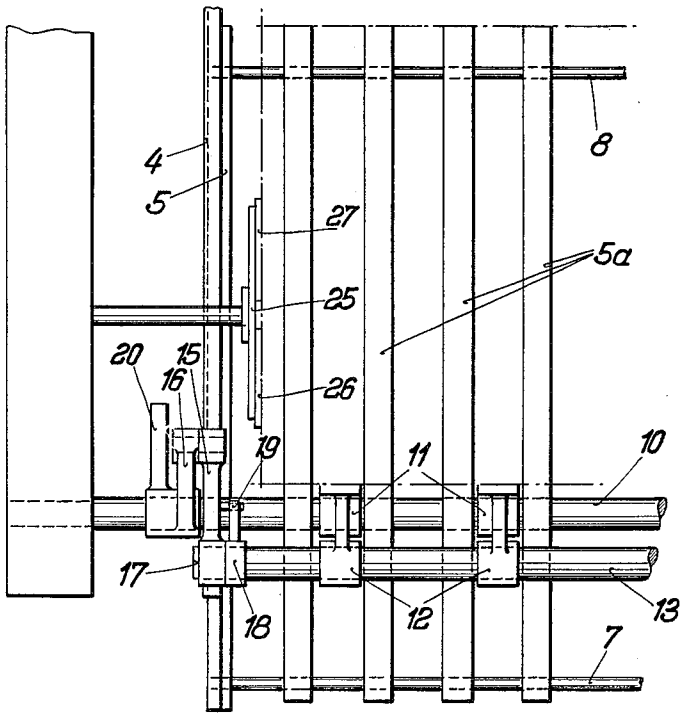


Fig. 6



Inventor:
WERNER KOCH
By Rudolph L. Haase
ATTORNEY

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2,738,973

STACKING DEVICE FOR MACHINES WORKING ON SHEETS, PARTICULARLY PRINTING MACHINES

Werner Koch, Offenbach (Main), Germany, assignor to Faber & Schleicher Aktiengesellschaft, Offenbach (Main), Germany, a German body corporate

Application January 27, 1953, Serial No. 333,456

8 Claims. (Cl. 271—89)

This invention relates to a stacking device such as is used in machines working on sheets, for example printing machines, and which enables the removal of a stack of sheets from the machine during work without thereby disturbing the continued operation of the stacking means.

In the conventional kind of stacking devices the sheets which are delivered by the machine are deposited onto a stacking table and when the pile thereon has reached a predetermined height the table is lowered sufficiently to enable an auxiliary table in the form of a grate to be introduced into the machine. In the continued operation of the stacking device the sheets are deposited onto this grate. Meanwhile the pile underneath the grate is removed and a new table placed in position into contact with the grate, which is then extracted so that the sheets which, in the meantime, have collected thereon, fall onto the new table while the operation of the stacking means is all the time being continued. The use of these grates in stacking devices, however, is limited. The introduction of the grate which, as aforesaid, takes place during the operation of the machine and of the stacking means, is obstructed by the front and side stops which are used for aligning the sheets as they are delivered from the machine onto the stacking table. For this reason the conventional form of the grates is that of longitudinal slats or flat bars of a length corresponding to the greatest length of the sheets to be stacked and which slats are held together by a cross slat at the rear end of the grate. This cross slat when the grate has been applied, remains outside the said stops on account of which the sheet supporting free lengths of the longitudinal slats are without any connection so that the entire arrangement becomes wholly unstable and it, therefore, can not be employed for larger sizes of sheets.

In view of the aforesaid disadvantages it is the main object of the invention to provide a stacking device in which grates can be universally employed without their introduction or removal being obstructed by the stops or any other elements, so that sheets of any size up to the largest possible may be stacked thereon without the operation of the machine or of the stacking device having to be interrupted.

In order to alleviate the trouble experienced in the conventional type of stacking device in the removal of the pile, one has connected the slats not only at their rear ends but also at their front ends so as to form a more rigid grate closed at both its ends. However, grates of this kind could so far only be introduced into the stacking device in positions below the aforesaid stops in the machine. This arrangement has the disadvantage that the sheets which are deposited on the grate can not be reached by the aligning devices and for that reason assume a disorderly position on the grate. When removing the grate, the sheets which meanwhile have collected thereon, fall in the same disorderly state on the stacking table and cannot be straightened by the aligning devices. These disarranged sheets on the table obstruct the further operation of the aligning means, so that the whole pile will not

have the orderly appearance which it should when eventually being removed from the machine.

It is, therefore, another object of the invention, to provide a stacking device in which a closed grate of the aforesaid kind can be introduced into the device at the height of the said stops or aligning elements, so that the disadvantages just referred to will not be encountered.

For the purpose of attaining these and other objects the invention, in one of its particular aspects, consists in the formation of the said stops in a manner, which will allow of their giving way to the auxiliary table when the same is being introduced or removed, and to automatically reassume their normal position immediately after such diverting movement.

As an example of carrying out the invention the front stops in the machine may be made to consist of two normally vertically disposed parts which are so arranged as to divert in one direction during the introduction of the grate and to thereby enable the cross slat to pass. The members of the stops, or at least one of them, may be journaled on a shaft and the shaft supported in levers which, when the grate is being withdrawn, swing upwardly so that the said stop members are able to divert in the other direction and to thus enable the cross piece passing the stops also on its return way. It is practical to combine the lever system just referred to with the sheet aligning or joggling devices in order to be able to carry out the aligning opeation in the most advantageous manner. The stops, in accordance with the invention, may consist of two mutually superposed parts arranged in such a manner that normally the upper portions thereof will be responsible for the orderly deposition of the sheets.

Another feature of the invention consists in that the side stops of the stacking device are provided with flaps or wings which are adapted to be lifted by the grate, or the cross members thereof respectively, when passing in or out of the stacking device.

The accompanying drawings diagrammatically illustrate a preferred embodiment of the invention by way of example. In these drawings:

Fig. 1 is a horizontal section through a device constructed in accordance with the invention with a grate in position.

Fig. 2 shows the position which the parts take when a grate is being introduced.

Fig. 3 is a view similar to Fig. 2 showing the position of the parts when the grate is being withdrawn.

Fig. 4 illustrates the position which the parts take when carrying out their aligning function.

Fig. 5 is a front view of the device with parts broken away, while

Fig. 6 illustrates the arrangement of Fig. 5 as seen from above.

Referring to Fig. 1, a conveyor chain 1 is used to convey the sheets to the stacking table 2, where they are deposited between the front stops 9 and the side stops 25 of which latter one is provided at each side of the device. Preferably the stops are reciprocated so as to serve at the same time for aligning the sheets. The means for reciprocating the side stops are not shown in the drawings as they are well known in printing machines.

When the stack 3 of the sheets resting on the stack table 2 has reached a certain predetermined height the table is lowered, usually by hand, just sufficiently far as to enable a grate 5 to be slid along the rails or guides 4 into the machine at a height in which the top of the stack is still within the space confined by the said stops. In the continued stacking operation the sheets are now deposited onto the grate also within the space confined by the stops 9 and 25 as is indicated by the dot and dash line in Fig. 6. Thereupon the table 2 is lowered onto the trolley 6 and wheeled out of the machine.

The horizontal slats 5*a* of the grate 5 are united in spaced relation to one another by the cross slats or cross pieces 7 and 8. In order to be able to push the grate 5 into the guides 4 without obstruction being encountered by the front stops 9, these are made to consist of two superposed parts 11 and 12. The parts 11 are turnable on a shaft 10, or together with the same, below the guide 4, while the parts 12 are adapted to rock about a shaft 13 above the guide 4 and which is capable of swinging movement about a point 17 which will be referred to in a later stage of this specification.

When the grate 5 is being pushed into and slid along the guide 4 the cross member 8 of the grate encounters the plate 12, causing it to rock about shaft 13 and to thus let the cross member 8 and, therewith, the grate pass as illustrated in Fig. 2. A spring 14, which with one of its ends is fastened to a lever 16 and with its other end to an arm in connection with the stop plate 12, serves to return the parts into their normal position after the cross piece has passed the stop plate member 12.

In order that the stop plate member 12 may also turn in the other direction when the grate 5 is being withdrawn, shaft 13 is journaled in arms 15 arranged at both sides of the stacking device and adapted to swing upwardly about their pivots 17 into the position shown in Fig. 3. This figure shows how the cross piece 8 has just encountered the plate 12 and is about to move it toward the left, thereby swinging the shaft 13 upwardly about the aforementioned point 17. For the purpose of keeping the parts 12 in position during their operation, a lever 18 is provided which strikes against an abutment 19 on the link 15, which is pivoted by means of the pin 17 to the end of a lever 16. This lever 16 is fast on shaft 10 to which latter is also fixed a lever 20, which serves to move the parts so as to align the sheets at the front end of the stacking device and which, for this purpose, is controlled to cause a rocking or joggling movement of the shaft 10 by an eccentric 24 over a bell crank lever 23 and the cam rollers 21 and 22. For striking against the sheets the stop members 11 and 12 are joined to form continuous plates as shown in Fig. 4 which serve as the front stops for the sheets and at the same time for aligning them in the course of their rocking movement about or together with the shaft 10. The side stops 25 are also reciprocated by any known means to align the sheets sideways in their correct positions as indicated by the dot and dash lines in Fig. 6.

The side stops are provided with wings or flaps 26, 27 adapted to pivot on pins 28, 29 about which they divert upwardly when encountered by the cross piece 8 of the grate 5 during the in and outward movement of the grate. These wings or flaps, as will be seen from Fig. 1, extend downwardly to below the grate surface and serve as extensions of the side stops 25. Abutments 26*a* and 27*a* are provided to limit the downward pivotal movement of the said wings relative to their respective side stops. The numeral 30 in Fig. 1 denotes the rear stop of the stacking device.

What I claim is:

1. In a printing machine, a device for stacking the sheets delivered from the printing mechanism and comprising means for introducing an auxiliary grate-like stacking table into the stacking device, a plurality of front stops, each of said front stops consisting of a lower plate member and an upper plate member, a pivot for said lower and a pivot for said upper plate member, and a guide for an auxiliary stacking table arranged at a height in the said stacking device intermediate the said pivots for the lower and upper stop plate members.

2. In a printing machine, a device for stacking the sheets delivered from the printing mechanism and comprising means for introducing an auxiliary grate-like stacking table into the stacking device, a plurality of front stops, each of said front stops consisting of a lower plate member and an upper plate member, said lower plate

member remaining unmoved during the introduction and removal of said grate-like auxiliary table, means for permitting a swinging movement of the said upper plate member, a guide for moving the said grate-like auxiliary table into and out of the stacking device at substantially the height of the said upper plate member, and a cross piece on the said grate for contacting with and thereby swinging the upper plate member out of the way of the said grate-like table when the latter is being moved into or out of the said guide.

3. In a printing mechanism, a device for stacking the sheets delivered from the printing mechanism and comprising a removable main stacking table, a grate-like auxiliary stacking table, a guide in which to slide said grate-like table in and out of the stacking device, front stops consisting of lower stop members pivotally arranged below said guide, and of cooperative upper stop members having their pivots arranged above the said guide, said front stops being spaced so as to be positioned each between two longitudinal slats of the grate and arranged so as to extend downwardly to a level below the said grate.

4. In a printing machine, a device for stacking the sheets delivered from the printing mechanism, a plurality of front stops each consisting of a lower stop member and an upper stop member, an auxiliary grate-like stacking table comprising a number of separate slats, a cross piece at either end of said grate for uniting said slats in spaced relation to one another, a guide rail for guiding said grate during its movement into and out of the stacking device and arranged at approximately the height of the separation line between the two stop members, a rocking shaft below said guide for supporting said lower stop member, a rocking lever on said shaft and a link pivotally supported at the end thereof, a rocking shaft for the upper stop member at the free end of the said link, a resilient connection between the upper stop member and said rocking lever, another rocking lever on the lower rocking shaft, and cam actuated means for controlling the second named rocking lever so as to swing the entire lever system about the lower rocking shaft for the purpose of aligning the stacked sheets as they are delivered from the printing mechanism into the stacking device of the machine.

5. In a machine for working on sheets, a device for stacking the sheets delivered from the working parts of the machine and for enabling a stack of sheets to be removed from underneath the said stacking device, said device comprising front stops each of said stops including a lower plate member and an upper plate member, a shaft pivotally mounting said lower plate member and a second shaft pivotally mounting said upper plate member for stopping and aligning the sheets as they are delivered into the stacking device, a grate-like auxiliary stacking table consisting of individual slats joined by means of cross bars one at least at either end of said auxiliary stacking table, pivoted means for normally holding the said front stops in a vertical sheet-stopping position but enabling them temporarily to assume an oblique position when contacted by the said cross bars of said grate-like auxiliary table when the latter is pushed into and removed from the said stack of sheets, resilient means for returning the said stops into their vertical position after having been passed by the said cross bars, and cam-actuated means for reciprocating said front stops to align the delivered sheets as by joggling in their longitudinal direction.

6. In a printing machine, a device for stacking the sheets delivered from the printing mechanism and comprising means for introducing an auxiliary grate-like stacking table into the stacking device, a plurality of front stops, each of said front stops consisting of a lower plate member and an upper plate member, a shaft serving as a pivot for said lower plate member, another shaft serving as a pivot for the upper plate member for jointly stopping the sheets as they are delivered into the stacking

device, a guide for said grate-like auxiliary stacking table arranged at a height in the stacking device intermediate the said shafts, a cross bar at either end of said grate-like auxiliary stacking table, means for normally holding said stop plate members in a joined continuous vertical sheet stopping position but enabling them temporarily to assume an oblique position when contacted by a cross bar of the said grate-like auxiliary table on the latter being pushed into and removed from the said stack of sheets, and resilient means for returning the said stop plate members into their vertical position after the said cross bar has passed the said stop plate members.

7. In a printing machine, a device for stacking the sheets delivered from the printing mechanism, said device comprising, a plurality of front stops for stopping the sheets as they are delivered to the stacking device, each of said front stops consisting of a lower plate member and an upper plate member arranged to form one continuous vertically disposed plate when in operation, a rocking shaft mounting said lower plate member and a rocking shaft mounting said upper plate member, a rocking lever on said lower shaft, a link pivoted to the end of said rocking lever for supporting said upper shaft and capable of swinging movement about the end of the said rocking lever, a grate consisting of a plurality of longitudinal slats and a cross bar uniting the said slats in mutually spaced relation at either end of said grate, of which cross bars at least one is adapted to pivot the said upper stop plate member about its rocking shaft when contacting therewith, lateral channels for guiding the said grate into and

out of the stacking device at a height slightly above the separation line between said upper and lower stop plate members, and resilient means for returning the said upper plate member into its vertical position after the said cross bar of the auxiliary stacking table has passed the said stop plate members.

8. In a printing machine, a device for the stacking of printed sheets having means for instroducing an auxiliary stacking table and a plurality of front stops for stopping the movement of the oncoming sheets, and side stops for maintaining the lateral position of the sheets in the stacking device, each of said front stops consisting of a lower plate member and an upper plate member to allow of the passage of the auxiliary stacking table therebetween, a pivot for said lower plate member, a guide for the auxiliary stacking table at a height in the said stacking device intermediate the said pivots for the upper and lower stop members, depending wings pivotally connected to the said side stops adapted to divert upwardly about their pivots when contacted by the said auxiliary table on its in and outward movement in the said guide, and abutments on the said side stops for limiting the pivotal movement of the said wings upon the said side stops.

References Cited in the file of this patent

UNITED STATES PATENTS

1,156,957	White	Oct. 19, 1915
1,211,512	White	Jan. 9, 1917
2,521,075	Matthews	Sept. 5, 1950