S. M. LANGSTON.

SHEET FEEDING MECHANISM.

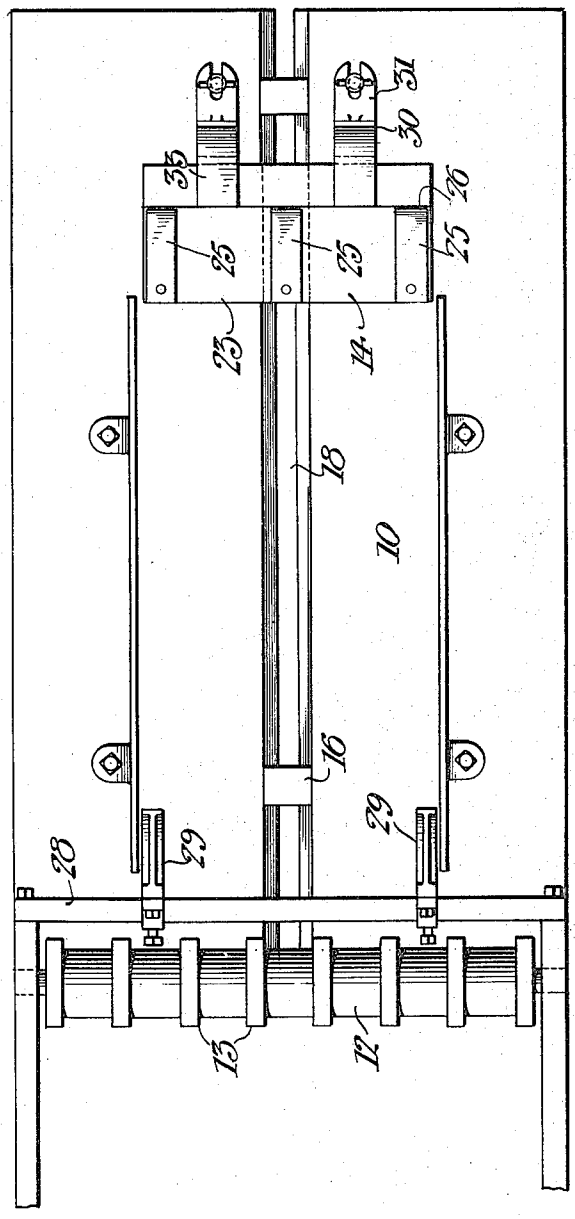
APPLICATION FILED JULY 25, 1914.

1,150,210.

Patented Aug. 17, 1915.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

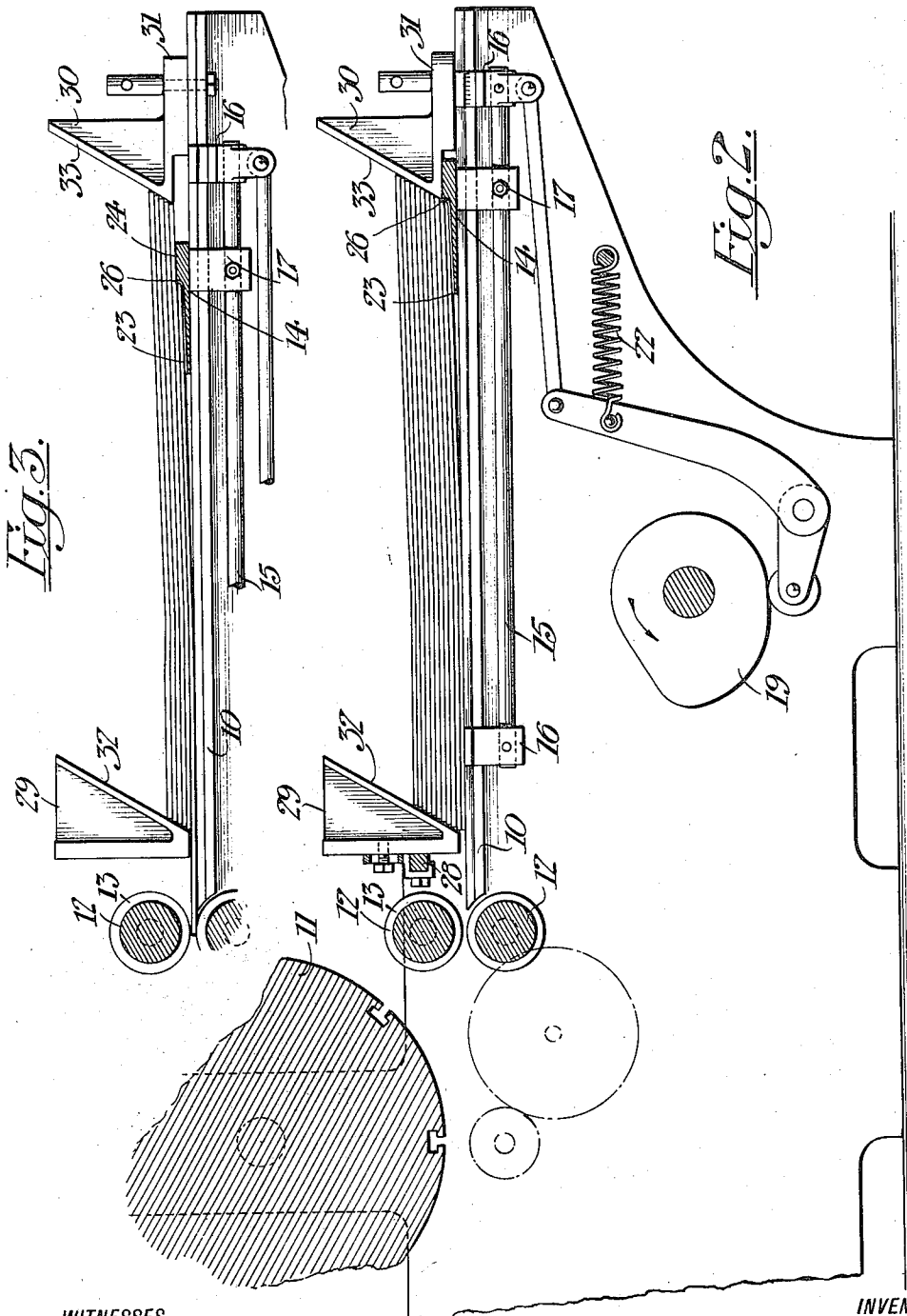

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 5.

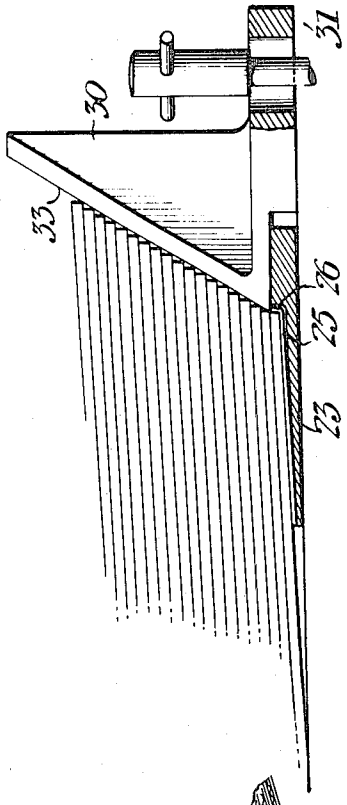


Fig. 7.

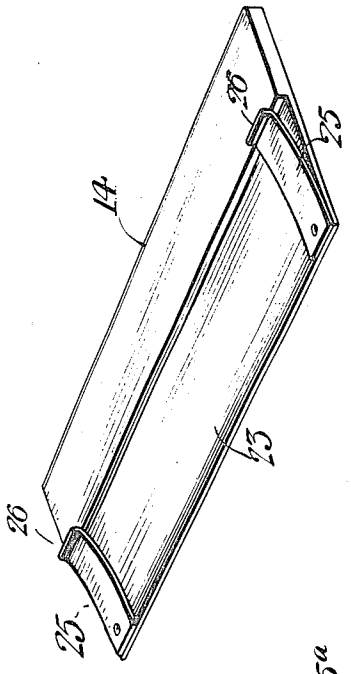


Fig. 4.

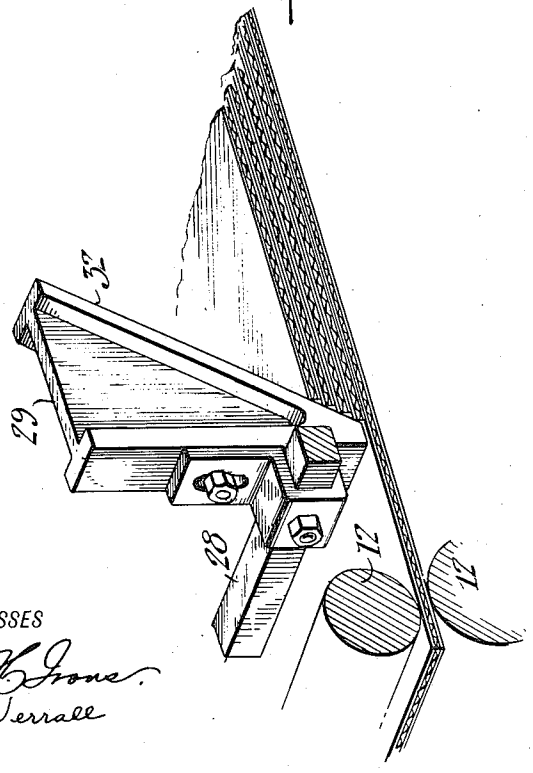
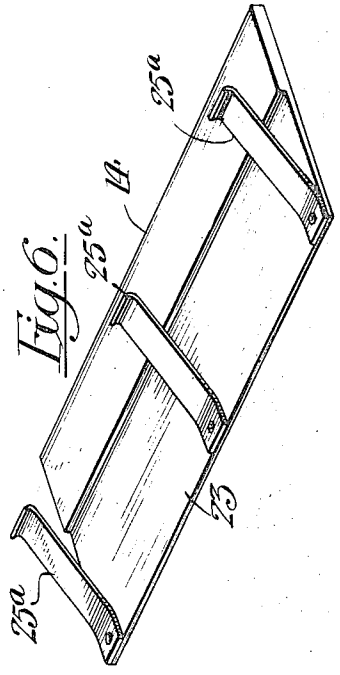


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SHEET-FEEDING MECHANISM.

1,150,210. Specification of Letters Patent. Patented Aug. 17, 1915.

Application filed July 25, 1914. Serial No. 853,013.

To all whom it may concern:

Be it known that I, SAMUEL M. LANGSTON, a citizen of the United States, and resident of Wenonah, in the county of Gloucester and State of New Jersey, have invented certain new and useful Improvements in Sheet-Feeding Mechanism, of which the following is a specification.

This invention relates to certain improvements in mechanism for feeding sheet material to printing presses or other machines and relates more particularly to that type of mechanism illustrated in my prior Patent 1,107,971 issued August 18th, 1914. In the specific form of machine illustrated in said application, there is provided a suitable table, platform or support for a column or stack of sheets to be fed, guides engaging with the edges of the sheets in the stack or column to hold the latter in position as successive sheets are fed therefrom, and a slide movable back and forth along the table or platform and adapted to engage with the rear edge of the bottom sheet to slide the latter out from under the remaining sheets of the stack or column and beneath the said guide.

One object of my present invention is to insure the proper engagement of the slide with the bottom sheet to feed the latter even though said bottom sheet be warped so that it does not lie flat on the support.

A further object is to reduce the frictional resistance encountered by the slide in returning to starting position by supporting at least a part of the weight of the column independently of the slide.

In the accompanying drawings, I have illustrated one embodiment of my invention although various other embodiments might be designed within the scope of my invention without departing from the terms of the appended claims, and various changes in details and arrangements of the parts might also be made. Therefore, I desire the drawings to be considered in an illustrative rather than in a limiting sense.

In these drawings, similar reference characters indicate corresponding parts in the several views.

Figure 1 is a top plan view of a portion of a machine constructed in accordance with my invention. Fig. 2 is a vertical longitudinal section with the slide in starting position. Fig. 3 is a section similar to a portion of Fig. 2, but showing the bottom sheet advanced part way. Fig. 4 is a perspective view of the guide at one edge of the column. Fig. 5 is a side view of the guide at the other edge, and, Figs. 6 and 7 are perspective views of two forms of slides.

The specific character of the machine in connection with which my feeding mechanism is employed, forms no portion of my present invention, and therefore I have not illustrated it in detail. The machine itself or a separate frame is provided with a table or platform 10, constituting a support for a pile or stack of sheets which it is desired to feed to the machine. These sheets may be of double faced corrugated paper, paper board, wooden boards, sheet metal or other sheet material. If the machine be a printing press it may include a printing cylinder 11, and a pair of feed rolls 12—12 the latter receiving the sheets from the feeding mechanism and having any form of frictional surface to properly engage with and advance the sheets. As illustrated the feed rolls have annular rings or gaskets 13 spaced apart along their length and formed of resilient material such for instance as rubber. Instead of, or in connection with, these gaskets, there might be scoring rollers or cutters for subdividing or creasing the sheets or trimming the edges.

For advancing the sheets from the bottom of the column to the feed rolls, I provide a slide 14 mounted to lie on the upper surface of the table and to move back and forth toward the feed rollers. The slide may be operated in any suitable manner, but is preferably adjustably connected to the driving mechanism so that the position of the beginning of the feeding movement may be varied to adapt the machine for feeding short or long sheets. I have illustrated slide operating mechanism substantially the same as is shown and claimed in my prior application above referred to. This involves the

use of a rod 15 longitudinally movable beneath the table and supported on guides 16—16. The slide 14 has a flange 17 extending down through a slot 18 in the table and connected to the rod intermediate of the ends of the latter.

The rod is caused to reciprocate by a cam 19 and suitable link and lever connections. The cam may drive the rod in both directions but preferably it drives it in only one direction and a spring 22 returns it. The slide may be adjusted along the rod and thus may begin its feeding movement at any desired points along the length of the table. One slide may extend partially or substantially the full width of the table or there may be provided a series of separate and independent slides of any desired length each having its own cam and operative mechanism.

The slide itself which involves an important feature of my invention, has a comparatively thin front portion 23 and may be slightly thicker at its rear portion 24. The two portions may be separated by a shoulder, or may merge together. In adjusting the slide to the proper position along the length of the rod, I permit the rear portion 24 to come out from beneath the column when the slide is at the rearmost position but the thinner front edge 23 is at all times beneath the column as set forth in my prior patent above referred to. Secured to the body portion of the slide are one or more members 25 for direct engagement with the rear edge of the sheet. Each member 25 extends upwardly and rearwardly from the front edge of the slide and has a hook or shoulder 26 at its rear end the height of which is less than the thickness of the sheet material to be fed. The member may be formed of spring metal and unattached to the slide at its rear end with said rear end raised above the body of the slide.

Instead of being highly resilient, members 25^a may be employed which are comparatively stiff and rigid, so as to support the rear portion of the column. They may bend only slightly under the weight of the column, but sufficient to insure proper engagement with the rear edge of the bottom sheet even though the latter be somewhat warped. Even though the members 25^a be rigid with the slide the proper spacing of them apart will insure the proper engagement by reason of the flexibility of the ordinary sheet material.

In operation, the slide moves rearwardly to such an extent that the hooks or shoulders 26 come out from beneath the column and immediately spring upwardly or the column drops slightly. This inclination, spacing, resiliency, and mounting positively insures engagement of the shoulders with the edge of the sheet even though the latter be warped or curved out of a straight line. The resiliency of the member as well as its length may be so proportioned that the shoulders or hooks of the several members tend to rise a distance greater than the extent of any warping or curving which may exist in sheets adapted for commercial purposes and upon which it is desired to print. Even without the resiliency two members 25 spaced apart as in Fig. 7 will always engage due to the weight of the column. I have shown two of these members mounted adjacent to opposite ends of one slide in Fig. 7, but it is of course evident that a larger number might be employed as in Fig. 6, or that a plurality of comparatively narrow slides might be employed each with its own hook member. In practice it is desirable to engage a sheet at two points at least, if the sheet be comparatively wide, although for feeding narrower sheets the engagement of a single member 25 is sufficient.

In order to relieve the slide of a portion of the weight of the column during the return movement of the slide and to thus reduce liability of injury to the sheets, by the hooks or shoulder 26, during the return movement of the latter, I provide auxiliary supporting means which at the same time constitute means for holding the sheets in proper stacked position. As shown there are provided two or more brackets, guides or stops 29, which engage with the front side of the column to prevent any of the sheets in the column, except the bottom sheet, from being fed to the machine. These guides or stops may be supported on a transverse bar 28 and may be adjusted toward and from the platform so that their lower edges will be at a distance above the platform but slightly greater than the thickness of two sheets. They may also be adjusted toward and from each other along the rod 28 in accordance with the width of the sheets to be fed. For engagement with the rear side of the column of sheets, I provide a somewhat similar stop or guide 30 in the form of a bracket detachably secured to the table. The table may be provided with a series of slots, openings or grooves, and the guide 30 may have a rearwardly extending base 31 slotted to receive a clamping bolt to permit the clamping of the guide in any desired position. The body portion of the guide 30 is either supported at a slight elevation above the surface of the table or the lower front edge is cut away to leave a recess or pocket into which the rear edge of the slide may extend when the latter is in this rearward limiting position.

The guides 29 and 30, have the surfaces which engage with the sides of the column inclined so that although each sheet of the stack may lie substantially horizontal, yet the stack as a whole will extend rearwardly

as well as upwardly from the platform. The rear surface 32 of the members 29 and the front surface 33 of the member 30 are parallel and inclined upwardly and rearwardly so that with the sheets lying one above the other, the rear edge of each sheet will project rearwardly beyond the rear edge of the sheet directly therebeneath as is clearly shown in the drawing. These rear edges thus each engage with the inclined surface 33 and the inclination is such in respect to the length of the sheets that, as the bottom sheet is fed forwardly the sheet next above will be supported at its rear edge by the inclined surface 33. The front edge of the sheet which is next to the bottom cannot drop down so long as there is a sheet beneath it, and it cannot slide forward due to the engagement with the surface 32. Thus the rear portion of the column will be supported independently of the bottom sheet during the feeding movement of the latter, and the column will not drop down to bring the next sheet on to the table or platform until after the rear edge of the bottom sheet has passed from beneath the front edge of the next to the bottom sheet. The entire column may then drop with a slight forward movement. In other words, the column itself will not drop vertically, but in the direction of the surfaces 32 and 33.

In operation, it is not necessary for the hook members 25 to feed the bottom sheet the entire distance, in fact it is only necessary to feed the sheet sufficiently far forward to bring the front edge well into the feeding rollers 12—12, and the latter will then operate to pull the sheet from beneath the column and advance it to the machine, meanwhile the slide returns to starting position before the column drops. The range of movement of the slide 14 may therefore be comparatively small in respect to the total length of the sheet to be fed. Even if the sheets be of slightly different lengths so that one or two sheets do drop at their rear edges the weight of the column will be at least partially supported by the inclined surface 33 during the return movement of the slide and the slide will thus be relieved of a large portion of the frictional resistance. During the return movement the spring members 25 may engage with under surface of next to the bottom sheet but will press against it with only the strength of the springs themselves, and the tendency to cut into the sheet will be reduced if not entirely removed. At the end of the return stroke the hook members may spring up still farther and engage with the rear edge of the superposed sheet. The extent of inclination or angle of the surfaces to the table or platform may be varied in accordance with the thickness, stiffness or other characteristics of the sheets. By forcing the rear guides forwardly the sheets may be given a decided tilt or inclination or at least the rear edges may be held up if the sheets be very flexible. The rear edge of the bottom sheet should not be raised beyond the reach of the hooks or shoulders 26.

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

1. A sheet feeding mechanism including a support for a column of sheets, a pair of guides for engagement with the front and rear edges of said sheets and each having its guiding face or edge inclined rearwardly, a slide superposed on said support and extending transversely thereof, the body of said slide having a rear portion adapted to move beneath the rear guide, a front thinner portion at all times beneath the column, said portions being separated by a shoulder, and a plurality of spring members each secured to the front edge of said front portion and extending rearwardly and upwardly and terminating in a hook or shoulder adjacent to the shoulder of said body, the hook or shoulder portions of said spring members being adapted to move from beneath the column when in a rear limiting position and to then resiliently move upwardly away from said support to an extent automatically governed by the thickness of the bottom sheet.

2. A sheet feeding mechanism including a support for a column of sheets, a slide superposed on said support and comprising a body having the front edge thereof of less thickness than the rear edge and having a shoulder extending transversely thereof upon the upper surface, and a spring member secured at the front edge of said body and terminating in an upwardly extending hook or shoulder adjacent to the shoulder of said body and movable upwardly therefrom when relieved of the weight of the sheets forming the column.

3. A sheet feeding mechanism including a support for a column of sheets, a slide superposed on said support and comprising a body having a shoulder extending transversely thereof upon the upper surface, and a spring member secured at the front edge of said body and terminating in an upwardly extending hook or shoulder adjacent to the shoulder of said body and movable upwardly therefrom when relieved of the weight of the sheets forming the column.

4. A sheet feeding mechanism including a support for a column of sheets having a comparatively narrow slot therein extending in the direction of the feeding movement of the sheets, a slide superposed on said support and comprising a body of materially greater width than said slot and a plurality of spring members secured to the

front edge of said body at points spaced farther apart than the width of said slot and each terminating in an upwardly extending hook or shoulder movable upwardly from said support when relieved of the weight of the sheets forming the column.

Signed at New York city in the county of New York and State of New York this 18th day of July A. D. 1914.

SAMUEL M. LANGSTON.

Witnesses:
C. W. FAIRBANK,
FLORENCE LEVIEN.