L. VON SAZENHOFEN.

SHEET FEEDING APPARATUS.

APPLICATION FILED AUG. 30, 1911.

1,089,274.

Patented Mar. 3, 1914.

2 SHEETS—SHEET 1.

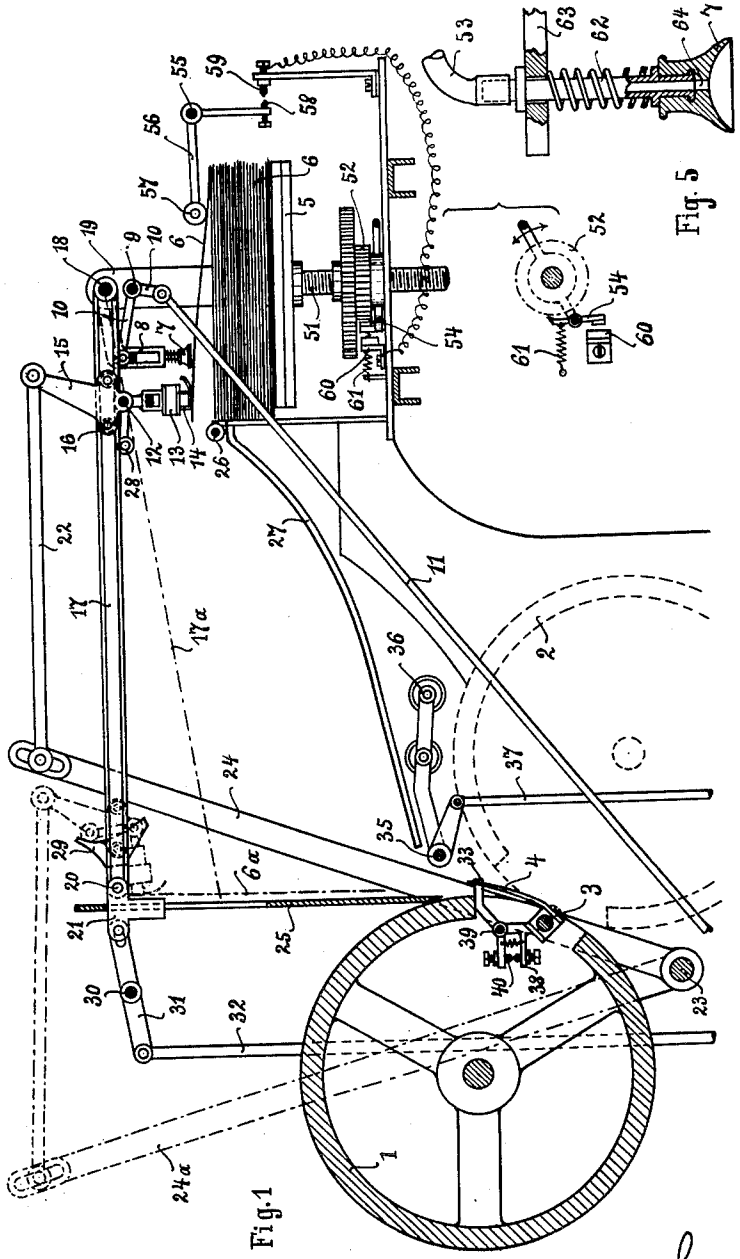

Fig. 1



Fig. 5

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2 SHEETS—SHEET 2.

Fig. 2

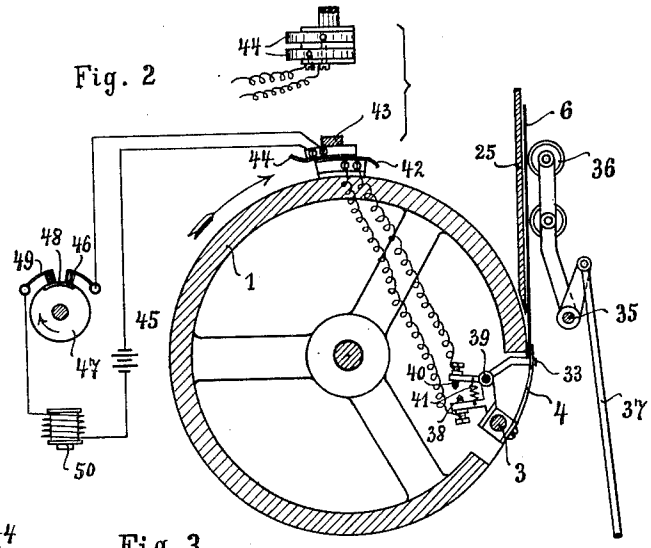



Fig. 3

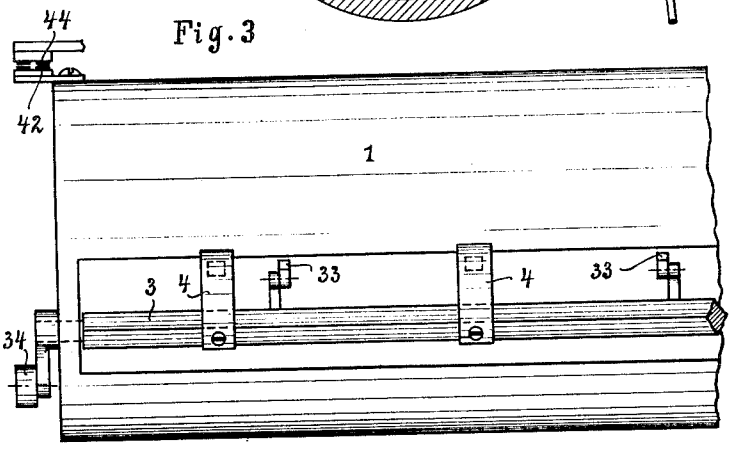
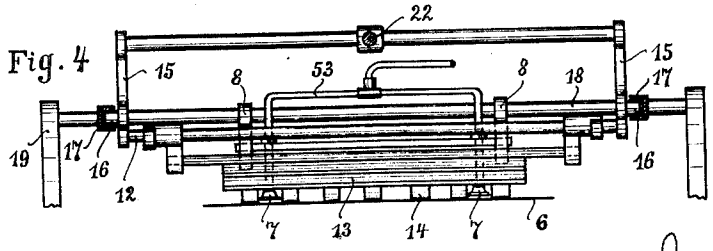



Fig. 4

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# UNITED STATES PATENT OFFICE.

LUDWIG VON SAZENHOFEN, OF NUREMBERG, GERMANY.

## SHEET-FEEDING APPARATUS.

1,089,274. Specification of Letters Patent. Patented Mar. 3, 1914.

Application filed August 30, 1911. Serial No. 646,933.

*To all whom it may concern:*

Be it known that I, LUDWIG VON SAZENHOFEN, a subject of the Emperor of Germany, residing at Nuremberg, Bavaria, Germany, have invented certain new and useful Improvements in Sheet-Feeding Apparatus, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus for automatically feeding metal sheets from a pile of such sheets into the gripping device of sheet metal printing machines, and the like.

The invention substantially consists in the alternate coöperation of a sucker device with an electromagnet, in a device for stopping the machine when the metal sheets are incorrectly fed into the same and also in an automatic adjustment of the vertical position of the table on which the metal sheets are piled.

One form of apparatus according to this invention is illustrated by way of example in the accompanying drawings, in which,

Figure 1 is a view in side elevation, with parts in section, of the improved apparatus applied to a sheet metal printing machine. Figs. 2 and 3 are, respectively, a cross section and front elevation of the device for preventing the metal sheets from being incorrectly placed in the machine, Fig. 4 is a front elevation of the sheet lifting device, and Fig. 5 illustrates an elevation in section of a sucker.

The sheet metal printing machine consists in the usual way of two rotating cylinders 1 and 2. The cylinder 1 grips the metal sheet which is introduced from above, by means of the grippers 4, rocking about the spindle 3 and pulls said sheet through the two cylinders. The metal sheets are fed singly to the cylinder 1 by the following mechanism: The metal sheets 6 which are to be printed are piled irregularly on a table 5. The sheet which at the particular moment is uppermost, is lifted from the pile by means of suckers 7 moved up and down in the guide arms 8 by levers 10 and 11, the former being pivoted on the spindle 9. The two suckers are resiliently mounted and connected by means of a tube 53 to an air-pump by means of which when placing the suckers 7 on the topmost plate a vacuum is produced in the sucker heads. The sheet is then lifted up by the suckers. The suckers 7 are constituted, (as is particularly shown in Fig. 5,) by a hollowed rubber-head, taking the shape of a plate, with a boring 64 and which is soft and elastic at its margins. By this it is obtained that when placing the sucker on the topmost plate it will always fit perfectly airtight to the surface for securely holding the plate in place. This arrangement therefore prevents every risk of the ink, which in most instances is still wet on the plate, being spoiled, a deficiency which exists with all suckers of the general type. The sucker 7 by means of a pipe 62, is resiliently and movably mounted in the bar 63, in order to insure flexibility whenever a plate occurs which is not quite straight. The further conveyance of the lifted sheet is now taken up by an electromagnet 13 which turns about the spindle 12 and is provided with sliding springs 14. The spindle 12 is mounted in a carriage 15 moving on rails 17 by means of rollers 16. The rails 17 are mounted at one end in the bearing 19 by means of the axle 18 and at the other end in the sliding member 21 by means of the axle 20. The carriage 15 is movably connected by means of a rod 22 to the lever 24 rocking on the spindle 23, so that as the lever 24 rocks the carriage 15 is moved toward the stop or guide plate 25. As soon as the electromagnet 13 has approached the lifted sheet (Fig. 1) current is supplied to the electromagnet by known means so that the sheet will be attracted, while the vacuum in the sucker 7 is destroyed and the sheet is released by the same. The alternate coöperation of sucker and electromagnet for the purpose of lifting up the separate sheets is necessary because the electromagnet in coming into contact with the pile of sheets, would owing to its magnetism lift up several plates at once, while the sucker always takes hold of the uppermost plate only and holds the same in a raised position, until a second plate which may have adhered to the first plate shall have dropped down again. The topmost sheet 6 is moved by the electromagnet 13, 14 over the guide rollers 26 and the guide bars 27 toward the stop plate 25, as indicated at $6^a$, on moving the carriage 15.

In order to cause the sheet 6 to assume a vertical position a lever 28 is secured on the spindle 12 which lever engages a stop or abutment 29 secured on the rail 17, thus causing the electromagnet 13 together with

the adhering sheet 6 to turn through an angle of 90° so that the sheet 6 comes to bear against the stationary plate or wall 25. The sliding member 21 adapted to slide up and down in the plate 25 is now lowered by means of the rods 31 and 32 turning on the fulcrum 30 and the flow of current in the electromagnet is interrupted so that the sheet is placed on the abutments or stops 33 provided between the cylinder 1 and the grippers 4, which latter are now pressed against the cylinder by means of a crank arm 34 mounted on the spindle 3 and connected to an eccentric, thus holding the sheet in position.

In order to prevent the sheet 6 bearing against the stop plate 25 from bulging out in a backward direction a roller support 36 is pivotally mounted on a spindle 35 which support is moved against the plate 25 by means of the rods 37 as soon as the sheet 6 has assumed a vertical position and rests freely on the grippers (Fig. 2).

In order to enable the machine to be stopped if one of the sheets should not be correctly fed into the cylinder, the following safety device is provided: On the spindle 3 there is secured a contact 38 on the end of which the stop or abutment 33 is pivotally mounted by means of the spindle 39, said abutment carrying a second contact 40. Both contacts are caused to approach each other by a spring 41. On the cylinder 1 there is secured a contact 42 which is temporarily connected or brought into touch with the contact 44, secured to the machine frame 43. By this means it is possible during a certain period of the revolution of the cylinder to electrically connect and disconnect the described safety device from time to time. When the sheet 6 is placed in position, the stop 33 is depressed against the action of the spring 41, so that the contacts 38 and 40 are caused to move apart. If, however, the sheet 6 were to assume an incorrect position, for instance an oblique one, so that only one or none of the stops 33 is depressed, then the two contacts 38 and 40 remain closed thus causing the machine to come to a standstill. From a source of supply 45 the electric current passes over the stationary contact 44 to the contact 42, thence to the contact screw 40 over the point of break to the contact screw 38, and thence back over the contact 42 and 44 to the sliding brush 46 and by way of the contact 48 secured on the revolving disk 47 to the brush 49, and thence to the releasing magnet 50 back to the source of current supply 45. If a releasing armature is arranged in front of the magnet 50, then the machine will be brought to a stand-still by this means, if the circuit is not broken by the contact screws 38 and 40. The circuit is not broken when the stops 33 are not depressed owing to the sheet assuming an incorrect position.

The table 5 can be adjusted by means of a spindle 51 and a ratchet wheel 52. The ratchet wheel 52 is caused to turn by a locking pawl 54 operated in a known manner. By this means the vertical position of the table 5 is adjusted as may be required.

As the sheets are not always of uniform thickness and do not lie flat one upon another, the exact vertical position of the topmost plate must be regulated by a special mechanism. For this purpose a double lever 56 is mounted on a spindle 55 which lever bears by means of a roller 57 on the pile of sheets, while at its other end this lever is provided with a contact screw 58 making contact with the contact screw 59 secured to the frame. This latter screw is connected to an electromagnet 60 which faces one end of the double armed pawl 54 which latter it causes to engage with the ratchet wheel 52 when the circuit is completed, whereas when the circuit is broken the spring 61 causes the pawl 54 to disengage from the ratchet wheel 52. As soon as the sheets have attained the required height, the roller 57 is raised and the circuit is broken by breaking the contact between the two contact screws 58 and 59, so that the electromagnet 60 releases the pawl 54 while the spring 61 disengages said pawl from the ratchet wheel 52. The table now remains stationary until the roller 57 is again free whereby the circuit is completed at the contact screws 58 and 59 while the released pawl 54 is caused by the electromagnet 60 to engage again the ratchet wheel 52.

The above described device for feeding the separate sheets into the sheet metal printing machine may also be used in connection with machines for working sheet metals.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In combination, printing cylinders and gripping means therefor, a vertical stop plate above said means, a track above said cylinders having one of its ends remote from said cylinders pivotally mounted, means for lowering the remaining end toward said cylinders and said means, a device for supporting a pile of sheets in a horizontal position, a sheet transferring carriage mechanism movable on said track for carrying said horizontally disposed sheets from said pile toward said stop plate, means engaging said mechanism to shift the carriage into a vertical position, and means for lowering the track to dispose said sheets within the range of said gripping means.

2. In combination, printing cylinders and

gripping means therefor, a track above said cylinders having stop means, a device for supporting a pile of sheets in a horizontal position, a sheet transferring carriage mechanism movable on said track for carrying said horizontally disposed sheets from said pile toward said stop means, means engaging said mechanism to shift the carriage into a vertical position, and means for lowering the track to dispose said sheets within the range of said gripping means, substantially as described.

3. In combination with mechanism provided with sheet gripping means, a track disposed above said means, a device for supporting a pile of sheets in a horizontal position, a carriage movable on said track provided with pivotally mounted sheet carrying means to dispose the sheets into a vertical position, and means for lowering said track to bring the sheets into range of said gripping means, substantially as described.

4. In combination with mechanism provided with sheet gripping means, of a track disposed above said means, a support for a pile of sheets, a carriage movable on said track provided with sheet carrying means for transferring the sheets from said pile to said mechanism, and means for lowering the track to bring the sheets carried by said sheet carrying means into range of said gripping means, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LUDWIG VON SAZENHOFEN.

Witnesses:

A. HEERLEIN,

ELISABETH HELLMUTH.