May 13, 1930. E. WEINGÄRTNER 1,758,134

SHEET DELIVERING AND STACKING DEVICE FOR PRINTING MACHINES

Filed Oct. 6, 1927 2 Sheets-Sheet 1

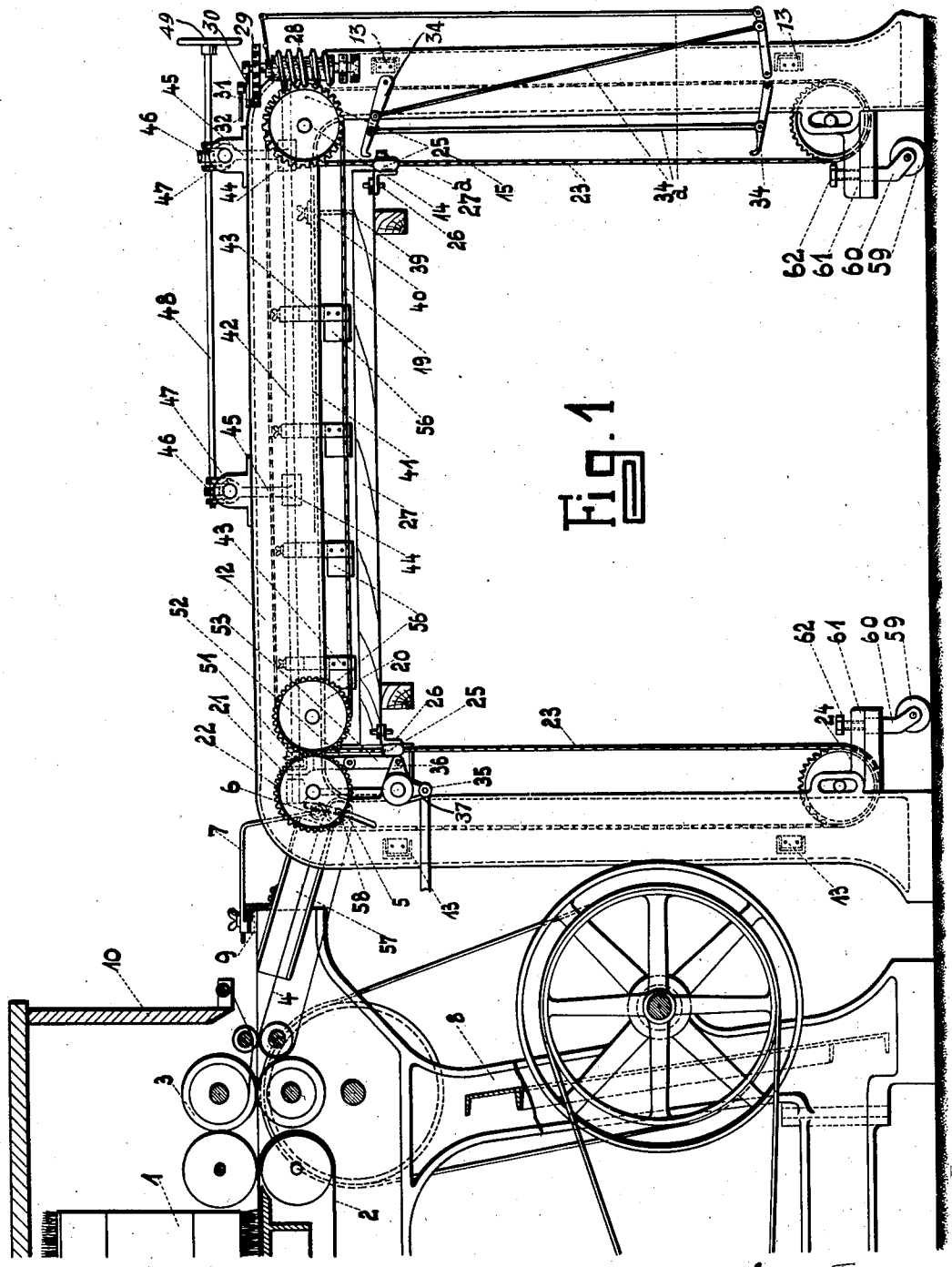


Fig. 1

Inventor
Eduard Weingärtner
by
S. Sokal
attorney

May 13, 1930. E. WEINGÄRTNER 1,758,134

SHEET DELIVERING AND STACKING DEVICE FOR PRINTING MACHINES

Filed Oct. 6, 1927 2 Sheets-Sheet 2

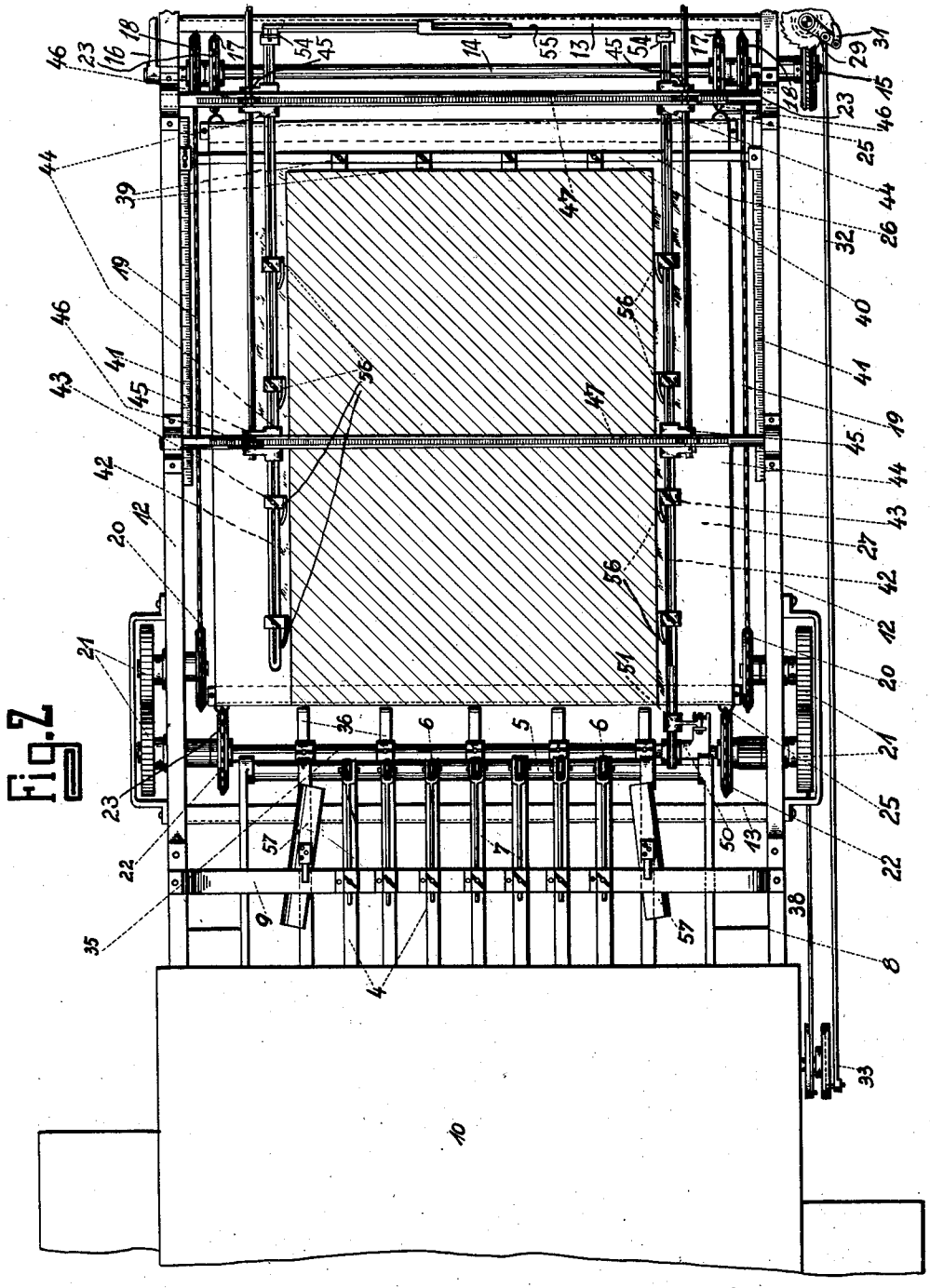


Fig. 2

Inventor
Edmund Weingärtner
by
S. Sokal
attorney

Patented May 13, 1930 1,758,134

UNITED STATES PATENT OFFICE

EDUARD WEINGÄRTNER, OF LEIPZIG, GERMANY

SHEET DELIVERING AND STACKING DEVICE FOR PRINTING MACHINES

Application filed October 6, 1927. Serial No. 224,489.

The present invention relates to sheet delivering and stacking devices for printing machines.

In the known devices of this kind for printing machines the sheets have to be delivered to the said devices in a definite time order of succession. In consequence of this fact such known devices cannot be employed for every kind of machine—for instance, they are not suitable for bronzing and ruling machines.

It is the principal object of the present invention to provide a sheet delivering and stacking device, which permits of any desired order of succession of delivery of the sheets and which can consequently be employed for all cases which may arise.

With this object in view the device according to the invention comprises inter alia a table which descends as the stack increases in size, and oscillating arms arranged above the said table in a frame, which arms guide the sheets issuing from the machine, from two or three sides, whilst the position of the sheets on the other sides is determined by stops.

A preferred constructional form according to the invention as applied to a bronzing machine is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is an elevation, partly in section, of a device according to the invention, and

Fig. 2 is a plan thereof.

In the part of the bronzing machine shown in the drawings the numeral 1 denotes the dust removal bands, the numeral 2 the feed band, the numeral 3 the two dust removing rollers which serve at the same time for the feeding of the sheets and the numeral 4 the feed bands which convey the sheets out of the machine. Each one of several pressure rollers 6 rests on one of several of the feed bands 4 immediately above the feed shaft 5 for the said bands, which is located outside the bronzing machine. These rollers 6 are each mounted so as to be free to oscillate on arms 7, which in turn are clamped to a bridge 9 fixed to the frame 8 of the bronzing machine. The rollers 6 rest by virtue of their own weight on the feed bands and ensure reliable feeding of the sheets lying on the feed bands 4. The bronzing machine is enclosed as usual in a housing 10. Behind the bronzing machine two frames 12 are mounted in a prolongation of the side walls of said housing, which frames are a little higher than the frame of the bronzing machine and are connected with one another by means of transverse ties 13. At the rear end of this frame and in its upper part a shaft 14 is rotatably mounted, which is provided with a worm wheel 15 at the one end which projects beyond the frame and with a crank handle 16 at the other end. On the part of the shaft 14 lying between the two frames 12 pairs of sprockets 17, 18 are keyed close to the inner side of each frame respectively. From each of the two sprockets 18 a chain 19 runs to a corresponding chain wheel 20 arranged at the same height in the front part of the frame. The rotation of these sprockets 20 which are rigidly mounted on their axles is transmitted by means of toothed wheels 21 arranged on the outside of the frame to adjacent sprockets 22, which consequently rotate in the reverse direction to the sprockets 17. Each of the pairs of toothed chain wheels 17, 17 and 22, 22 has a chain 23 passing over it in a vertical direction, which chain also passes over a sprocket 24 rotatably mounted on an adjustable pin below the said sprockets 17, 17 and 22, 22 in the lower part of the frame. In each of the chains 23 a link plate member 25 is provided. The link plate members 25 are all arranged on their respective chains on the inner half of the chain and at the same height. The two front link plate members and the two back link plate members 25 each carry an angle iron 26 running transversely to the frame 1, and these angle irons serve as a support for a wooden table 27.

The worm wheel 15 mounted on the shaft 14 engages with a vertically arranged worm 28, on the shaft of which a ratchet wheel 29 is fixed and an arm 30 provided with a pawl 31 is loosely mounted. The arm 30 is connected with a connecting rod 32, the other end of which is pivotally connected to the crank pin of a crank disc 33 driven by the bronzing machine. On each revolution of the crank disc the shaft 14 is therefore rotated through a

short distance. This operation takes place in such a manner that the table carried by the chains 23 is caused to descend a short distance. The extent of the motion of the shaft 14 may be regulated by adjustment of the crank pin on the crank disc 33, so that the descent of the table corresponds to the increase in size of the pile of sheets delivered on to said table. As soon as the table has descended to a certain height the controlling mechanism just described is automatically cut out of action. This cutting-out of the gear may be effected in many different ways. In the constructional form shown by way of example in the drawings it is to be understood that the worm 28 is not rigidly connected to the ratchet wheel, but is connected thereto through the medium of a friction clutch coupling, which is released when a projection 27^a provided on the table strikes on a control lever 34 through the medium of a link 34^a, as soon as the table has attained a definite lower position.

In the front part of the framework formed by the frames 12 a shaft 35 is rotatably mounted, on which shaft adjustable vertical arms 36 are provided. These arms are arranged close to the edge of the table 27 nearest to the bronzing machine and their upper ends lie at a lower level than that of the feed shaft 5 for the feed bands 4, so that the sheets issuing from the machine can slide away over them. On the one end of the shaft 35 projecting over the frame a crank arm 37 is arranged, which is connected with an eccentric rod 38 actuated by a shaft of the bronzing machine. This eccentric rod sets the shaft 35 in oscillatory rotary motion. The arms 36, which are thus likewise caused to oscillate, push the sheets issuing from the machine and delivered on to the table 27 up to the stops 39. These stops are mounted on a transverse batten 40, which can be displaced longitudinally in the frame on battens 41 provided with scales and can be adjusted according to the dimensions of the sheet. In the frame two further shafts 42 are mounted which are provided with vertically downwardly directed adjustable arms 43 and which run in the longitudinal direction of the said frame. These shafts 42 each carry two sleeves 44 which are provided with arms 45 forming a fork. In each of these forks a toothed wheel 46 is mounted. These two shafts 42 with the said pairs of toothed wheels are suspended from two transverse rods 47 arranged on the upper edge of the frame and running perpendicularly to the said shafts 42. The said transverse rods 47 are toothed on their upper sides. The two toothed wheels of each shaft 42 are mounted on a common shaft 48 which is provided at its end with a hand wheel 49. By turning the hand wheel the shafts 42 can consequently be displaced in the frame in the transverse direction in parallel motion by the rolling of the toothed wheels 46 on the toothed rods 47. The shafts 42 are likewise set into oscillatory motion which is derived from the shaft 35. For this purpose an angle lever 50 is provided which is loosely mounted on the shaft 35, but is prevented by means of a key from rotating. The one arm of said angle lever is horizontally directed towards the table when the shaft 35 is in the position in which the arms 36 are vertical and the other arm of said angle lever is upwardly directly vertically when the said shaft is in the said position. The horizontal arm of the angle lever 50 is pivotally connected to a horizontally arranged forked arm 51 provided on the one shaft 42 by means of two intermediary members 52, 53. If the shaft 35 is displaced the arms 36 are moved backwards whilst at the same time the one shaft 42 will be turned by the lever 50 through the connecting members 51, 52, 53 in such manner that the arms 43 swing outwardly. The two shafts 42 each carry at their rear end a crank arm 54 which in the case of the one shaft is upwardly directed and in the case of the other shaft is downwardly directed. The two crank arms 54 are connected with one another by means of an adjustable rod 55 so that the motion communicated to the one shaft 42 from the shaft 35 is likewise communicated to the other shaft 42 but in the reverse direction. The two shafts 42 are so adjusted that when the arms 43 are swung inwards to the fullest extent the distance of the arms of the one shaft 42 from those of the other shaft correspond to the breadth of the sheets which are to be delivered. The sheets issuing from the machine without guidance will consequently be exactly guided laterally by means of the oscillating arms 43. In order to prevent the sheets catching on the arms 43 and to avoid turning of the edge on engagement, plates 56 are arranged on the inner side of the arms 43 which plates are bent backwards in the direction of the bronzing machine in order to engage the issuing sheets and to guide them gently into the correct position. The vertically upwardly directed arm of the angle lever 50 displaceably mounted on the shaft 35 is forked and it encloses the front end of the shaft 42 driven by the shaft 35. If the shaft 42 is displaced in the frame by means of the hand wheel 49, then in consequence of this it also carries the angle lever 50 on the shaft 35 with it, so that for the purpose of displacing the shaft 42 its coupling with the shaft 35 does not need to be unclutched and then clutched again.

In order to ensure that the sheets issuing from the machine after leaving the guide bands 4 are capable of readily floating onwards and are easily delivered on to the stack, each sheet on emergence from the bronzing machine is caused to assume a curved shape which gives the sheet greater stiffness than it would possess if it issued from the machine as a flat sheet. For this purpose two outwardly curved plates 57 are arranged on either

side of the path formed by the feed bands 4. The hollowed portion of each plate is directed towards the feed bands. These plates run from the back of the housing 10 enclosing the bronzing machine to the feed shaft 5 for the bands 3 at an acute angle and extend with the lowest part of the curved portion up to the proximity of the outermost feed bands 4. The feed bands 4 are so adjusted that the sheets issuing from the machine are broader than the path formed by the aggregate of the feed bands. The front edge of the sheet issuing from the machine consequently very soon strikes on the plates 57 whereby the sides of the said sheet are upwardly curved. The curved plates 57 are clamped in an adjustable manner on the bridge so that they can be adjusted at any time according to the breadth of the sheet. In consequence of the fact that the sheets issue in curved form from the machine the possibility of the oscillating arms 43 striking too sharply on the sides of the sheet whilst guiding the latter and thus causing the sheet to become damaged is also avoided. The floating properties of the sheets differ according to the thickness or stiffness. For this reason it is preferable to be able to adjust the inclination of the band guides. This adjustment is attained in the simplest manner by mounting the front feed shaft 5 in corresponding curved slots 58 in the frame 12, in which slots it can then be clamped in the desired position by means of clamping screws.

The device described renders it possible to deliver the sheets emerging from the bronzing machine and stack them into a properly arranged stack whilst it also presents the particular advantage that the stacking of the sheets is quite independent of the delivery period of the successive sheets. Moreover, the adjustment of the table controlling gear does not necessitate any excessive care. The removal of the whole stack together with the table is effected by pushing a trolley under the said table after the latter has reached its lowest position (in which, as already mentioned, the control gear has been automatically released) and then lifting the table together with the stack off the angle irons 26 whereupon the table together with the stack can be removed by means of the trolley to any desired place.

After a new plate has been inserted and has been cranked up by means of the handle 16 a further delivery can then be effected. Through the cranking up the projection 27^a of the table again strikes on an arm 34 which again couples up the worm 28 through the link 34^a. In order to be able to move the crank handle 16 it is necessary to provide a coupling by means of which the worm wheel 15 can be clutched and unclutched from the shaft 14. The machines for which the new sheet delivering and stacking device is intended to be employed, for example, bronzing machines, are often moved from place to place in the machine shop in order to render it possible to employ them with different offset presses. For this reason it is preferable to construct the frame of the stacking device so that it can be readily transported from place to place, for instance by mounting it on suitable rollers.

The rollers 59 are mounted on bolt members 60, which are in turn loosely mounted in brackets 61 arranged on the inside of the feet of the frame 12. Each of these bolt members is acted upon at its upper end by a screw 62, by means of which the extent to which the bolt members penetrate into the holes of the brackets can be adjusted. Whilst the delivery device is in use the screws 61 are screwed back so far that the frame stands firmly on its feet. If, however, the sheet delivery device is to be moved to another place, the screws 61 are screwed down further, whereby the bolts 60 are pressed out of the brackets and the frame is raised, so that its load is then carried on the rollers 59. When the sheet delivery device is constructed so as to be transportable, the band guide 4 and the arms carrying the rollers 6 are preferably mounted in the frame of the said device itself instead of being mounted in the machine for which the device is to be employed.

I claim:

1. In sheet delivering and stacking devices for printing machines and the like having means for causing the delivery table to descend as the size of the stack increases, the combination of: a frame in which the delivery table is mounted, three shafts mounted in said frame and arranged in U-form, means for transmitting oscillatory rotary motion to one of said shafts, oscillating jogger arms mounted on said last named shaft, means for transmitting said motion from said last named shaft to the second shaft arranged at right angles to it, oscillating jogger arms mounted on second shaft, means for transmitting said motion in the reverse direction from said second shaft to the third shaft running parallel to said second shaft and oscillating jogger arms mounted on said third shaft.

2. In sheet delivering and stacking devices for printing machines and the like having means for causing the delivery table to descend as the size of the stack increases, the combination of: a frame in which the delivery table is mounted, three shafts mounted in said frame and arranged in U-form, a shaft provided on the printing machine and adapted to transmit oscillatory rotary motion to one of said shafts, oscillating jogger arms mounted on said last named shaft, means for transmitting said motion from said last named shaft to the second shaft arranged at right angles to it, oscillating

jogger arms mounted on said second shaft, means for transmitting said motion in the reverse direction from said second shaft to the third shaft running parallel to said second shaft and oscillating jogger arms mounted on said third shaft.

3. In sheet delivering and stacking devices for printing machines and the like, a combination as specified in claim 1, in further combination with: two racks arranged transversely to the frame; two toothed wheels running on each of said racks, by means of which toothed wheels said second and third parallel shafts are suspended from said racks, the two toothed wheels from which the second shaft is suspended being mounted on a common shaft, and the two toothed wheels from which the third shaft is suspended being likewise mounted on a common shaft; and two hand wheels provided respectively on said common shafts and adapted to rotate these latter.

4. In sheet delivering and stacking devices for printing machines and the like, a combination as specified in claim 1, in further combination with: plates carried on each of the oscillating arms arranged on the parallel shaft on the inwardly directed side, said plates being bent backwards in the direction of the printing machine.

5. In sheet delivering and stacking devices for printing machines and the like a combination as specified in claim 1, in further combination with: a coupling device having a forked arm within which the end of the second shaft driven by said first named shaft is arranged in such manner than on displacement of said second shaft in the frame the coupling device is displaced on said first named shaft at the same time.

6. In sheet delivering and stacking devices for printing machines and the like a combination as specified in claim 1, in further combination with means for rendering the device transportable.

7. In sheet delivering and stacking devices for printing machines and the like, the combination as specified in claim 1, in further combination with: brackets arranged on the interior of the feet of the frame, bolts arranged loosely in holes in said brackets, rollers mounted on said bolts and serving to render the device transportable and screws arranged above said bolts in such manner as to enable the position of said bolts to be adjusted by screwing and unscrewing.

In testimony whereof I have signed my name to this specification.

EDUARD WEINGÄRTNER.