

April 9, 1929.

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1,708,157

APPARATUS FOR FEEDING FOLDED OR UNFOLDED SHEETS
TO PRINTING, FOLDING, OR OTHER MACHINES

Filed Oct. 13, 1926

2 Sheets-Sheet 1

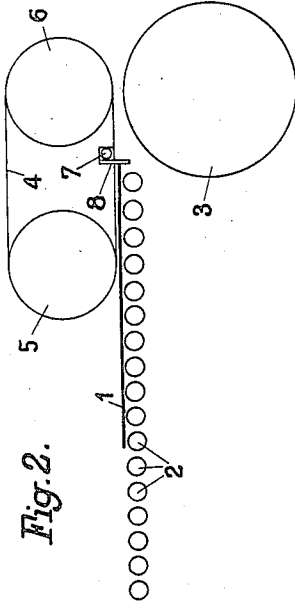


Fig. 1.

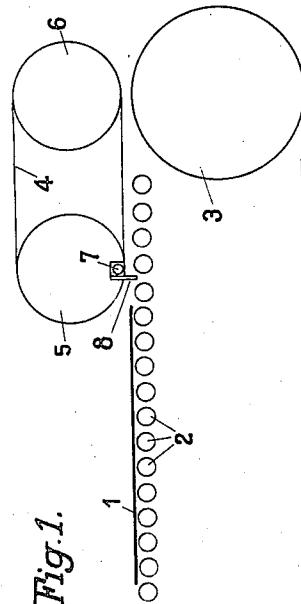


Fig. 2.

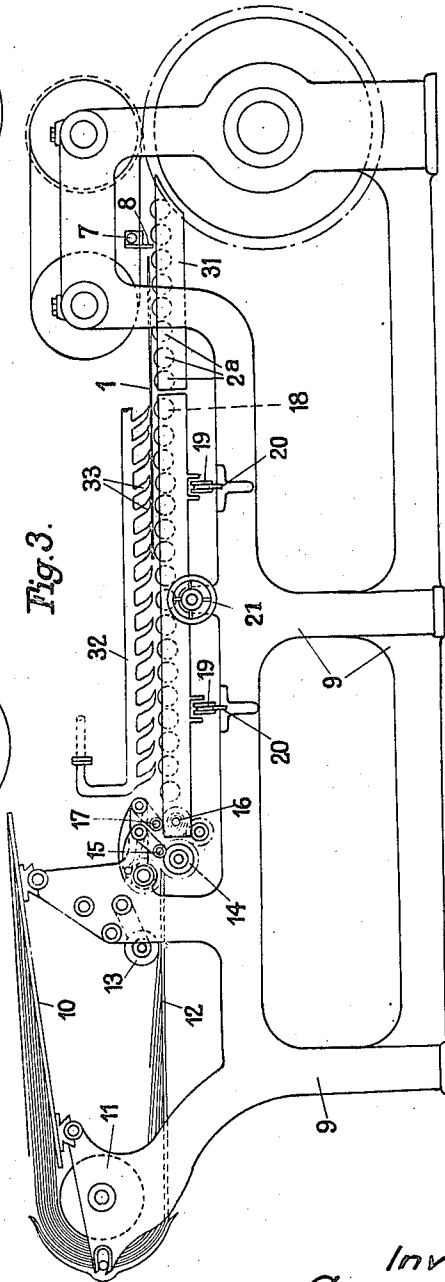


Fig. 3.

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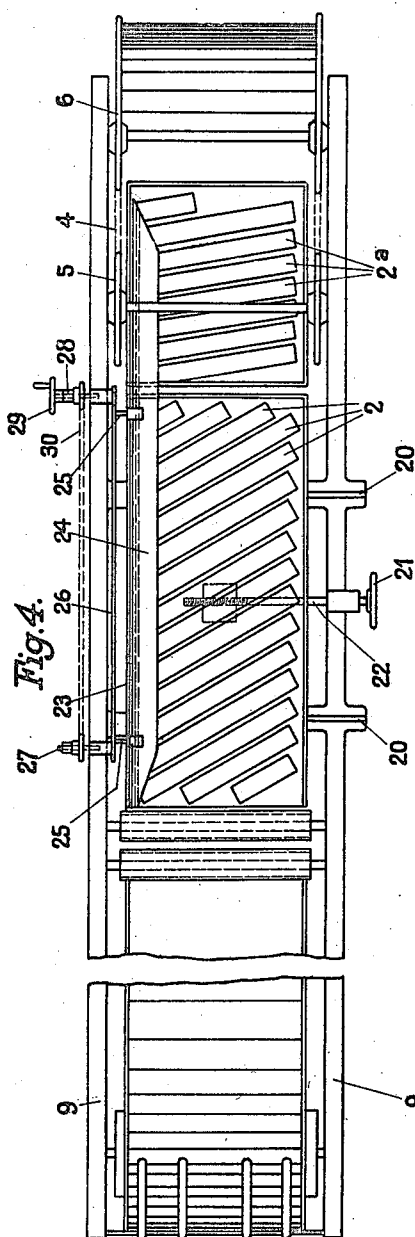
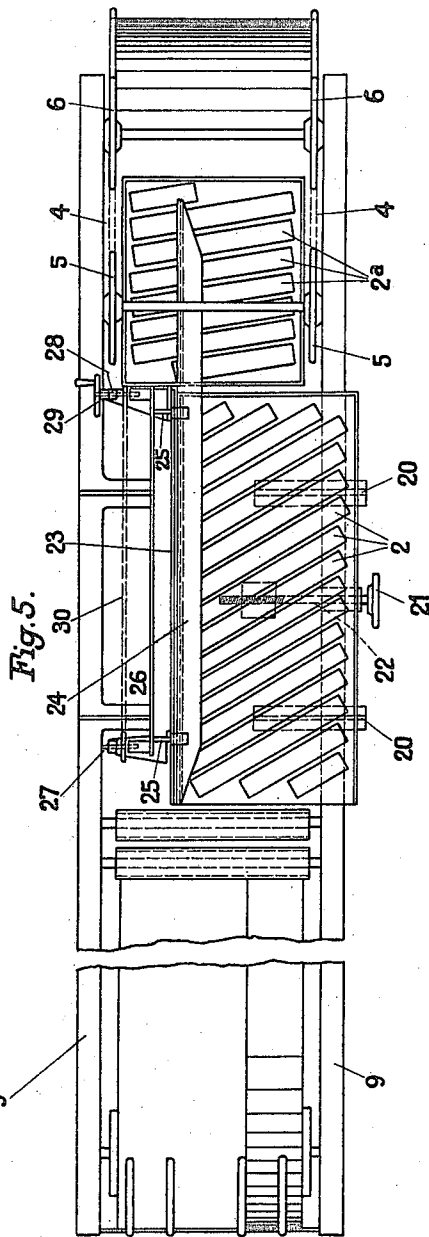
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APPARATUS FOR FEEDING FOLDED OR UNFOLDED SHEETS
TO PRINTING, FOLDING, OR OTHER MACHINES

Filed Oct. 13, 1926

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FEEDING FOLDED OR UNFOLDED SHEETS TO PRINTING, FOLDING, OR OTHER MACHINES.

Application filed October 13, 1926, Serial No. 141,272, and in Germany March 27, 1925.

With some types of apparatus for feeding folded or unfolded sheets to a printing, folding or other machine each sheet in turn is moved against stationary stops, whereby it is registered and brought to rest, and then is fed to the machine, or gripped by the mechanism of the machine while in the position of rest. Certain disadvantages arise from the sheet coming to rest. In the first place a substantial loss of time is involved, or, in other words for a given rate of feed the movements of the feed mechanism must be more rapid than would be the case if there were no period of rest. There is also a limit to the speed at which the feed mechanism can move, and this may be below the rate at which the machine is capable of taking sheets. In the case of machines capable of using sheets uninterruptedly, for example rotary printing presses, the period of rest involves additional waste. In a rotary press, for example, the circumference of the cylinders must substantially exceed the length of the sheets, to allow for the gap between successive sheets. The second of two sheets, therefore, cannot be registered until the first has been removed from the registering marks, so that between the sheets on the cylinders there is a gap proportional to the angle through which the cylinders rotate during the changing of sheets at the register stops. Consequently a position of the cylinder surface is idle, and the circumferential velocity is greater than it would be, for the same output, if there were no periods of rest in the sheet feed.

According to my invention these defects are removed by arranging that after being detached from the pile, by hand or mechanically, the sheets are fed to the machine without any interruption of their movement while they are being registered. By this means I am able to obtain an increased rate of feed without increasing the velocity at which the sheets travel, and the feed is improved by the fact that the travel of the sheet is not first retarded and stopped, and then accelerated again. The sheet taken from the pile may be moved along a stationary lateral guide for registering it, or caused to strike with its front edge registering abutments or marks, which travel in the direction of the sheet movement till withdrawn from the path of the sheet, or I may

use a lateral guide together with travelling abutments registering the front edge.

The improved apparatus for feeding sheets is illustrated in the annexed drawings, which show an example of the apparatus according to my invention.

Figs. 1 and 2 are diagrams illustrating two phases of the feed operation.

Fig. 3 is a side view of the apparatus, and Figs. 4 and 5 are plan views thereof, with certain parts of the mechanism in different positions.

Referring first to Figs. 1 and 2, the sheet 1 is moved by rollers 2 towards the gripper roll 3 of a rotary press. Above its path two endless chains or bands 4 working on pulleys 5, 6 carry a transverse rod 7, to which are fixed fingers or abutments 8. The latter extend into the path of the sheet when the rod 7 is at the lowest point in its orbit of travel, or, in other words, when the portions of the chains carrying the rod form part of the lower stretches of the chains. The abutments travel at approximately the speed at which the sheet is to pass through the press, and their movement is timed so that they meet the grippers on the roll 3 and deliver the sheet to the grippers.

The feed rollers have a circumferential speed exceeding that of the pulleys, so that they push the sheet up against the registering marks or abutments 8 while the latter are travelling from the pulleys 5 to the pulleys 6.

I may use bands 4 whose length is a multiple of the circumference of the gripper cylinder 3, and make the bands carry a plurality of appropriately spaced rods 7 and fingers 8. Alternatively, the circumference of the cylinder may be multiple of the length of the bands.

It is not necessary that the velocity of the abutments be precisely equal to the circumferential velocity of the cylinder. Moderate differences do not matter, provided that the respective speeds and dimensions are so proportioned that the registering marks coact properly with the grippers. I use the term grippers in a wide sense for any appropriate device which will receive the sheet and take it into the press.

As shown in Figs. 3, 4 and 5 the bands 4 are disposed above the delivery end of a feed table, whose frame 9 supports the pul-

leys. At the receiving end of the feed table there is an elevated, inclined board 10, for supporting the sheets, which are bent round a roll 11, between the latter and
 5 a segmental guide, and extend on to a board 12, on which the sheets are loosely piled, but from which they are taken separately by friction or wiper wheels 13 of a known kind. Each separated sheet is fed
 10 at low speed by a set of feed rolls 14, 15 to a set of feed rolls 16, 17, which feed it onwards at higher speed. To allow of the sets of feed rolls working at different speeds the top rolls 15 are lifted, by means of cam
 15 mechanism, when the top rolls 17 are in operation, and vice versa.

The feed rolls 2 are mounted obliquely in a transversely adjustable frame 18, beyond which, towards the delivery end of the table, there is a fixed frame 31 with feed rolls 2^a disposed at a less acute angle. Along one side of the frame 18 there is a lateral sheet registering guide or ruler 23, having a
 20 flange 24 for preventing wrinkling of the sheets. The sheets are moved up against this guide 23 owing to the obliquity of the rolls. The guide or ruler is adjustable on the frame 18, for correcting any slight irregularities which may have occurred in
 25 preparing the batch of sheets dealt with. The guide is fixed to a bar 26 by means of two bolts 25, at least one of which operates as a set screw. The bar 26 is engaged with two screw spindles 27, 28. The spindle 28
 30 has a hand wheel 29, for turning it, and is connected to the other spindle by means of a chain and sprocket wheels 30, so that by turning the wheel 29 both spindles are uniformly rotated.

40 The frame 18 has wheels 19 running on rails 20, and can be adjusted transversely of the direction of feed by means of a screw spindle 22 and hand wheel 21.

Fig. 4 shows the frame 18 set for dealing
 45 with sheets of the largest size, and Fig. 5 shows it set for the smallest sheets, the shifting of the guide 23 causing the small sheets to be alined accurately with the printing machine.

50 A blower 32 with downwardly and forwardly directed nozzles 33 emits streams of air which hold the sheets on the rolls 2 and assist in feeding them forwards.

Owing to the reduced obliquity of the
 55 rolls 2^a the sheets are thrust with reduced force against the guide 23 at the delivery end of the feed table, where the abutments 8 comes into operation.

It will be understood that I may so arrange the grippers and the abutments 8, and
 60 so time the feed, that the sheets are fed to the press in practically direct sequence, with no gap other than that required for the abutments 8.

65 In practice, the rod 7 is of a length ex-

ceeding the width of the widest sheet which the machine is designed to handle, and the fingers 8 are slidably mounted on the rod for adjustment toward and from each other to suit the width of the sheets being fed,
 70 suitable means being provided to retain the fingers in any position of adjustment. The points of these fingers, as shown, extend below the top plane of the rollers 2^a, and, consequently, below the plane of travel of
 75 the sheets, in order to ensure stopping contact of the sheets with the fingers and to prevent the sheets from passing beneath the fingers. As the rod 7 lies above the level of the gage 23 when in its lowermost position, i. e., when upon the lower stretches of the chains 4, and as both fingers 8 always
 80 lie on one and the same side of the gage 23, i. e., at the right hand side in Figures 4 and 5, viewed in the direction of travel of the sheet, the rod and fingers may travel without interference from the gage. In order to avoid interference between the fingers 8 and rolls 2^a, the latter may be grooved or made
 85 up of spaced disks to give proper clearance to the fingers on their travel. The blower terminates sufficiently far in rear of roll 5 to prevent contact of the rod 7 and fingers 8 therewith.

For dealing with sheets of different
 90 lengths appropriate adjustments of the registering and feed devices are made.

Having thus fully described my invention, I claim:

1. An apparatus for feeding sheets from
 100 a pile to a printing, folding or other machine comprising means for taking the sheets separately from the pile, a feeder embodying obliquely arranged feed rolls for feeding the sheets taken from the pile, the
 105 feed rolls which are near the delivery end of the feeder being less oblique than the preceding feed rolls, a lateral sheet registering guide along which the sheets are caused to travel by the action of the feed rolls, abutments movable temporarily into the path of the sheets and in the direction of feed for registering the sheets at their front edges, and means for moving said abutments at a
 110 speed slower than that of the feed rolls.

2. An apparatus according to claim 1, with means for placing registering abutments temporarily in the path of the fed sheets and moving them in the direction of the feed without stopping the sheets, the said registering abutments travelling parallel with the surface of a feed table having means tending to feed the sheets at a speed exceeding the speed of the abutments, in combination with means for laterally registering the sheets
 120 consisting in a lateral guide and feed rolls in the feed table oblique to the guide.

3. An apparatus according to claim 1 with means for placing registering abutments temporarily in the path of the fed sheets and
 130

moving them in the direction of the feed without stopping the sheets, the said registering abutments travelling parallel with the surface of a feed table having means to feed
5 the sheets at a speed exceeding the speed of the abutments, in combination with means for laterally registering the sheets consisting in a lateral guide, and feed rolls in the feed table oblique to the guide, the feed rolls near
10 the delivery end of the feed table being less oblique than the preceding feed rolls.

4. An apparatus according to claim 1 with means for placing registering abutments temporarily in the path of the fed sheets and
15 moving them in the direction of the feed without stopping the sheets, the said registering abutments travelling parallel with the surface of a feed table having means to feed the sheets at a speed exceeding the
20 speed of the abutments, in combination with

means for laterally registering the sheets consisting in a lateral guide, and feed rolls in the feed table oblique to the guide, and means for transversely adjusting the feed table with the feed rolls. 25

5. Apparatus as claimed in claim 1, in which the feeding means includes a feed table, with means for transversely adjusting the feed table.

6. Apparatus as claimed in claim 1, with means for adjusting the lateral sheet registering guide angularly to or parallel with the line of feed. 30

7. Apparatus as claimed in claim 1, including a feed table, means for feeding the sheets along said table, and means for feeding the sheets to said table at at least two speeds of progressively increasing character. 35

In testimony whereof I affix my signature.

GEORG SPIESS.