Feb. 27, 1934. H. FANKBONER 1,949,152

DELIVERY MECHANISM

Filed March 10, 1931 3 Sheets-Sheet 1

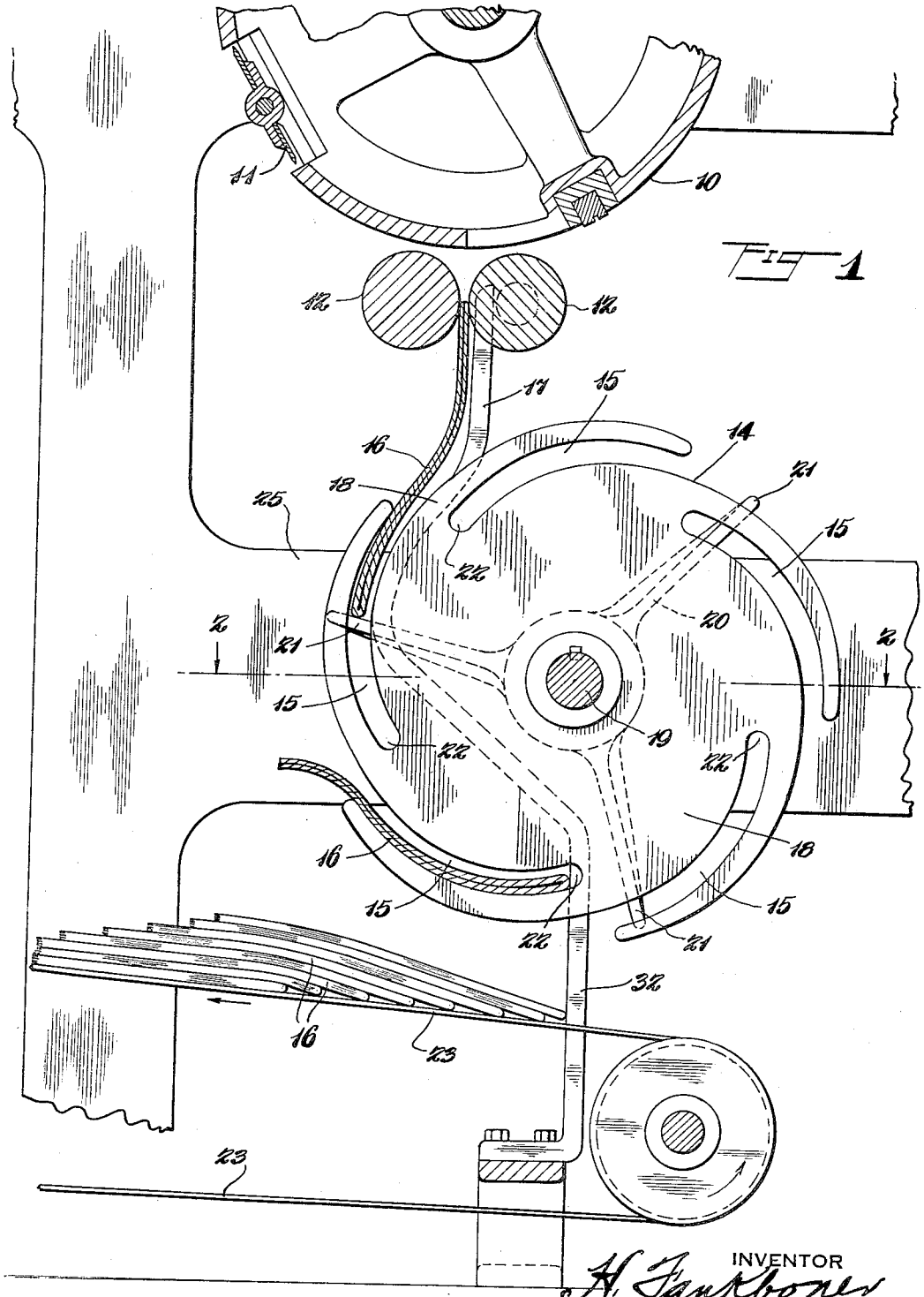

Fig 1

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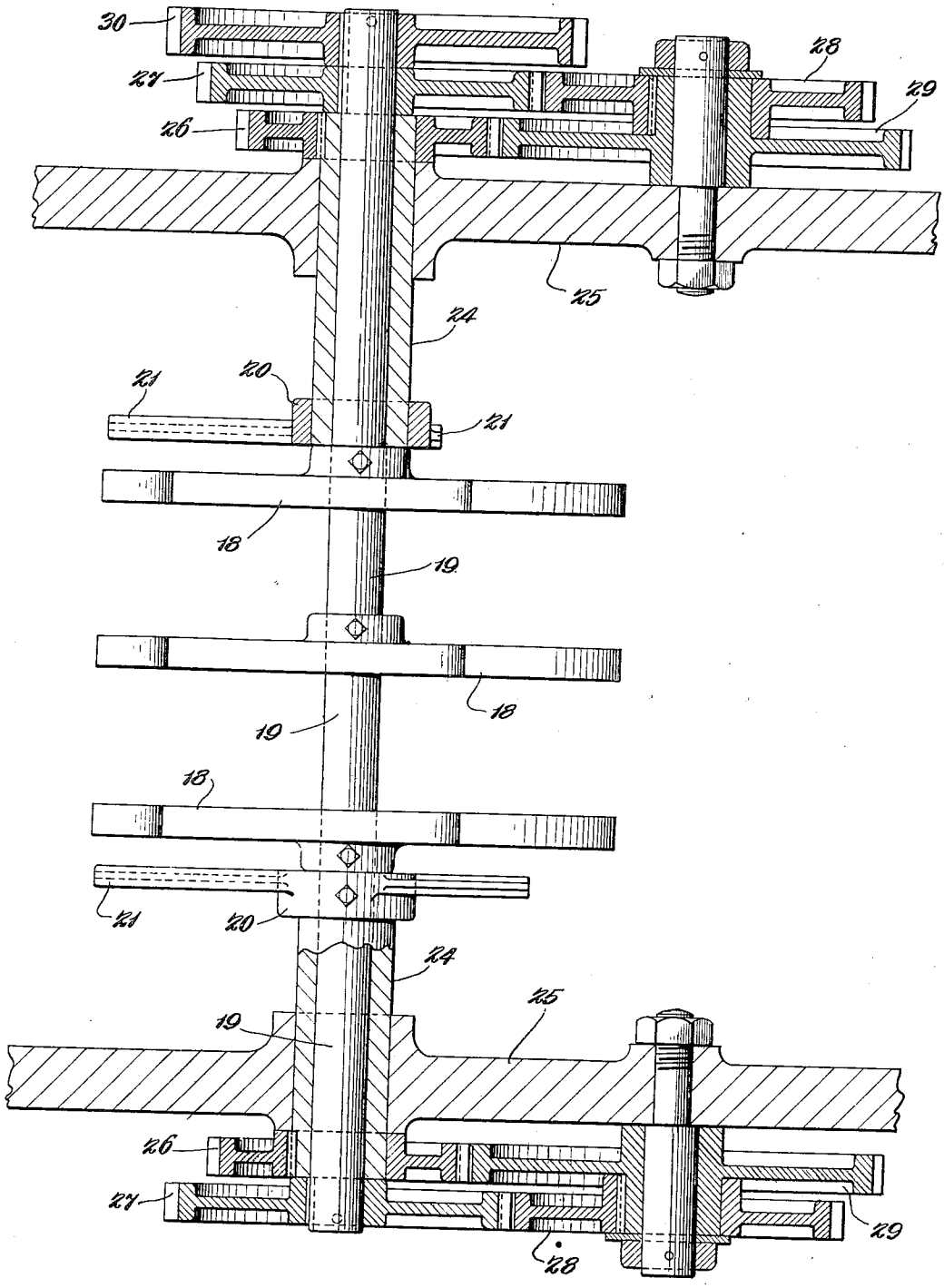

Fig. 2.

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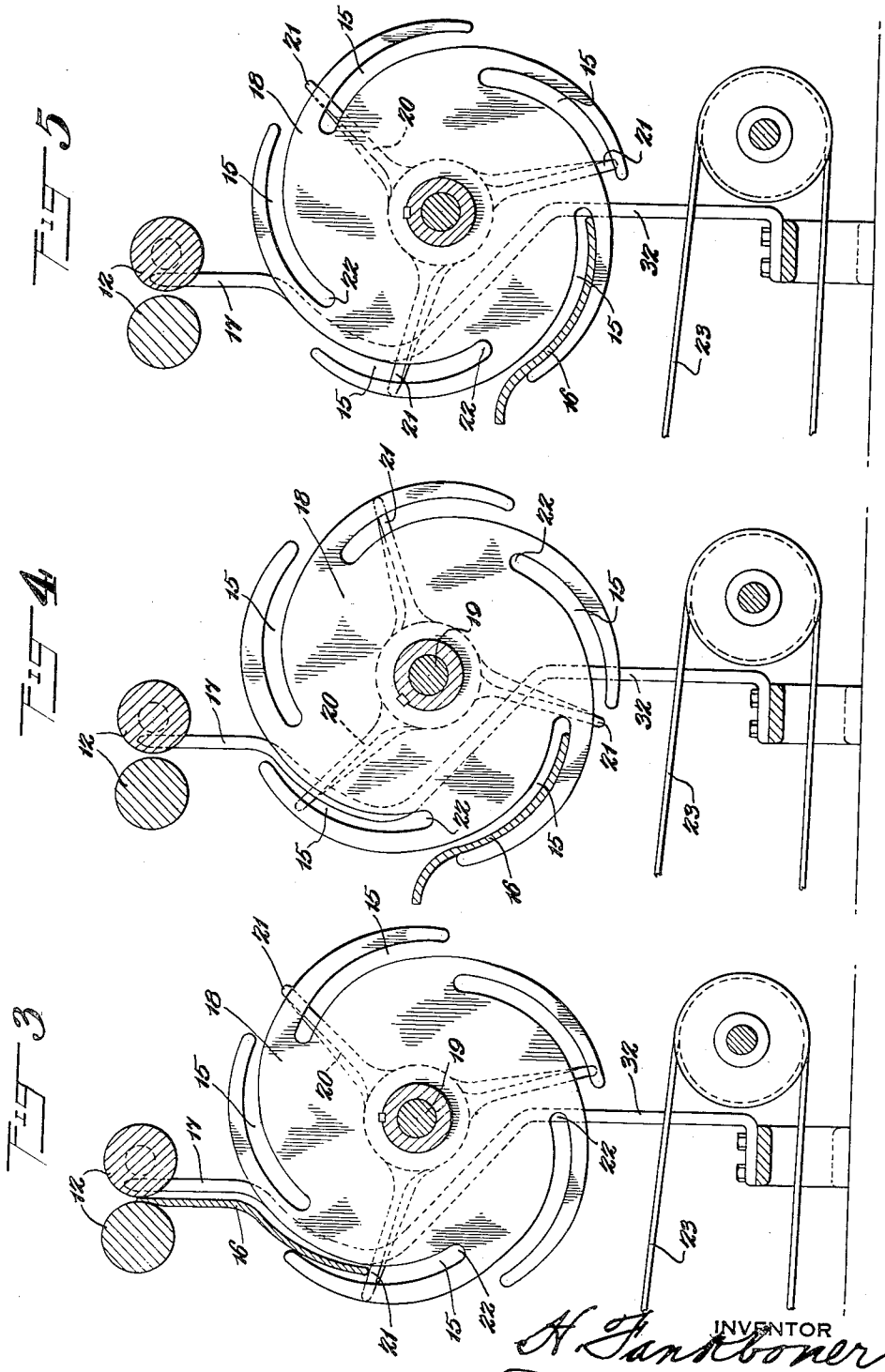

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DELIVERY MECHANISM

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18 Claims. (Cl. 271—80)

The present invention relates to delivery mechanism, and more particularly to such mechanism for use with the high-speed folding mechanism of a rotary newspaper press.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:

Fig. 1 is a central vertical section through the present preferred and illustrative embodiment of the invention;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1; and

Figs. 3, 4 and 5 are diagrammatic views illustrating the manner of operation of the mechanism shown in Figs. 1 and 2.

The present invention has for its object the provision of means for increasing the speed at which the delivery mechanism of a printing press can be operated and means for improving the operation of the delivery mechanism at high speeds. A further object is the provision of means for maintaining the folded product under complete control at all times while it is moving in the delivery mechanism. Still another object is the provision of means for progressively slowing the movement of the product after it leaves the folding mechanism. The invention also provides a novel and improved method of handling the products after completion of the folding operation.

In accordance with the present preferred embodiment of the invention, the delivery mechanism for delivering the printed and folded products from the press comprises a delivery fan having a plurality of flies for receiving the folded products as they leave the folding mechanism. Associated with the fan are members projecting within the pockets and advancing with them at a speed intermediate that of the flies and products so that the folded products are checked in their speed first by the projecting members and later by the flies, after which the products are stopped and finally dropped on the usual delivery belts.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory of the invention but are not restricted thereon.

The illustrative embodiment of the invention is shown in connection with a conventional folding mechanism in which the sheets are folded from a folding cylinder 10 by means of the usual folding blade 11 by tucking the sheets between the usual folding rollers 12.

Below the folding rollers 12 is mounted the delivery mechanism which comprises a rotary fan 14 provided with a plurality of flies 15 into which the folded products 16 are guided from the folding rollers by the usual guides 17. This rotary fan in the present embodiment comprises a plurality of disc-like members 18 fixedly mounted on shaft 19 and rotating therewith, the fan discs each being provided with a plurality of spiral slots or flies 15. The slots of each member 18 register with the slots of the other members and form the flies for receiving the folded products while carrying them to the delivery belt.

Means are also provided, in accordance with the present invention, for checking the speed of the folded products before the products come in contact with the bottoms of the fan flies, as well as for maintaining the product under complete control as it leaves the folder, thereby reducing the tendency of the product to rebound and also preventing twisting of the product as it falls at a high speed from the folding rollers. These means also permit the slots or flies 15 to be made much deeper than usual, thereby effecting a better handling of the product and reducing the tendency of the trailing end to fly out due to centrifugal force. As embodied, a pair of spiders 20, each provided with a plurality of radially extending stops or arms 21, is mounted coaxially with the fan members 18 and rotates therewith, but at a slightly greater speed. As the folded product 17 falls from the folding rollers, its speed is first checked by the rotating stops 21, which are constantly advanced relative to the fan flies 15. The speed of the products 17 is again checked as the product comes in contact with the bottom 22 of the fan flies and the product is then stopped and finally delivered onto the moving delivery belt 23 in the usual manner. The rotating stops 21 are mounted at the ends of the series of fan members 18 and are securely fastened to the inner ends of the driving sleeves 24 surrounding the fan shaft 19, and are

also journaled in the side frames 25 of the folding unit.

As embodied, the fan members 18 are each provided with five flies 15 and each set of rotating stops 20 comprises three radial arms 21, although the number of flies and radial arms may be varied as desired.

Means are also provided for driving the radial arms and the fan members at predetermined relative speeds so as to properly time the flies and stops relative to each other and the folded products. As shown in the drawings, the radial arm supporting and driving sleeves 24 are each provided with a gear 26, which are driven from gears 27 through the gears 28, 29, rotatably mounted on the side frames 25. Gears 27 are fast on the main shaft 19 and are driven by means of gear 30 which is also fast on the main shaft 19. Gear 30 receives its power from the folding mechanism, thereby timing the delivery mechanism with the folding mechanism. The gear ratio of the gearing just described is such that the speeds of the radial arms and flies is inversely proportional to the number of arms and flies, and in the present embodiment, the flies are driven at three-fifths the speed of the radial arms.

Figures 3 to 5 of the drawings illustrate the manner of operation of the present embodiment of the invention.

As shown in Figure 3, the completion of the discharge of the folded product from the folding rollers is just being effected, and the head of the folded product has been guided into the fly of the delivery fan. The product initially moves downwardly at a relatively fast speed and just as the product leaves the folding rollers 12, the head of the product contacts with a moving radial arm 21, moving at a slightly slower speed. This checks the speed of the product, and at the same time prevents the product becoming twisted as it drops by reason of the ends dropping at unequal speeds. Radial arm 21 continues to rotate at a greater speed than the fan fly 15, while supporting and maintaining the product under control and finally reaches the position shown in Figure 4 in which the product has come in contact with the bottom 22 of the fly 15, thereby further checking its speed. On further rotation of the fan, the folded edge of the product is moved against the fixed stop 32 and the product is pushed out of the fly dropping onto delivery belt 23, which conveys the product away from the delivery mechanism.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principle of the invention and without sacrificing its chief advantages.

What I claim is:

1. The method of delivering products from a folder to a rotary fan which includes positively checking the speed of each product intermediate the folder and fan.

2. The method of delivering products from a folder to a rotary fan which includes engaging and supporting each product by its bottom edge as soon as it is released from the folder thereby preventing free falling of the product.

3. The method of delivering products from a folder to a rotary fan which includes engaging and supporting the product by its bottom edge as soon as it is released from the folder thereby preventing free falling of the product and checking the speed of the product in several stages.

4. The method of delivering products from a folder to a rotary fan which includes feeding the products from the folder at a relatively high speed, checking the speed of each of the products and feeding them into a fan fly travelling at a slower speed.

5. The method of delivering products from a folder to a rotary fan which includes feeding the products from the folder at a relatively high speed, supporting the product by its ends as it is released from the folding mechanism and checking the speed of each product while the product is dropping into the fan.

6. The method of delivering products from a folder to a rotary fan which includes feeding the products from the folder at a relatively high speed, engaging the bottom edge of each product as it is being fed into the fan fly, supporting the product by its bottom edge, checking the speed of each product, moving the product relatively to the fan and stopping the product relatively to the fan.

7. A delivery mechanism for folding mechanisms including in combination means for initially and positively checking the speed of each product as it is fed from the folding mechanism at a relatively high speed and a moving fan fly moving at a relatively slow speed to receive the folded product.

8. A delivery mechanism for folding mechanisms including in combination means for initially and positively checking the speed of the product as it is fed from the folding mechanism at a relatively high speed, a rotary fan for receiving the folded products travelling at a higher speed than the fan and a conveyor belt onto which the products are delivered.

9. A delivery mechanism for folding mechanisms including in combination a rotary fan for receiving folded products from the folder, and means for positively checking the speed of each of the products between the folder and fan.

10. A delivery mechanism for folding mechanisms including in combination a rotary fan for receiving folded products from the folder, said fan being provided with a plurality of flies, and stops moving faster than said flies for initially checking the speed of the products as they are fed into a fly.

11. A delivery mechanism for folding mechanisms including in combination a rotary fan for receiving folded products from the folder, said fan being provided with a plurality of flies, and stops moving faster than said flies for initially checking the speed of the products as they are fed into a fly, and a stationary stop for removing the products from the fly.

12. In a delivery mechanism for folding machines, a rotary fan into which the products are delivered from the folding mechanism said fan having means for engaging each product as soon as the product is released from the folding machine thereby preventing free falling of the product.

13. A delivery mechanism for folding machines including in combination a rotary fan having a plurality of flies to receive folded products from the folder, and a less number of members projecting into the flies and in a position to obstruct movement of the products relatively to the flies, said members moving at a greater speed than the flies.

14. A delivery mechanism for folding machines including in combination a rotary fan

having a plurality of flies for receiving the folded products from the folding machines, and a less number of members mounted coaxially with the fan and moving at a greater speed than the fan and obstructing movement of the products as they are fed to the fan.

15. A delivery mechanism for folding mechanisms including in combination a rotary fan having a plurality of flies, a plurality of arms extending into the flies and mounted coaxially with the fan, the number of arms being less than the number of flies and means for driving the arms at a speed greater than that of the fan.

16. A delivery mechanism for folding mechanisms including in combination a rotary fan having a plurality of flies, each to receive a folded product from the folding mechanism, a plurality of sets of rotatably mounted arms coaxial with the fan, the number of sets of arms being less than the number of flies and means for rotating the arms at a greater speed than the fan is rotated.

17. A delivery mechanism for folding mechanisms including in combination a rotary fan having a plurality of flies, each to receive a folded product from the folding mechanism, a plurality of sets of arms rotatably mounted coaxially with the fan and projecting into the fan flies and in the path of the folded products fed to the fan, the number of sets of arms being less than the number of flies, and means for rotating the arms a number of revolutions equal to the number of flies while the fan is rotated a number of revolutions equal to the number of sets of arms.

18. A delivery mechanism for folding mechanisms including in combination a rotary fan having a plurality of flies each to receive a folded product from the folding mechanism, a plurality of sets of arms rotatably mounted coaxially with the fan and projecting into the path of the folded products as they are fed into the flies, the speed of the fan flies and arms being inversely proportional to their number.

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