May 29, 1956 O. A. FORS 2,747,503

ROTARY PRINTING PRESS SHEET TAKE-OFF-DEVICE

Filed July 7, 1952 3 Sheets-Sheet 1

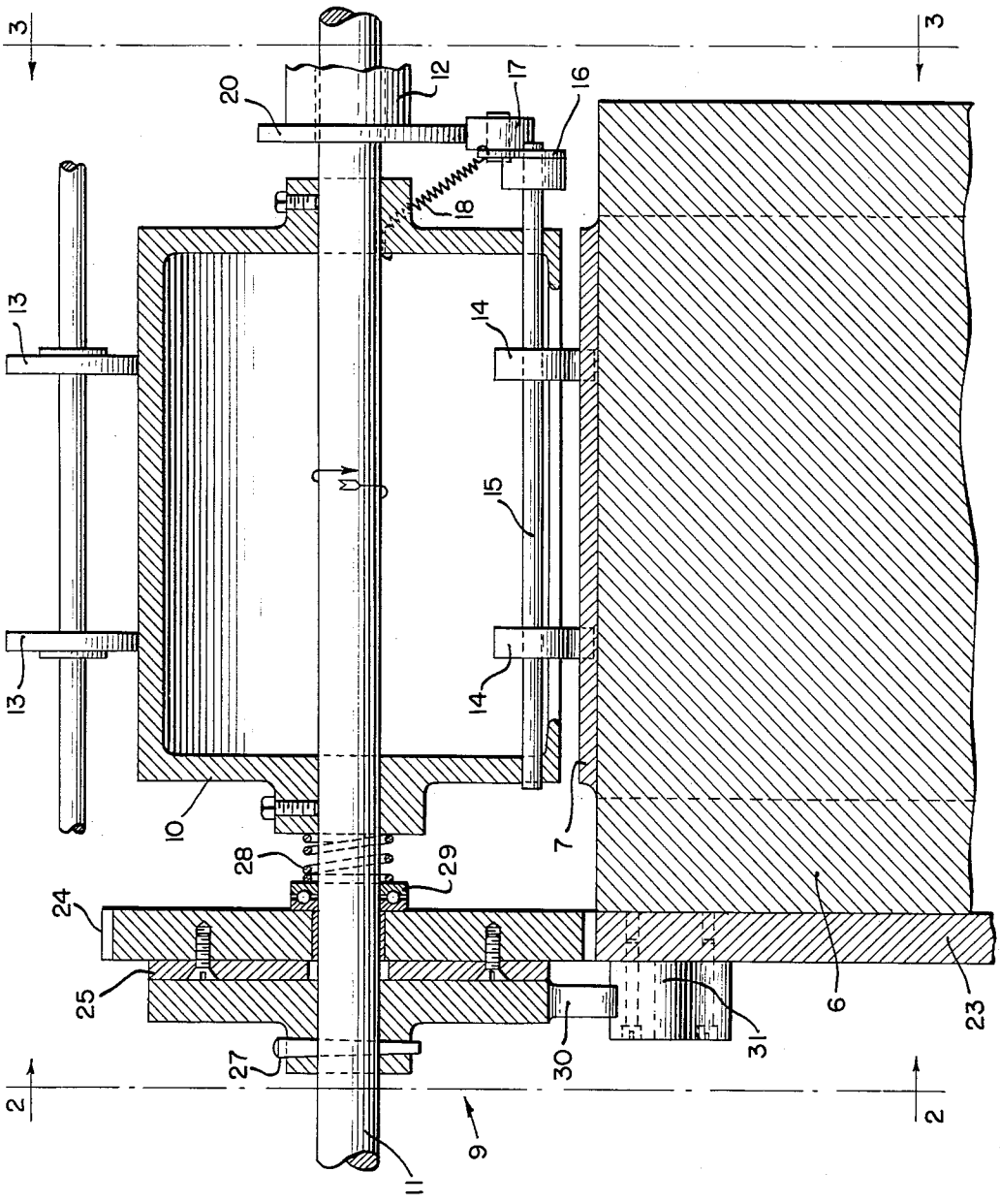


FIG. 1

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Filed July 7, 1952 3 Sheets-Sheet 2

FIG. 2

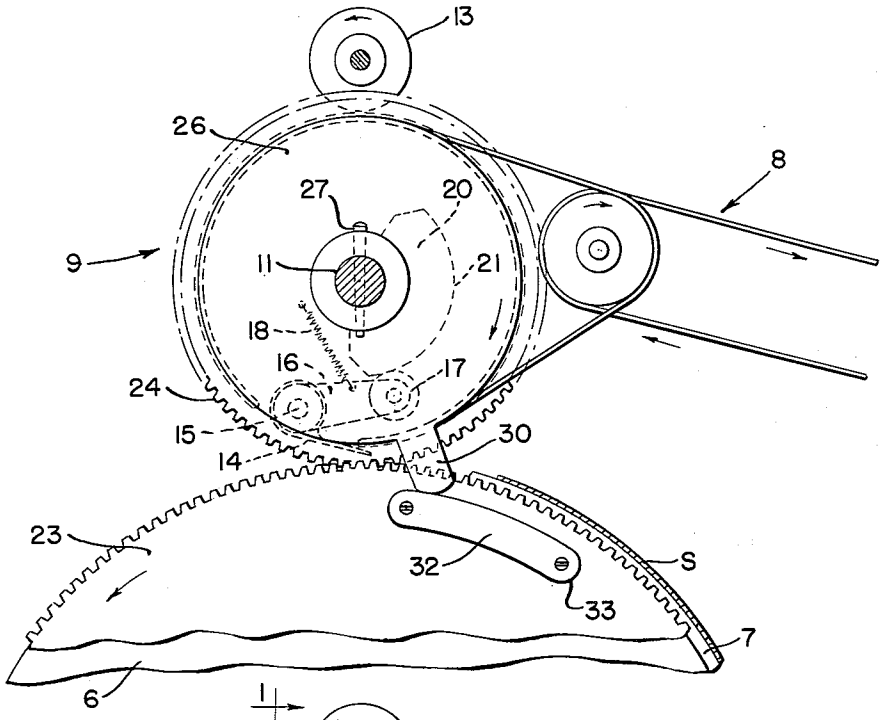
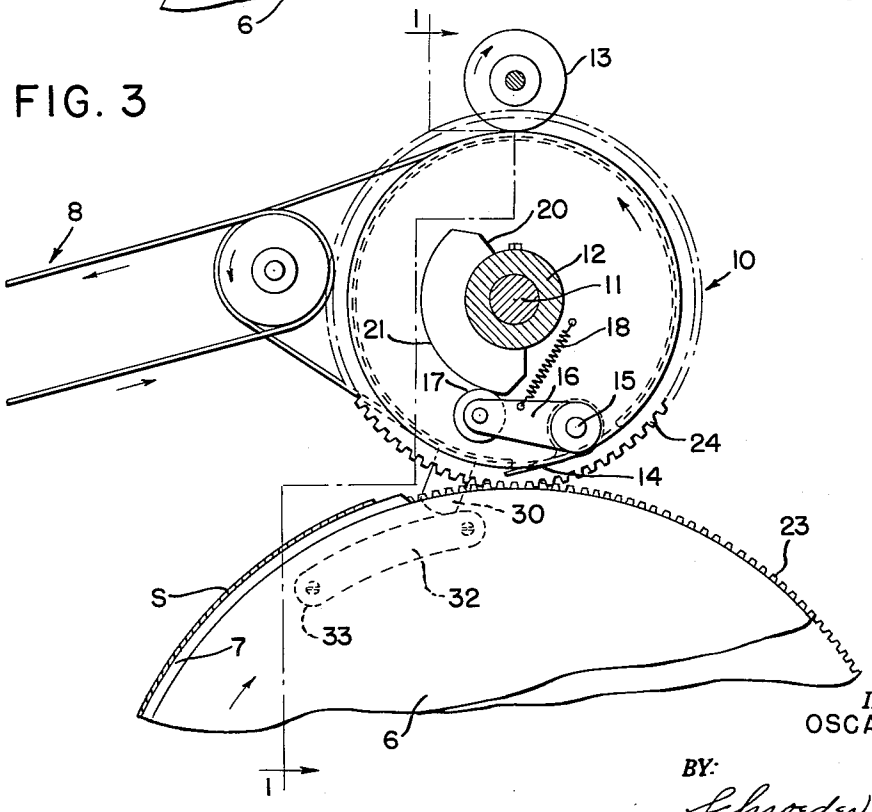


FIG. 3



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Filed July 7, 1952 3 Sheets-Sheet 3

FIG. 4

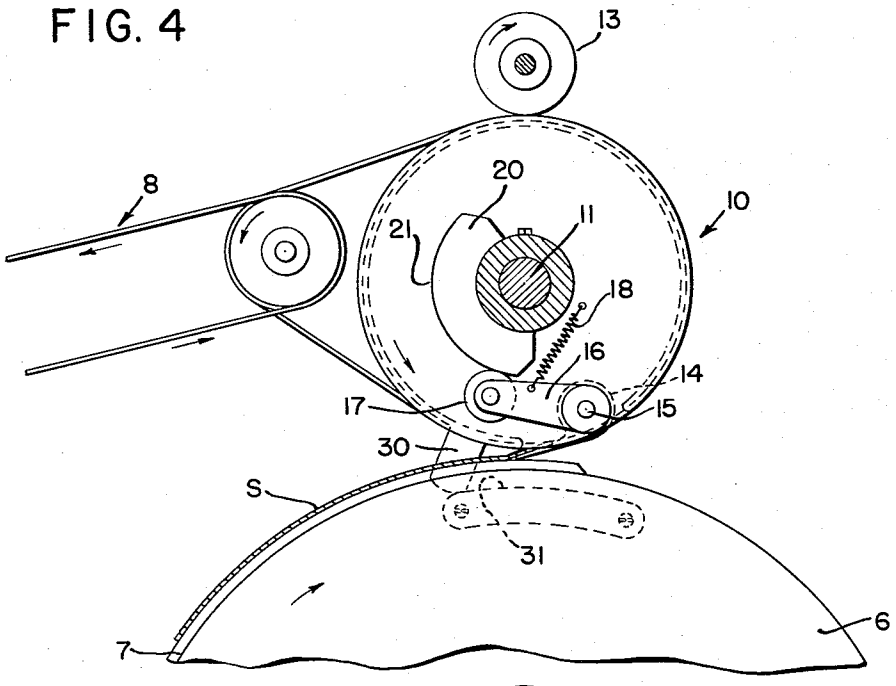
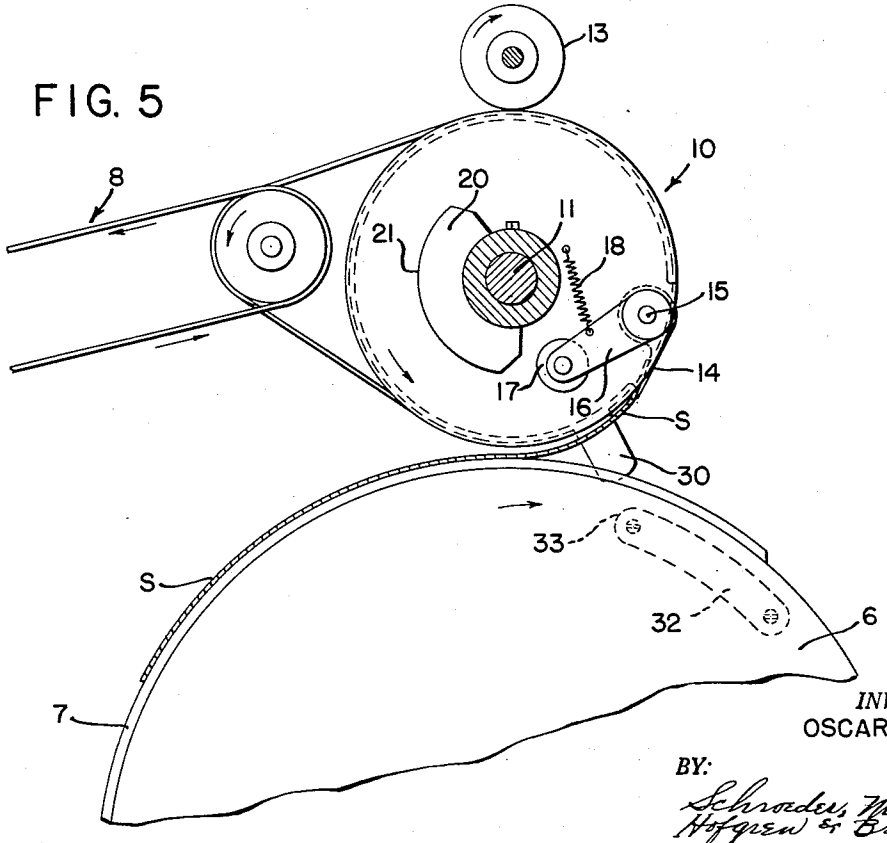


FIG. 5



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ROTARY PRINTING PRESS SHEET TAKE-OFF-DEVICE

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Application July 7, 1952, Serial No. 297,543

3 Claims. (Cl. 101—232)

This invention relates to a sheet pick-up device for a printing press and more particularly to an intermittently driven sheet pick-up device for taking printed sheets from a rotary press in proper timed relation.

The primary object of the invention is to provide a fully automatic rotary member adapted to be intermittently driven in timed relation with a press to take each printed sheet from the printing roll.

Another object of the invention is to provide a fully automatic sheet pick-up device having a sheet gripping finger disposed in a position at rest until a sheet has advanced to gripping position.

Another object of the invention is to provide a sheet pick-up device for automatically taking printed sheets from a printing roll and delivering them to a conveyor in timed relation to the printing roll.

A further object is the provision of a sheet pick-up device having an intermittent rotary drive timed in relation to the printing roll so that the pick-up device is at rest until the sheet is advanced to gripping position.

The invention is illustrated in an exemplary embodiment in the accompanying drawings, in which:

Figure 1 is a vertical broken sectional view through approximately the center of the pick-up device and taken substantially along line 1—1 in Figure 3;

Figure 2 is a broken side elevational view partly in section and partly diagrammatic taken substantially along line 2—2 in Figure 1;

Figure 3 is similar to Figure 2 taken from the other side of the pick-up mechanism and substantially along line 3—3 in Figure 1;

Figure 4 is the same as Figure 3 with the parts advanced in position from that shown in Figure 3; and

Figure 5 is the same as Figures 3 and 4 with the parts advanced still further.

The sheet pick-up device is intended for taking printed sheets from the printing roll or plate cylinder of a rotary press. After the printed sheets are taken from the plates, they are delivered by the device to a conveyor or other device for removing the sheets from the press. The particular pick-up device herein illustrated is intended for use with a rotary intaglio printing press such as illustrated in my copending application Serial No. 269,293, filed January 31, 1952, now U. S. Patent No. 2,716,548. A part of the press illustrated in my copending case is shown herein and includes the plate cylinder 6 upon which is mounted a printing plate 7 of the intaglio type for receiving successive sheets S which are printed by pressure exerted against the sheet and printing plate. After the sheet is printed, it is carried to the pick-up device of this invention and transferred from the plate cylinder to a conveyor generally indicated 8.

The pick-up device generally indicated 9 includes a cylinder 10 mounted for rotation with a shaft 11 supported in suitable bearings in the frame of the printing press, one of the bearings being illustrated at 12. Idler rolls 13 are provided at the top of the pick-up device for the purpose

of holding sheets against the surface of the cylinder until they are delivered to the conveyor 8.

The sheets themselves are grasped by fingers carried by the pick-up cylinder. These fingers 14 are mounted on a shaft 15 journaled in the cylinder 10. An arm 16 at the outer end of the shaft carries a cam follower 17 which is biased by spring 18 toward the axis of the pick-up cylinder 10 that pulls the fingers toward the surface of the cylinder. A cam 20 is secured to the bearing 12 so that it is supported in fixed position relative to the printing press. This cam has a working surface 21 positioned to engage the cam follower 17 and thus rock the shaft 15 upon which the fingers are mounted to open and close the fingers against the surface of the cylinder.

The pick-up device is driven in timed relation to the rotation of the plate cylinder 6. This drive is accomplished through a clutch which permits the pick-up cylinder to be at rest in proper position to receive each printed sheet. A drive gear 23 is mounted at one end of the plate cylinder 6 and rotates with the plate cylinder. A driven gear 24 idly rolls upon the shaft 11 and is provided with friction material 25 secured to one face thereof. A friction plate 26 is secured by pin 27 to the shaft 11 so that the friction material 25 with the aid of compression spring 28 bears against a ball bearing 29 slidable upon the shaft for the purpose of providing additional force to hold the friction material 25 against the friction plate.

In order to drive the pick-up cylinder in proper timed relation, the driven gear is given a number of teeth in relation to the drive gear to provide slightly more than one rotation thereof for each plate on the plate cylinder. In other words the drive must bring the cylinder around to a position at rest which is proper to receive the next printed sheet. If there are two plates on the plate cylinder, the gear ratio may be slightly less than 1 to 2. The cylinder is held at rest by the combination of an outwardly radially extending runner 30 on the friction plate positioned to slide over a runway surface 31 provided on a lug 32 secured to the side of the drive gear 23. As the pick-up cylinder comes around close to proper position for receiving another sheet, the runner 30 hits the runway 31 and thereafter slides along the runway. Since the friction plate is fastened to the shaft 11, the pick-up cylinder is held at rest. This condition starts at the position shown in Figure 3. In this position the drive gear 23 will continue to rotate the driven gear 24 but since the runner is against the runway, the pick-up cylinder will remain at rest. In this position the cam 20 has rocked the fingers 14 to an open position in advance of the leading edge or front end *s* of the sheet S on the plate 7.

Following the rotation of the parts to Figure 4, it will be noted that the sheet S has its front end advanced into the fingers. The pick-up cylinder has not as yet continued its rotary motion and it will be noted that the stationary cam 20 still bears the same relation to the cam follower 17. In Figure 5 the runner 30 has gone beyond the end 33 of the lug 32 so that the friction drive may advance the pick-up cylinder. At the same time the cam follower moves off the stationary cam 20 and closes the finger on the front end of the sheet S. The movement forwardly of the pick-up cylinder occurs at a speed equal to the advance of the sheet so that the fingers are closed upon the sheet without movement in the plane of the sheet.

After the cylinder has traveled from Figure 5 through an additional 200° or so, the cam follower 17 will again strike the cam to open the fingers and allow the sheet to be carried onto the conveyor 8. In actual operation, a lug 32 will be provided on the drive gear for each plate 7 on the plate cylinder and the gear ratios will be chosen accordingly. In actual practice, it has been found that a gear ratio of 1 to 2 with two plates on the plate cylinder,

diminished by about twelve teeth on the driven gear, permits a very satisfactorily operated pick-up device. This means that the driven gear has about six teeth meshing with the drive gear during each time the pick-up cylinder is at rest.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, for some modifications will be obvious to those skilled in the art.

I claim:

1. Drive means for imparting intermittent rotary motion to a shaft, comprising: a drive gear continuously meshing with a driven gear idly mounted upon the shaft; a plate-like member keyed to the shaft and having an outwardly extending projection movable in a circular path about the shaft; an elongated, circumferentially extending lug mounted near the periphery of the drive gear and movable in a path intersecting the path of movement of the projection, said lug having an arcuate surface concentric with the gear and carried intermittently into the path of the projection, said projection being first arrested by moving against said lug surface and then sliding over said arcuate surface of the lug as the lug is carried forwardly by the drive gear, to arrest rotary movement of said plate-like member and shaft until the lug passes; and frictional drive means adjacent said driven gear on the shaft, said drive means being yieldably urged against said plate-like member to impart rotary movement to the shaft when the lug and projection are out of engagement.

2. A printing press drive mechanism for imparting intermittent rotary motion to a sheet pick-up device having sheet grippers adapted to be at rest when receiving sheets from a rotating plate cylinder of the printing press, comprising: a shaft adjacent the plate cylinder and mounting the sheet pick-up device; a member keyed to the shaft

and having a projection movable in a circular path about the shaft; an idler gear on the shaft having a frictional drive connection with said keyed member; a drive gear meshing with the idler gear and carrying a lug movable in a path intersecting the path of said projection, said lug having an arcuate surface concentric with the gear and said projection engaging and sliding on said surface as the projection approaches the drive gear to hold the sheet pick-up device at rest, said lug and projection being positioned to stop movement of the sheet pick-up device in timed relation to the rotation of the plate cylinder so as to arrest movement of the sheet grippers when adjacent the plate cylinder in sheet transfer position, said frictional drive connection permitting continued rotation of the idler gear when the movement of the shaft is arrested.

3. A printing press drive mechanism as specified in claim 2 in which the drive gear is mounted concentric with the plate cylinder and rotates therewith, said lugs being located on the drive gear opposite the leading edge of the plates on the plate cylinder to provide said intermittent motion in said timed relation to rotation of the plate cylinder.

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