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STACKING MACHINES FOR PAPER UNITS

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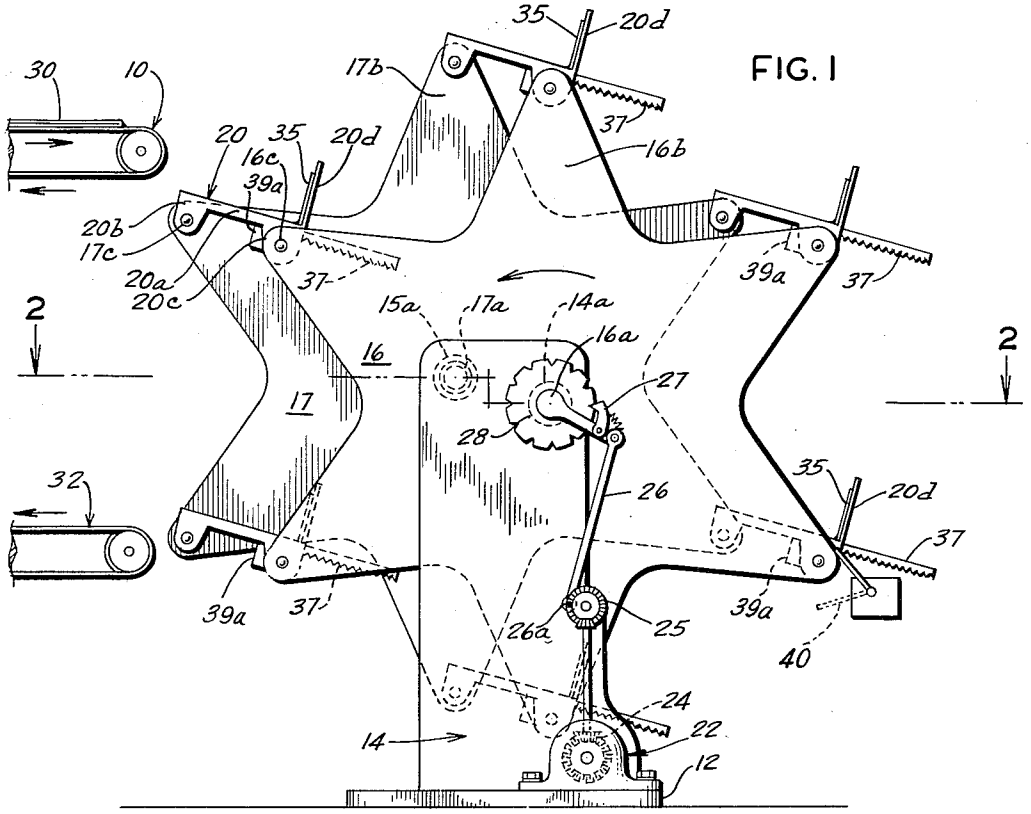

FIG. 1

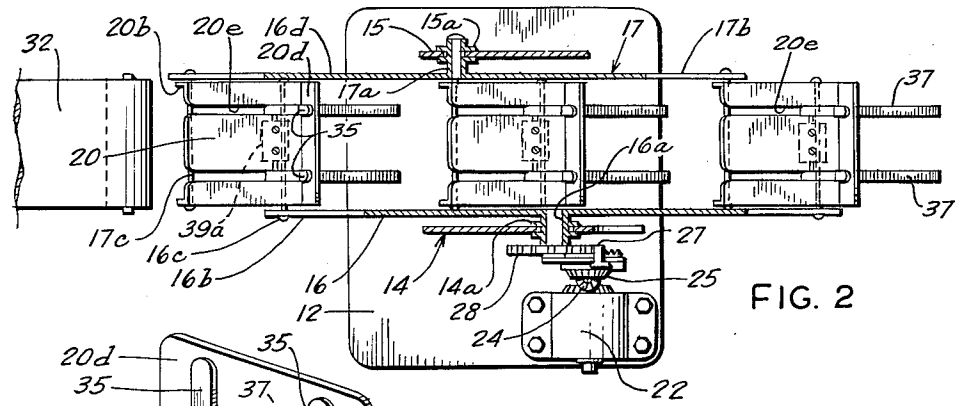

FIG. 2

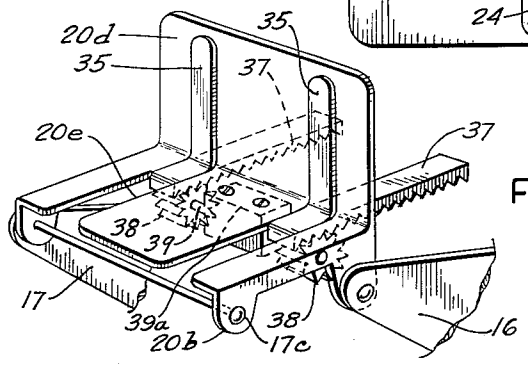

FIG. 3

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STACKING MACHINES FOR PAPER UNITS

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My invention relates to the feed of circulars, pamphlets, or other paper units in single order from a press or other processing source for use in groups. The press feed may be rapid, and the units may be stacked as delivered into groups of 25, 50 or more. In many establishments stacking is done by hand. Where machine means have been provided for this purpose the mechanism was complicated and spread over a considerable area, using extensive floor space.

In view of the above situation, it is the main object of the present invention to provide a stacking machine which eliminates the need of manual labor or attention, and which is geared to suit any speed of the unit feed.

Another object is to provide a machine of the above character which is rotary and has an automatic control for limiting the height to which groups of the units may be stacked.

A further object is to provide a control for receiving a partial number of units at a height close to the unit delivery zone, making room for an additional number of units by lowering the stack of original ones.

An additional object is to design the novel machine with few parts, and so compactly as to occupy a minimum of floor space.

A better understanding of the invention may be gained by reference to the accompanying drawing, in which—

FIG. 1 is a side elevation of the machine;

FIG. 2 is a section thereof on the line 2—2 of FIG. 1; and

FIG. 3 is a perspective view of a mechanism for pushing a stack of paper units onto a departing conveyor.

Referring specifically to the drawing, **10** denotes a conveyor leading from a printing or other source of paper units, and designated to deliver them in single succession.

The stacking machine is located immediately behind the delivery zone of the conveyor **10**, and rests on a base **12**. The latter has a pair of standards **14** between which is a rotor journaled for free rotation. The rotor is composed of a pair of vertical discs **16** and **17** which are spaced from each other. The standard **14** has a bearing **14***a* to journal the spindle **16***a* of the disc **16** for rotation; and the standard **15** has a similar bearing **15***a* to journal the spindle **17***a* of the disc **17** likewise. However, the bearing **14***a* is near the right-hand edge of the standard **14**, while the bearing **15***a* is near the left-hand edge of the standard **15**, disposing the discs of the rotor in staggered position, as seen in FIG. 1.

The discs **16–17** are of star shape and formed marginally with a circular series of tapered arms **16***b* and **17***b*. This arrangement places the points of each pair of arms **16***b* and **17***b* diagonally in respect to a platform **20** disposed between them.

Each platform **20** is made with downbent side flanges **20***a*, the ends of these being enlarged to form front and rear pairs of ears **20***b* and **20***c*, each pair perforated in transverse registration. A pin **16***c* passes from the point of each arm **16***b* through the ears **20***c* for pivoting the rear portion of the platform **20** from the arm **16***b*; and a similar pin **17***c* passes from the point of each arm **17***b* through the ears **20***b* for pivoting the frontal portion of the platform from the arm **17***b*.

By engaging the pins **16***c* and **17***c* as described, the platforms connect the discs **16** and **17** for joint rotation. Also, the platforms constitute parallel links which lie in planes parallel to the direction in which the plates are

offset. If the direction were horizontal, all the platforms would be horizontal and remain so at all points in the rotation of the rotor **16–17**. However, the purpose of the invention requires that the platforms have a tilt from front to rear, and this is procured by setting the bearing **14***a* of the disc **16** a short distance below the bearing **15***a* of the disc **17**, as seen in FIG. 1. This setting causes the deflection of the platforms to the tilted positions shown in FIG. 1.

The rotor **16–71** is driven with a stop-motion in the direction of the curved arrow in FIG. 1. The drive means comprise a motor **22** from which a reduction drive **24** leads to a wheel **25**; and a connecting rod **26***a* rises from a crank pin **26** on the wheel to the region of the spindle **16***a*. Here the drive is imparted step-by-step from the connecting rod to the spindle through the agency of a pawl **27** and ratchet wheel **28**.

It has been mentioned that the conveyor **10** delivers the paper units in single succession. With the upper platform **20** at the left (as seen in FIG. 1) in receiving position rearwardly of the conveyor, the latter may be operated at a speed to deposit the paper units **30** in rapid succession on the platform, whereby to accumulate half—say, 25—of the required stack to the level of the upper conveyor run. The platform has an upbend **20***d* at the rear to form a backstop for the accumulating paper units.

It is noted that the rotor has six platforms. However, the ratchet wheel **28** has 12 teeth, so that the platforms advance only half the distance that they are spaced every time the pawl **27** draws on the ratchet wheel. When half of the stack has accumulated on a given platform, the drive of the rotor as just mentioned lowers the platform with the accumulating stack a sufficient distance to receive the remaining paper units from the conveyor. The next action of the gearing places the next platform in the order of rotation in receiving position behind the conveyor, repeating the aforesaid operation. Each platform bearing a full stack of paper units descends to a level where the stack may be removed—during the stationary interval of the platform—for tying or wrapping into a bundle.

A mechanism is provided at the lower level for pushing the stack of paper units onto a departing conveyor **32**. The mechanism is shown in FIG. 3, and involves a pair of pusher arms **35** which are normally behind the stacking zone of each platform, or in front of the backstop **20***d*. The arms **35** have gear-rack bases **37** with which a pair of pinions **38** mesh, these being carried by a shaft **39**. The latter is driven by a motor **39***a* when a stack of paper units is to be pushed off the platform, this being done by the advance of the pusher arms **35**; and slots **20***e* in the platform form clearances for the arm bases **37** during the movement referred to. The pushing operation may be induced by a suitable control, such as a spring switch **40** tensioned by the arms of the rotor **16**, as indicated in FIG. 1.

It will now be apparent that the novel stacking machine is geared to co-operate with a paper unit conveyor which delivers units at a rapid rate, whereby to build up the required stacks of units at frequent intervals and without need of manual assistance. Further, the stacking machine is made of few parts and so compactly as to occupy a minimum amount of floor space.

I claim:

1. A stacking machine for flat-type units deposited in successive order by a supply source, comprising a rotary collector with supports positioned at intervals to receive said units in stacking accumulation, said supports extending in a series along the periphery of the collector, and means to stop the latter periodically for accumulating a desired number of units on each support from said supply source, said collecting unit being a rotor having companion

discs journaled on parallel axes to offset the discs laterally from each other, and said members being platforms interposed in peripheral succession between the discs, one end of each platform hinged to a pivot carried by one disc and the other end hinged to a pivot carried by the other disc, whereby to offset such pivots and position the platforms at the same angle at all points in the rotation of the rotor.

2. A stacking machine for flat-type units deposited in successive order by a supply source, comprising a rotary collector with supports positioned at intervals to receive said units in stacking accumulation, said supports extending in a series along the periphery of the collector, and means to stop the latter periodically for accumulating a desired number of units on each support from said supply source, said collecting unit being a rotor having companion discs journaled on parallel axes to offset the discs laterally from each other, and said members being platforms interposed in peripheral succession between the discs, one end of each platform hinged to a pivot carried by one disc and the other end hinged to a pivot carried by the other disc, whereby to offset such pivots and position the platforms at the same angle at all points in the rotation of the rotor, the position of the axis further from said supply units being lower than that of the other axis, whereby to lend the platforms an incline in a direction away from said supply units.

3. A stacking machine for flat-type units deposited in successive order by a supply source, comprising a rotary collector with supports positioned at intervals to receive said units in stacking accumulation, said supports extending in a series along the periphery of the collector, and means to stop the latter periodically for accumulating a desired number of units on each support from said supply source, said members being platforms carried by the collector with an incline away from said supply source, a backstop on each platform, and pusher means carried by each platform for ejecting a stack of units from the same.

4. A stacking machine for flat-type units deposited in successive order by a supply source, comprising a rotary collector with supports positioned at intervals to receive said units in stacking accumulation, said supports extending in a series along the periphery of the collector, and means to stop the latter periodically for accumulating a desired number of units on each support from said supply source, said members being platforms carried by the collector with an incline away from said supply source, a backstop on each platform, and pusher means carried by each platform for ejecting a stack of units from the same, such means comprising a backing member for the stack and slidable to advance the same, and other means to operate the backing member.

5. A stacking machine for flat-type units deposited in successive order by a supply source, comprising a rotary collector with supports positioned at intervals to receive said units in stacking accumulation, said supports extending in a series along the periphery of the collector, and means to stop the latter periodically for accumulating a desired number of units on each support from said supply source, said members being platforms carried by the collector with an incline away from said supply source, a backstop on each platform, and pusher means carried by each platform for ejecting a stack of units from the same, such means comprising a backing member for the stack and slidable to advance the same, and other means underneath the platform to operate the backing member.

6. A stacking machine for flat-type units deposited in successive order by a supply source, comprising a rotary collector with supports positioned at intervals to receive said units in stacking accumulation, said supports extending in a series along the periphery of the collector, and means to stop the latter periodically for accumulating a desired number of units on each support from said supply source, said members being platforms carried by the collector with an incline away from said supply source, a backstop on each platform, and pusher means carried by each platform for ejecting a stack of units from the same, such means comprising a backing member for the stack and slidable to advance the same, and other means underneath the platform to operate the backing member, such other means comprising a gear rack base for the backing member, the platform being slotted to accommodate the rack base for sliding motion and allow access to it from underneath, and motor-operated gear means underneath the platform in mesh with said rack base.

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