

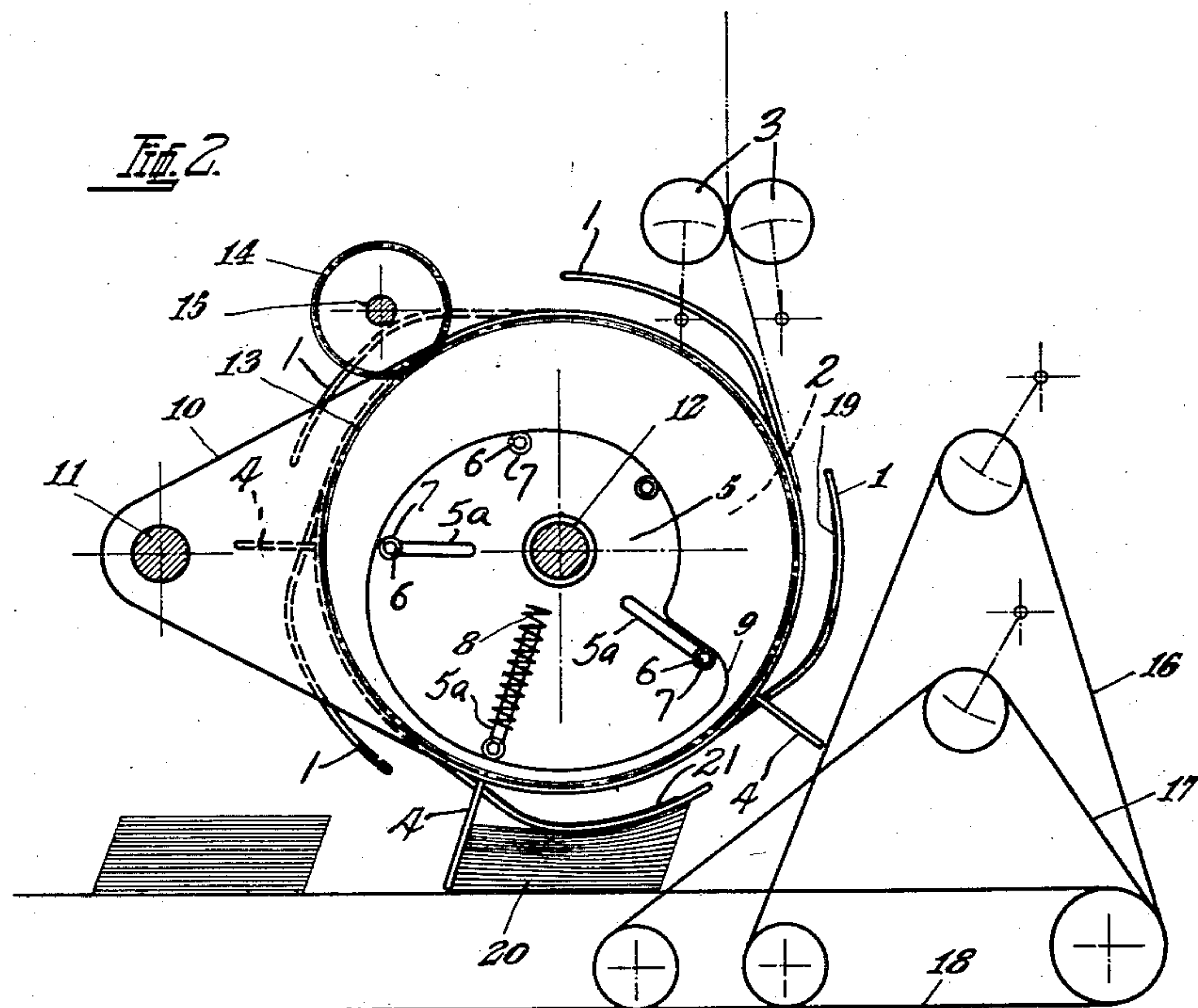
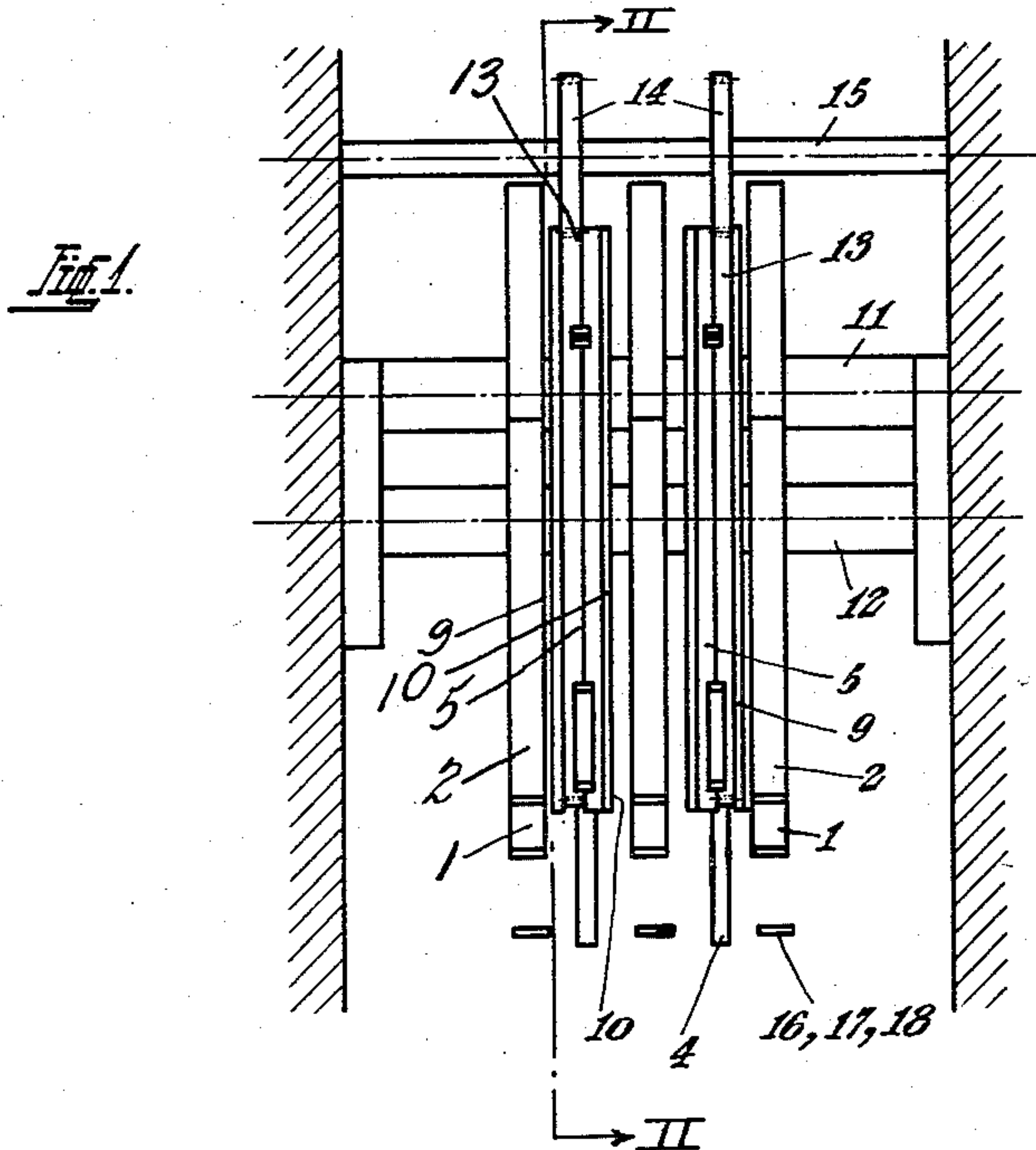
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SHEET COLLECTORS FOR COLLECTING PAPER SHEETS INTO PILES

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SHEET COLLECTORS FOR COLLECTING PAPER SHEETS INTO PILES

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4 Claims. (Cl. 271—71)

The present invention relates to apparatus for collecting sheet material into stacks of predetermined number.

The function of sheet collectors in folding machines is to cause a substantial slowing down in the paper sheets arriving at the same speed as the machine and to collect these sheets on a running band or belt without causing any damage to the finished printed product during this delaying process. The products thus slowed-down generally drop on to a continuously moving belt, the sheets overlapping on it in the manner of scales. One of the sheets is made to take up a slightly different position after every 25 or 50 sheets by means of a special arrangement so that piles or bundles which are always of the same size can be pushed up by hand without having to be counted. Pushing up the bundles by hand is not always desirable. For example, when the machines are fast running, the operators cannot catch up and the number of operators at the collector cannot be increased for reasons of space. When quality products are being printed in book printing or offset printing there is also a risk of the fresh, not yet completely dried print becoming smeared in the pushing up operation. Means have therefore been sought so as to form these bundles mechanically and so that they have only to be removed by the operator. The constructions so far known work either with or without the standard collector star. Those constructions which do not use the collecting star suffer from the disadvantage that they are not absolutely sure to collect exactly the same number of sheets in all the bundles. When the known form of collecting star is used difficulties take place during the transition from one bundle to the next, this being due to the fact that the finished bundle under the star takes up a certain amount of space according to the number of pages, the collecting belt having to be set to this space. The first sheets of the fresh bundle have then to drop fairly freely into this space so that they can easily take up the wrong position, particularly when the operation is taking place at great speed. The arrangements operating in conjunction with the collector star have always been arranged outside the latter.

The invention remedies these drawbacks. It is characterised by the feature that, for forming the bundles or piles, further star-shaped discs are arranged on the shaft of the collector star. Fixed, slidable, rocking or other blades are provided on these discs, and are moved relative to the shaft by means of eccentrics, cams or the like. These discs rotate at a different, i. e. smaller speed than the collector stars. The bundle which is forming moves into a space which opens out in wedge-shape.

One embodiment of the invention is illustrated in the accompanying drawing.

Fig. 1 is a cross-section through the apparatus pursuant to the invention.

Fig. 2 is a section taken along lines II—II of Fig. 1.

The blades 1 of the collector stars 2 catch the sheets 19 coming from the folding rollers 3 and convey them at reduced speed which depends on the number of blades 1

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at the periphery and the diameter of the collector star 2. Blades 4 are mounted for radial or reciprocating displacement in the slower rotating, star-shaped discs 5. Pins 6 carrying rollers 7 are mounted on the blades 4 and ride in radial slots 5a in the discs 5. The rollers 7 are pressed against cam surfaces 9 by springs 8. The cam surface 9, shaped as shown in Fig. 2, is formed by cutting out a portion of a plate 10, held by a cross bar 11. The collector stars 2 are fixed to the shaft 12. On the other hand, the discs 5 are rotatably mounted on the shaft 12. They are provided with teeth 13 and are driven by the gear wheels 14 which are mounted on the shaft 15. The speed of discs 5 relative to the shaft 12 is dependent upon the number of sheets to be contained in each bundle.

A wedge-shaped space is formed by means of, for example, three belt systems 16, 17 and 18 and the collector stars 2. The belts of the systems 16, 17 and 18 move uniformly and at the same speed as the blades 4 and convey together with the blades 4 the bundle 20 being formed out of the machine, the blades 4 extending consecutively into the wedge-shaped concavity.

The drawing shows the apparatus at that instant when the last sheet 21 has been added to the bundle 20. Through the action of the cam surface 9, the blade 4 has moved out from the disc 5 causing the next sheet 19 to be intercepted. The sheet 19 becomes the first sheet in the new bundle now forming. As the blade 1 is turning faster than the blade 4, it slips under sheet 19 so that this sheet lies against the band 16, at the same time leaving the passage open for the next blade provided with the next sheet. In this manner the new bundle is gradually formed, with both blade 4 and band 16 as a support. As blade 4 advances slowly band 17 replaces band 16 as a partial support and finally band 18 serves to carry away the built up stack.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In an apparatus for collecting sheet material into stacks of predetermined numbers, including a shaft and a collector star secured thereon and rotatable therewith and conveyor belt means for conveying said stacks away; in combination, a star shaped disc disposed about said shaft for rotation at a slower speed than said collector star, said disc being provided with a plurality of radially extending slits; radially displaceable blade means disposed in said slits, respectively; pins secured to and extending axially from said blade means and inwardly of said disc; a plurality of rollers, each said roller being transversely secured to one of said pins at its juncture with its respective blade means; a plurality of springs secured to said disc, each of said springs arranged on each of said pins for urging said blade means out of said slits; cam means controlling the displacement of said blades in said slits, said cam means comprising a fixed plate member adjacent said disc, and formed with an eccentric cam surface contacting said rollers and restraining said blade means, having its widest profile adjacent the conveyor belt means, one of said blade means being urged through one of said slots and contacting said conveyor belt means for building up a stack of sheets thereon as a support when said collector star and said disc are rotated.

2. In an apparatus according to claim 1, including a pair of endless bands running at an angle to each other and defining a wedge-shaped space therebetween, said blade means extending into said space during stack build-up, said stack being supported by said blade means and

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one of said bands initially and then by said blade means and the other of said bands as said blade means rotates, said other band conveying away said stack after termination of the build-up thereof when the next of said blade means commences build-up of a new stack.

3. In an apparatus for collecting sheet material into stacks of predetermined numbers, including a shaft and collector star means rotatably disposed on said shaft; a star-shaped disc disposed about said shaft for rotation at a slower speed than said collector star means, said disc being provided with a plurality of radially extending slits, a plurality of radially displaceable blades disposed in said slits, respectively, pins secured to and extending axially from said blade means and inwardly of said disc, a plurality of rollers, each said roller being transversely secured to one of said pins at its juncture with its respective blade; a plurality of springs secured to said discs, each arranged on each of said pins for urging said blades out of said slits, an eccentric cam surface restraining said blades and holding the latter in said slits, the profile of said cam surface controlling the displacement of said blades as said disc rotates, and a supporting surface complementary with said blades, successively, whereby rotation of said star collector means serves to build up a stack of sheet material between one of said blades and said

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supporting surface, rotation of said disc causing said stack to advance with said one blade relative to said supporting surface until the next one of said blades initiates build-up of the next stack.

4. In an apparatus according to claim 3, said supporting surface being formed of three endless belts disposed at an angle to each other and being concave with respect to said shaft, whereby a stack is built up between one blade and the first of said belts, said stack advancing during build-up to the second of said belts and then to the third of said belts upon completion of build-up, said third belt conveying said stack away.

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