E. P. SHELDON.

COLLECTING AND STAPLING MECHANISM.

APPLICATION FILED AUG. 16, 1919.

1,343,231.

Patented June 15, 1920.

4 SHEETS—SHEET 1.

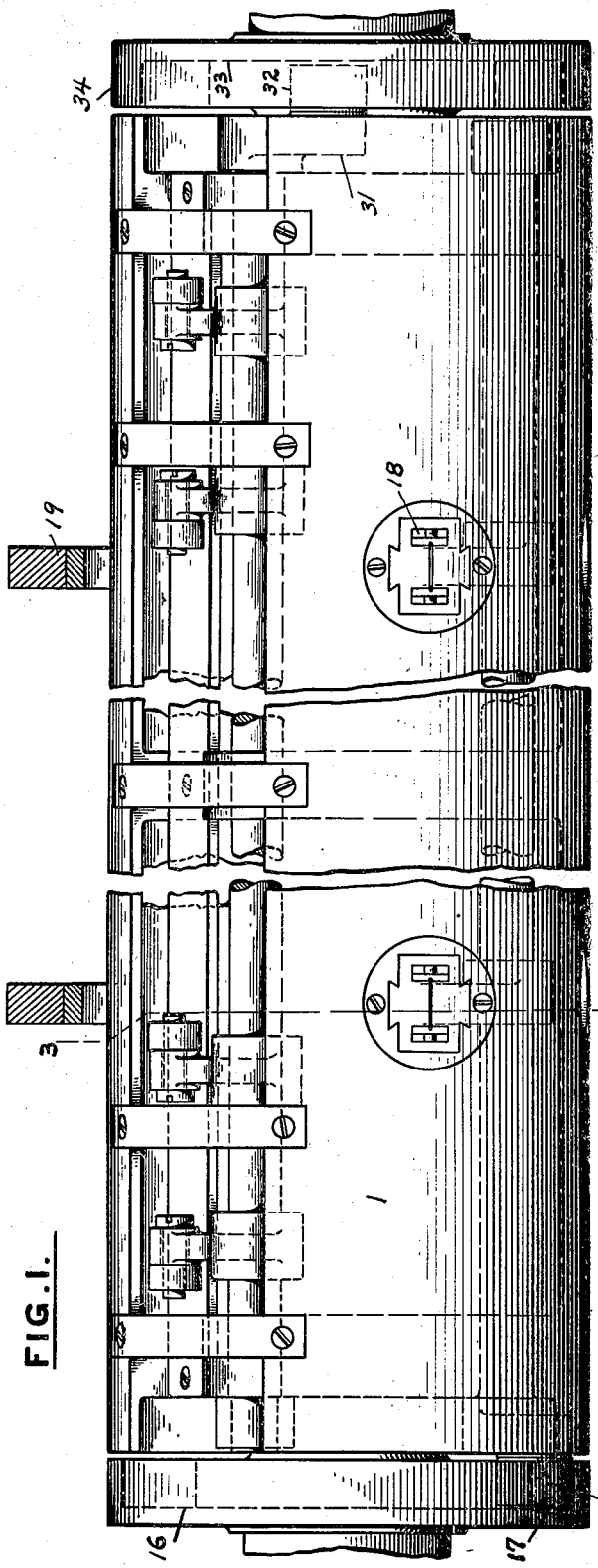


FIG. 1.

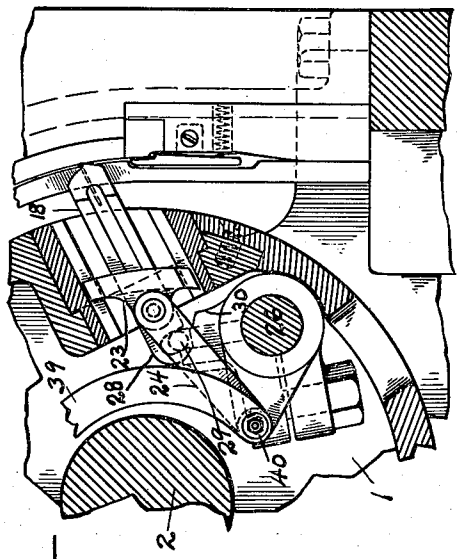


FIG. 8.

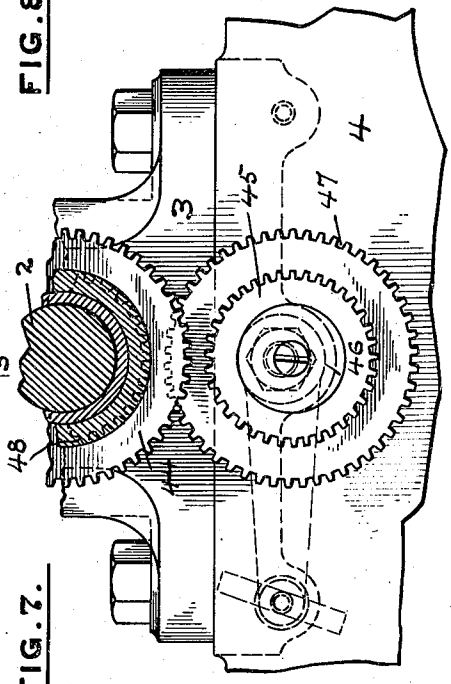


FIG. 7.

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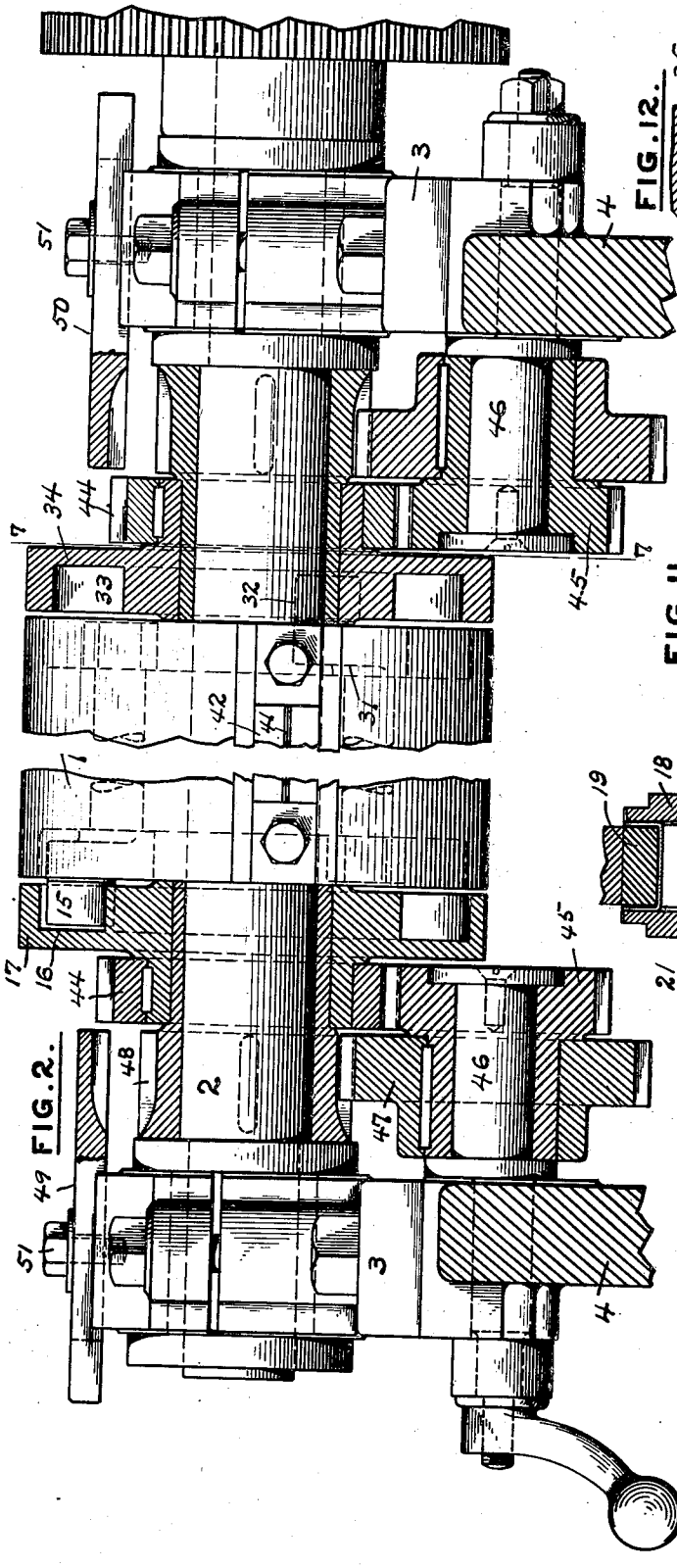


FIG. 2.

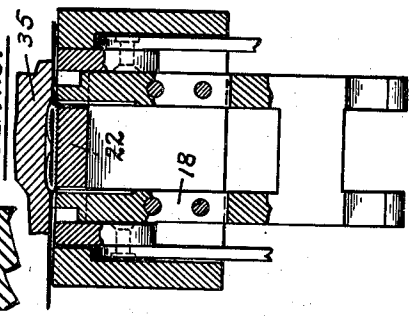


FIG. 12.

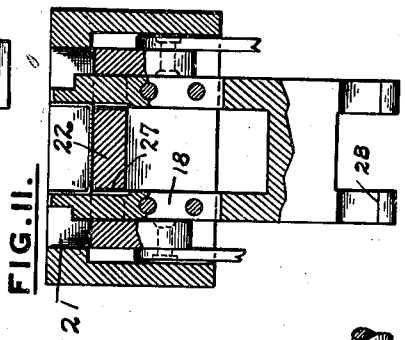


FIG. 11.

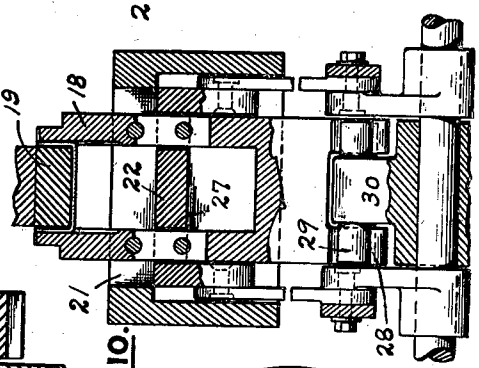


FIG. 10.

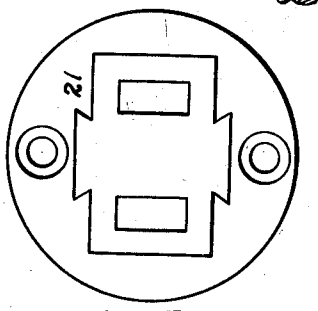


FIG. 9.

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4 SHEETS—SHEET 3.

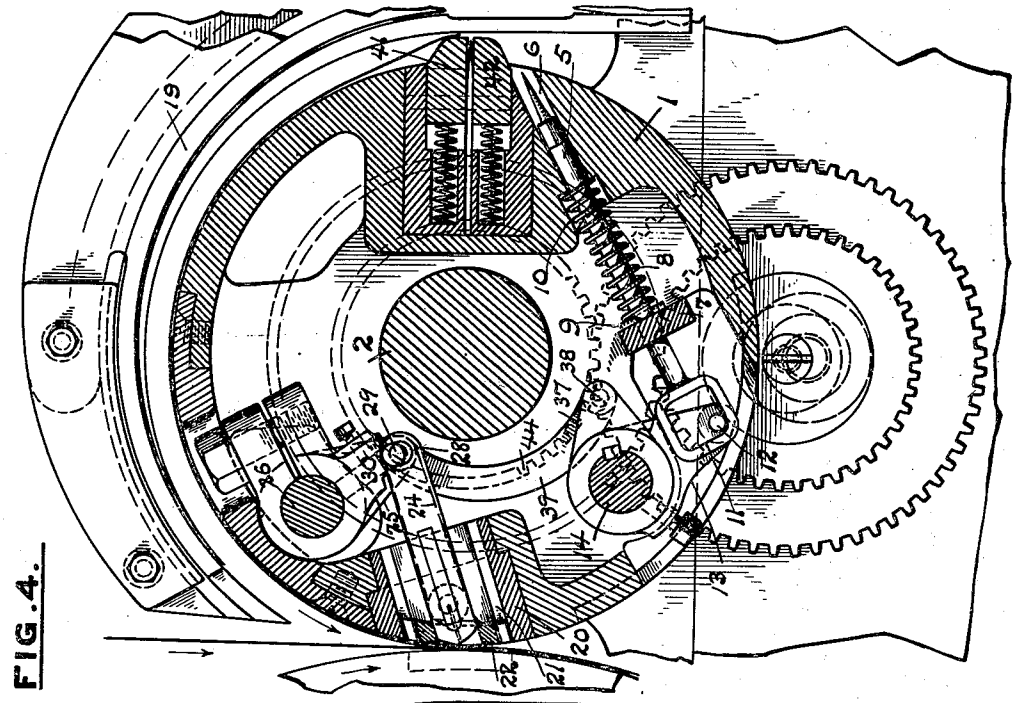


FIG. 4.

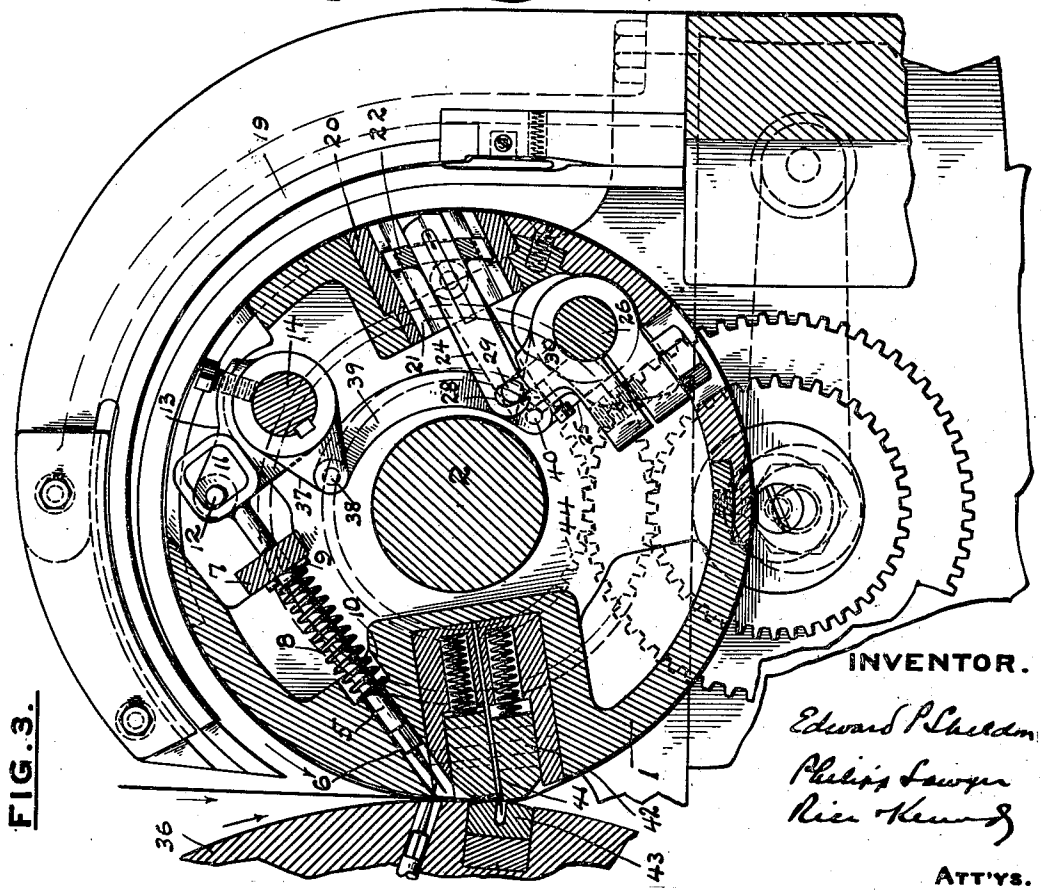


FIG. 3.

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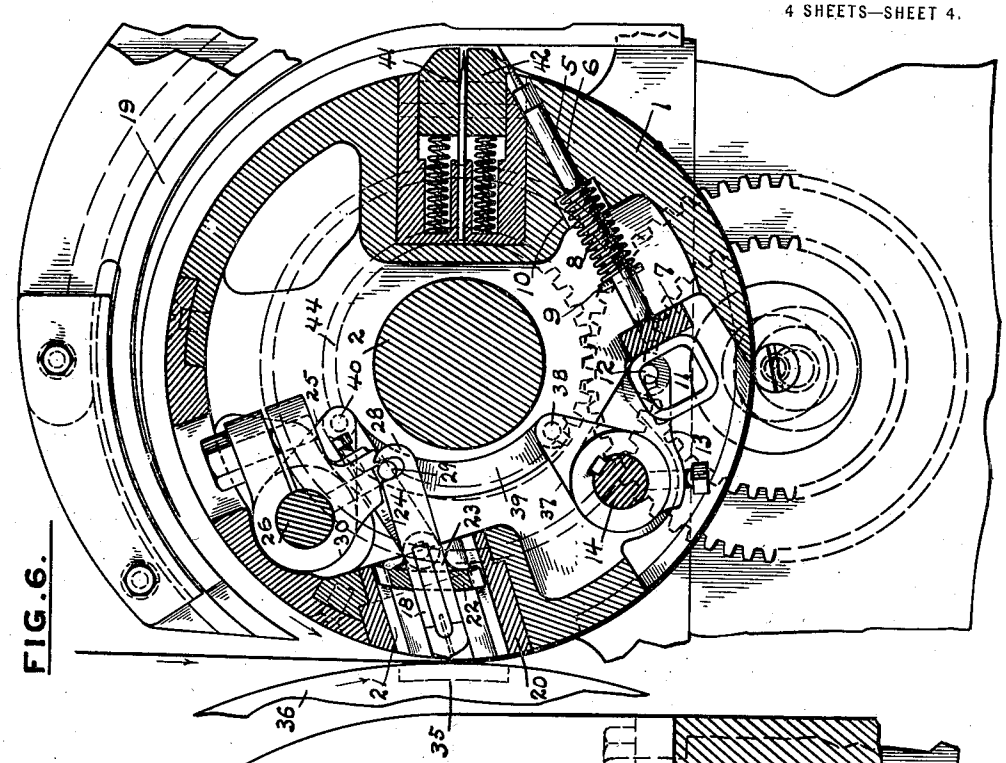


FIG. 6.

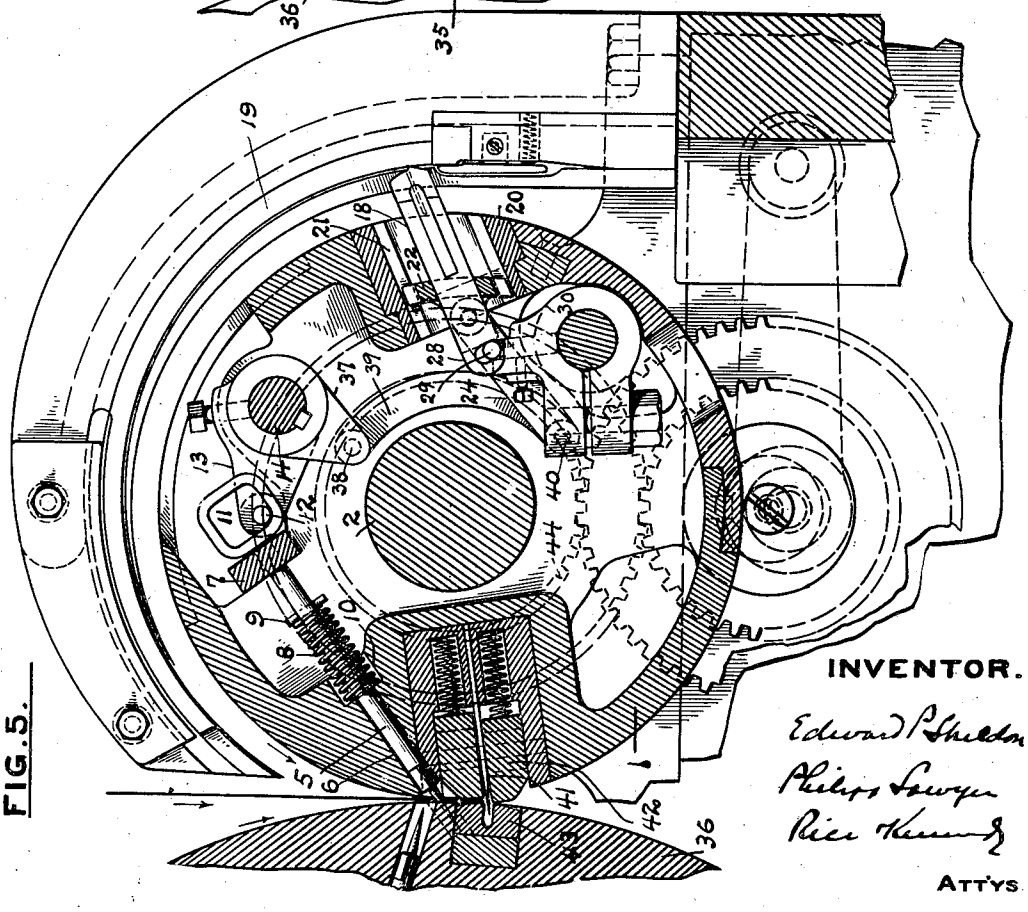


FIG. 5.

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UNITED STATES PATENT OFFICE.

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COLLECTING AND STAPLING MECHANISM.

1,343,231. Specification of Letters Patent. Patented June 15, 1920.

Application filed August 16, 1919. Serial No. 317,877.

To all whom it may concern:

Be it known that I, EDWARD P. SHELDON, a citizen of the United States, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Collecting and Stapling Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in collecting and stapling or stitching mechanism, and has been designed particularly for use with printing machines.

In certain classes of printing machines as heretofore constructed, provision is made for running a web or sheet through without collecting, or cutting and collecting sheets cut from a web and stapling the collected product, or running through such cut sheets without collecting. Where such collected product was to be stapled, however, a special stapling mechanism, usually a cylinder, had to be added to the machine. Where sheets were cut from a web and collected this stapling cylinder had to be located below the cutting and collecting cylinders, and this position made it difficult to get at the stapling cylinder to adjust the wire feed and for other purposes, and where this stapling cylinder was installed in a machine not especially designed for it, certain other mechanisms of the machine had to be moved to accommodate the cylinder, and the stapling cylinder was difficult to install.

It is the especial object of the present invention to produce an easily accessible mechanism in which a collecting and stapling or stitching mechanism are supported in a common carrier, so that a web or sheet may be run through the machine without stapling or sheets may be collected and stapled without any change in the mechanism other than silencing the stapling or the collecting mechanism when desired. It is a further object of the invention to produce such mechanism in which the carrier which supports the collecting and stapling mechanism may also carry a cutting mechanism by which sheets may be cut from a web and, if desired, collected and stapled, or run through straight or collected without stapling.

With these and other objects not specifically referred to, in view, the invention consists in novel parts and combinations which will be described in connection with the accompanying drawings, in which:—

Figure 1 is a side view partly broken away and partly in section of a carrier for supporting both the collecting and stitching mechanisms.

Fig. 2 is a sectional elevation partly broken away showing the operating mechanism for actuating the collecting and stapling devices.

Fig. 3 is a cross section taken on the irregular line 3—3 of Fig. 1, showing the collecting and stapling mechanisms and their operating means.

Figs. 4, 5, and 6 are views similar to Fig. 3 showing the parts in the different positions they occupy when the mechanisms are adjusted to collect and staple a product.

Fig. 7 is a detail view partly broken away and partly in section on line 7—7 of Fig. 2, showing the operating mechanism in non-collecting position.

Fig. 8 is a detail sectional view partly broken away showing the operation of the stapler in taking a staple length.

Fig. 9 is a plan view of the staple former.

Figs. 10, 11, and 12 are detail sectional views illustrating the operation of clenching a staple.

Machines constructed in accordance with the invention will include a support or carrier capacitated to support both a mechanism for collecting sheets and a mechanism for stapling or stitching the collected product, and the support or carrier embodying the invention in its best form will be capacitated to support cutting devices for cutting the sheets which are to be collected and stapled from a web, and these mechanisms will be of such character that any or all of them may be silenced or operated as desired, or removed from the carrier if not wanted, depending on the particular product which it is desired to produce.

The particular mechanisms employed may be varied within wide limits, but in the best constructions, the collecting, cutting and stapling devices will be carried on a rotary carrier, such carrier being employed to effect high speed production. In the particular construction illustrated, there is provided a rotary carrier in the form of a cylinder 1, mounted on a shaft 2 suitably supported in bearings 3, on a frame 4 of any usual or desired construction. This cylinder 1, in

the construction illustrated, is capacitated to support collecting, cutting and stapling mechanisms which may be of any usual or desired character. In the particular construction illustrated, a collecting mechanism is shown supported on the cylinder the sheet taking devices of which are shown as pins 5. These pins are provided in sufficient number along the cylinder to effectively take and hold the sheets, and as they are similar in construction and operation but one will be described. These pins work in guide slots 6, formed in the cylinder wall, the shank of the pin passing through a bar 7, and the pins are normally held in retracted or non-taking position by springs 8 taking against a projection 9 on the pin and the wall 10 of a recess formed at the inner end of the slot 6. Beyond the bar 7 the pins are formed with a slotted head 11, in which takes an actuating pin or stud 12 which is operated to throw the pin into sheet taking position at the proper time, this slotted head providing a lost motion for purposes hereinafter referred to. This pin or stud 12 is carried on an arm 13 on a cam shaft 14 extending across the cylinder and (see Fig. 2) having a cam roll 15 which takes in the groove 16 of an operating cam 17, which is mounted loosely on the carrier shaft 2, this cam being driven through connections hereinafter referred to.

Machines constructed in accordance with the invention will be capacitated to support a mechanism for securing together the plies of a collected product where such a product is desired. While this securing means may be of various characters, it will be carried by and operated from the cylinder 1, which carries the collecting pins. In the particular construction illustrated, these securing devices are a stapling mechanism adapted to form and insert wire staples in the collected product at the points desired, and these staplers may be of any usual construction, and any desired number, two such being illustrated arranged along the cylinder to staple the product at two points in line with each other. These staplers are of the same construction and are operated in the same manner. As shown each includes a staple forming plunger 18 which takes a wire length cut off by a suitable mechanism, not illustrated and which coöperates with a staple forming horn 19 eccentric to the carrier to form the legs of the staple in the usual manner.

In constructions where the staple forming and inserting mechanism is carried on the collecting cylinder means are provided whereby after the staple has been formed, it may be withdrawn within the periphery of the carrier so that the staple will be out of the way of the sheet which is to be collected on the carrier. In the best constructions, furthermore, means will be provided to operate the stapling mechanism so that the staple is positively inserted in the product as distinguished from the ordinary staple insertion effected by rolling contact. In the particular construction illustrated, there is provided a hollow head or block 20 set into the cylinder wall, this block being provided with ways 21 (see particularly Fig. 9) in which is arranged to slide an anvil plate 22 which effects the positive insertion of the staple in the product at the proper time. This plate (see Fig. 8) is provided with ears 23 to which are connected an arm 24 pivoted to an arm 25 loosely mounted on a shaft 26 extending across the cylinder frame, the anvil being reciprocated so as to be drawn out of the way of the formed staple as it is drawn into the carrier by the staple forming plunger to clear the carrier surface.

The staple forming plunger is mounted and operated in any usual manner. In the particular construction illustrated, it works through guide slots 27 formed in the plate 22, before referred to. The inner end of the plunger is recessed (see Fig. 10) to form hooked lugs 28 in which work actuating pins 29 carried on each side of a lever arm 30 clamped to the shaft 26. This shaft 26 is operated to actuate the plunger through a cam (see Fig. 2) arm 31 having a cam roll 32 which takes in a groove 33 of a cam 34 loosely mounted on the end of the shaft 2 opposite the pin operating cam 17, before referred to. The parts are so arranged and proportioned that the plunger is forced outwardly beyond the carrier to take the wire length and after it is taken and the staple formed is withdrawn so that the face of the plunger and the ends of the legs of the staple carried by it are within the periphery of the cylinder. At the stapling point the anvil 22 is pushed outwardly to the periphery of the cylinder and by this movement removes the staple from the plunger on which it is held by the spring of the wire and positively inserts it in the product, the anvil acting as an abutment against which the staple seats, the various steps in this operation being clearly illustrated in Figs. 10, 11, and 12, the staple being inserted against a closing die 35 on a coöperating cylinder 36.

The stapling mechanism may be silenced when no stapling is desired in any usual way, as for instance stopping the wire feed, or removing the stapling plungers.

In machines embodying the invention in its best form for convenience in construction, the cam for operating the collecting pins will be utilized for operating the clenching anvil. While various constructions may be employed for this purpose, in the particular construction illustrated, the shaft 14 has positioned thereon an arm 37

to which is pivoted at 38 one end of a cross over link 39, the other end of this link being pivoted at 40 to the arm 25, before referred to, through which the anvil is operated. In order that the collecting pins and anvil may be operated independently of each other, a lost motion is provided both for the pins and anvil, the slotted head 11 of the pin, before referred to, being utilized for this purpose, and the guides 21 in which the anvil slides being sufficiently long to permit the anvil to have a sufficient idle movement therein.

Machines constructed in the best form of the invention will include cutting mechanism for severing sheets from a web, and in the best constructions this cutting mechanism will be also carried on the carrier 1, this cutting mechanism including the usual cutter knife 41, mounted in the carrier with which coöperates the usual spring seated cheeks 42, the cutter knife coöperating with a coöperating cutting wood 43 on the cylinder 36, before referred to.

Machines constructed in accordance with the invention will include means whereby the stapling mechanism may be operated to insert a staple at every revolution of the cylinder or carrier, where a collected product is being sent through and no further collecting is to be done, or if collecting is to be done, at a number of revolutions, and the collecting pins being likewise operated, to produce different products. While this may be effected in various ways, the operating cams 17 and 34, before referred to, are arranged so that they may be stationary with respect to the cylinder, which arrangement is used where a product is to be stapled at each revolution, or they may be given a movement with the cylinder but at half the speed thereof, so as to effect the stapling and collecting function in the particular machine shown at every other revolution of the cylinder. As the same construction is preferably employed for each of the cams 17 and 34, but one such construction will be described. In the particular construction illustrated, referring to Figs. 2 and 7, the cam 17 is secured to a gear 44, which meshes with a gear 45 on an eccentric shaft 46. This eccentric shaft carries a gear 47, which is adapted to be thrown into mesh with a gear 48 fast on the shaft 2 of the carrier, before referred to. In the construction shown in Fig. 2, the parts are shown in the position they occupy when a product is collected, and stapled at every other revolution of the carrier, while in Fig. 7 the eccentric shaft 46 is shown rocked to throw the gears 45 and 47 out of mesh with gears 44 and 48, in which position the stapler is operated to staple a product at every revolution of the carrier. The pin rods, of course, are likewise in this position operating at every revolution of the carrier, and when no collecting is to be done the pin points are removed so as to keep them out of the way of the sheet.

When the parts are in the position shown in Fig. 7, owing to the fact that the cams 17 and 34 are loose on the shaft, means are provided for holding these cams stationary which means may be of any suitable character, as a pair of sliding latches 49, 50, which have slotted ends, and are secured to the bearing blocks 3, before referred to, in any suitable manner as by bolts 51.

With the construction shown and described a very compact arrangement is provided, all the parts of which are readily accessible and by the use of which extra cylinders and other driving connections are omitted, and a construction has been provided where if desired a sheet may be cut, sheets collected or stapled, or any of these mechanisms may be silenced as desired. While the form of the machine shown and described is a preferred one, it will be understood that various changes may be made in the particular character of the stapling mechanism and the collecting mechanism, and the invention is not to be restricted to these forms shown and described.

What is claimed is:

1. The combination of a carrier, a sheet collecting mechanism mounted thereon, mechanism for securing together the plies of a collected product also mounted on the carrier and means for actuating the collecting and securing mechanisms.

2. The combination of a carrier, a sheet collecting mechanism mounted on the carrier, means for stapling or stitching a collected product also mounted on the carrier, and means actuating the collecting and stapling mechanisms.

3. The combination of a rotary carrier, a sheet collecting mechanism mounted on the carrier, mechanism for securing together the plies of a collected product mounted on the carrier, and means for actuating the collecting and securing mechanisms.

4. The combination of a rotary carrier, a sheet collecting mechanism mounted on the carrier, means for stapling or stitching a collected product also mounted on the carrier, and means actuating the collecting and stapling mechanisms.

5. The combination of a carrier, a cutting mechanism mounted on the carrier, a sheet collecting mechanism mounted on the carrier, mechanism for securing together the plies of a collected product mounted on the carrier, and means for actuating the collecting and securing mechanisms.

6. The combination of a rotary carrier, a cutting mechanism mounted on the carrier, a sheet collecting mechanism mounted on the carrier, mechanism for securing together

the plies of a collected product mounted on the carrier, and means for actuating the collecting and securing mechanisms.

7. The combination of a carrier, a cutting mechanism mounted on the carrier, a sheet collecting mechanism mounted on the carrier, a stapling or stitching mechanism for securing together the plies of a collected product also mounted on the carrier, and means for actuating the collecting and stapling or stitching mechanism.

8. The combination of a carrier, a sheet collecting mechanism mounted on the carrier, mechanism for securing together the plies of a collected product mounted on the carrier, and means for actuating both the collecting and securing mechanisms at different revolutions of the carrier.

9. The combination of a carrier, a sheet collecting mechanism mounted on the carrier, a stapling or stitching mechanism for securing together the plies of a collected product mounted on the carrier, and means for actuating both the collecting and the stapling or stitching mechanisms at different revolutions of the carrier.

10. In combination, a sheet collecting mechanism and a carrier for said mechanism, said carrier being provided with means for supporting and operating a stapling or stitching mechanism.

11. The combination of a collecting mechanism, a stapling or stitching mechanism, a common carrier therefor, and means for actuating said mechanisms, the parts being arranged so that a product may be collected and stapled, or collected without stapling, or run through without collecting or stapling.

12. In combination, a sheet collecting mechanism, a rotary cylinder for supporting said mechanism, said cylinder being formed with an aperture or opening through which a product collected thereon may be stitched or stapled.

13. The combination of a carrier, a sheet collecting mechanism mounted on the carrier, stapling or stitching devices also mounted on the carrier, means for actuating the collecting and stitching or stapling mechanisms, and a coöperating abutment for the stitching or stapling mechanism.

14. The combination of a rotary carrier, sheet collecting devices arranged thereon, stapling or stitching mechanism for securing together the plies of a collected product also mounted on the carrier, means for actuating the collecting devices and the stitching or stapling devices, and means for withdrawing a staple out of the path of the sheets while collecting.

15. The combination of a rotary carrier, sheet collecting mechanism mounted on the carrier, cutting mechanism also mounted on the carrier, mechanism for stitching or stapling the collected product also mounted on the carrier, means for actuating the collecting and stapling or stitching mechanisms, and a coöperating rotary carrier provided with cutting blocks and with an abutment for the stitching or stapling mechanism.

16. A collecting or stapling cylinder provided with means for collecting a product, and means for stitching or stapling the collected product.

17. A collecting or stapling cylinder provided with means for collecting sheets, and means for stapling or stitching the collected sheets, said means being arranged so that either may be silenced.

18. A collecting and stapling or stitching cylinder provided with sheet collecting devices, a staple inserting device and means for cutting a sheet from a web.

19. A cylinder provided with sheet collecting means, and means for stitching or stapling a collected product, the cylinder wall being formed with an opening through which the stapling mechanism may operate to staple a product collected on the cylinder, and sheet cutting means on the cylinder.

20. In combination with a rotary carrier, sheet collecting devices, mounted thereon, stitching or stapling mechanism mounted on the carrier, means for actuating the collecting and stapling or stitching mechanisms, and means whereby the said mechanisms may be caused to operate at every revolution of the carrier or at every other revolution of the carrier.

21. The combination with a rotary carrier, sheet collecting devices mounted on the carrier, stapling mechanism including a staple forming plunger and an anvil movable relatively thereto mounted on the carrier, a cam and connections for operating the collecting devices, a cam and connections for operating the plunger, and connections from the operating cam for the collecting devices to the anvil for actuating the latter.

22. The combination of a rotary carrier, sheet collecting devices mounted thereon, a cam, and means including a lost motion connection for operating the collecting devices from the cam, a stitching or stapling mechanism including a staple forming plunger and an anvil movable relatively thereto, a lost motion connection for the anvil, and connections for operating the anvil from the operating cam for the collecting devices.

23. The combination of a carrier, sheet collecting mechanism mounted on the carrier, a stapling mechanism also mounted on the carrier, said stapling mechanism including means movable against the formed staple for positively inserting it in a product, and means for actuating the collecting and stapling mechanisms.

24. The combination of a rotary carrier, sheet collecting mechanism mounted there-

on, a staple forming plunger mounted on the carrier, means for causing the plunger to withdraw a formed staple out of the path of a sheet, an anvil movable relatively to the plunger, and means for moving the anvil to positively insert a staple in a collected product.

25. The combination of a carrier, a sheet collecting mechanism mounted on the carrier, a stitching or stapling mechanism also mounted on the carrier, a shaft for the carrier, cams for driving the collecting and stapling mechanisms loose on the shaft, and means for connecting said cams to the shaft so as to partake of the movement thereof.

26. The combination of a carrier, a plurality of sheet collecting mechanisms arranged in line across the carrier, a plurality of stitching or stapling mechanisms arranged in line across the carrier, and means for actuating the collecting and stitching or stapling mechanisms.

27. The combination of a carrier, a plurality of sheet collecting mechanisms arranged in line across the carrier, a plurality of stitching or stapling mechanisms arranged in line across the carrier, means for actuating the collecting and stitching or stapling mechanisms, and a coöperating abutment for the stitching or stapling mechanism.

In testimony whereof, I have hereunto set my hand.

EDWARD P. SHELDON.