E. CRAIG.

CARTON STAPLING MACHINE.

APPLICATION FILED JAN. 17, 1918.

1,323,965.

Patented Dec. 2, 1919.

5 SHEETS—SHEET 1.

Fig. 1.

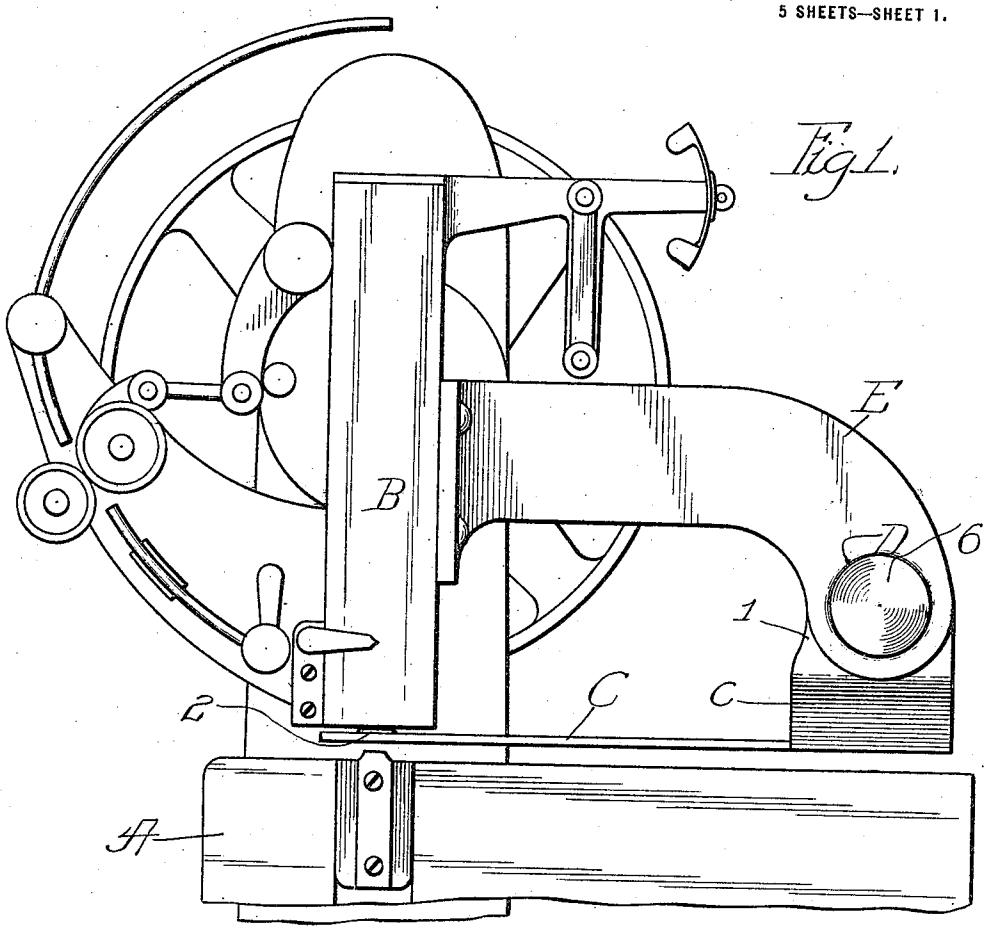

Fig. 2.

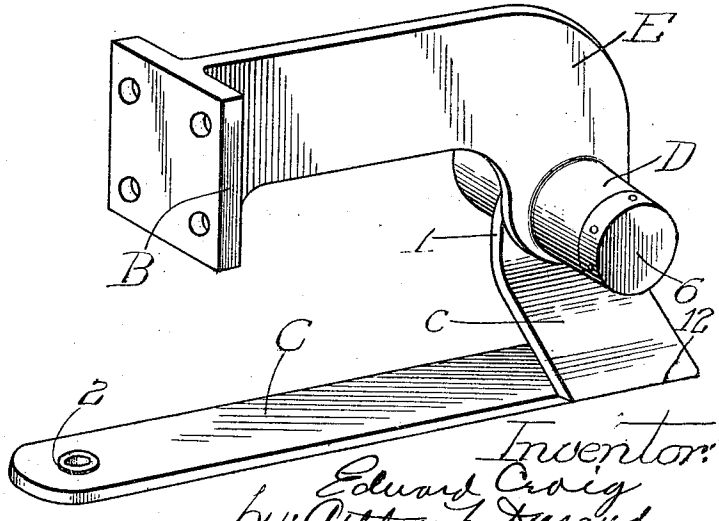

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Fig. 3.

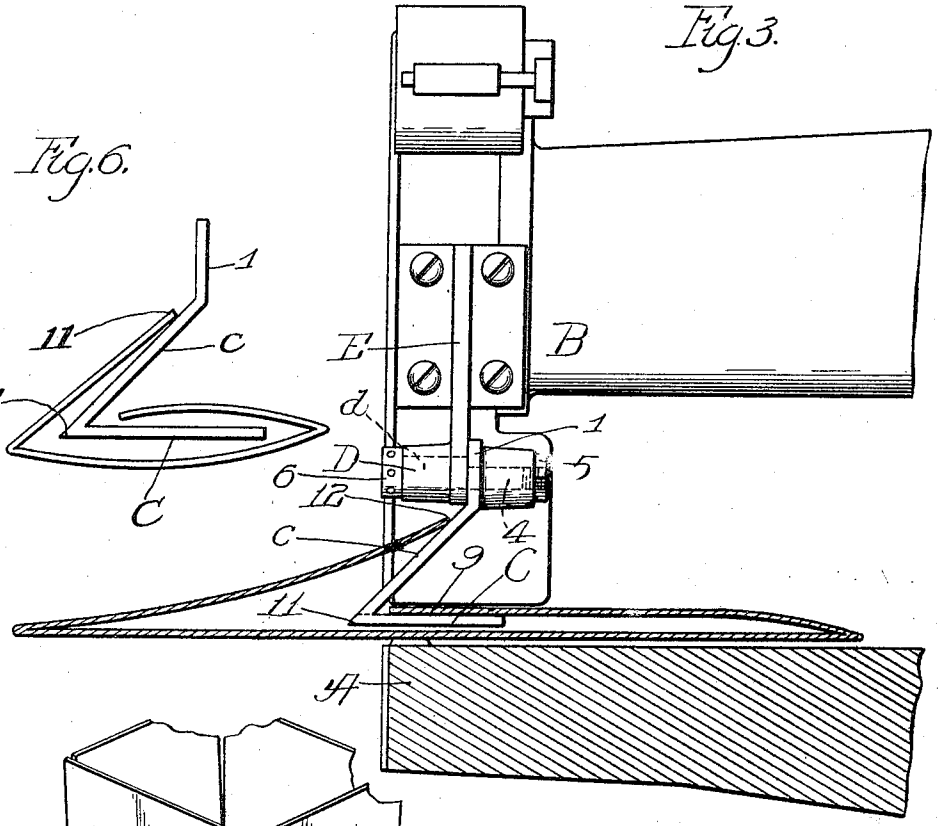


Fig. 6.

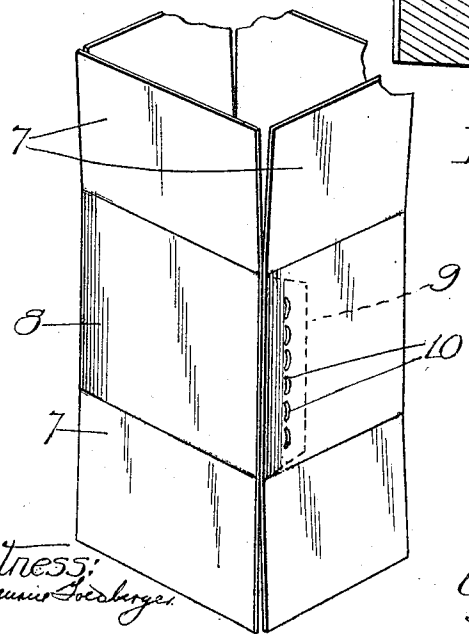
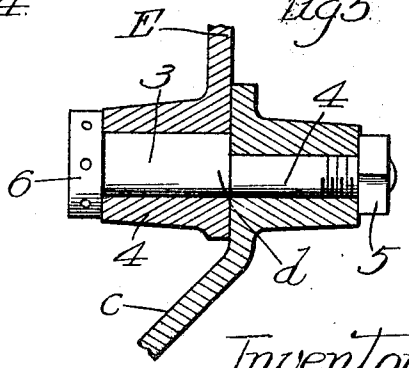


Fig 4.

Fig 5.



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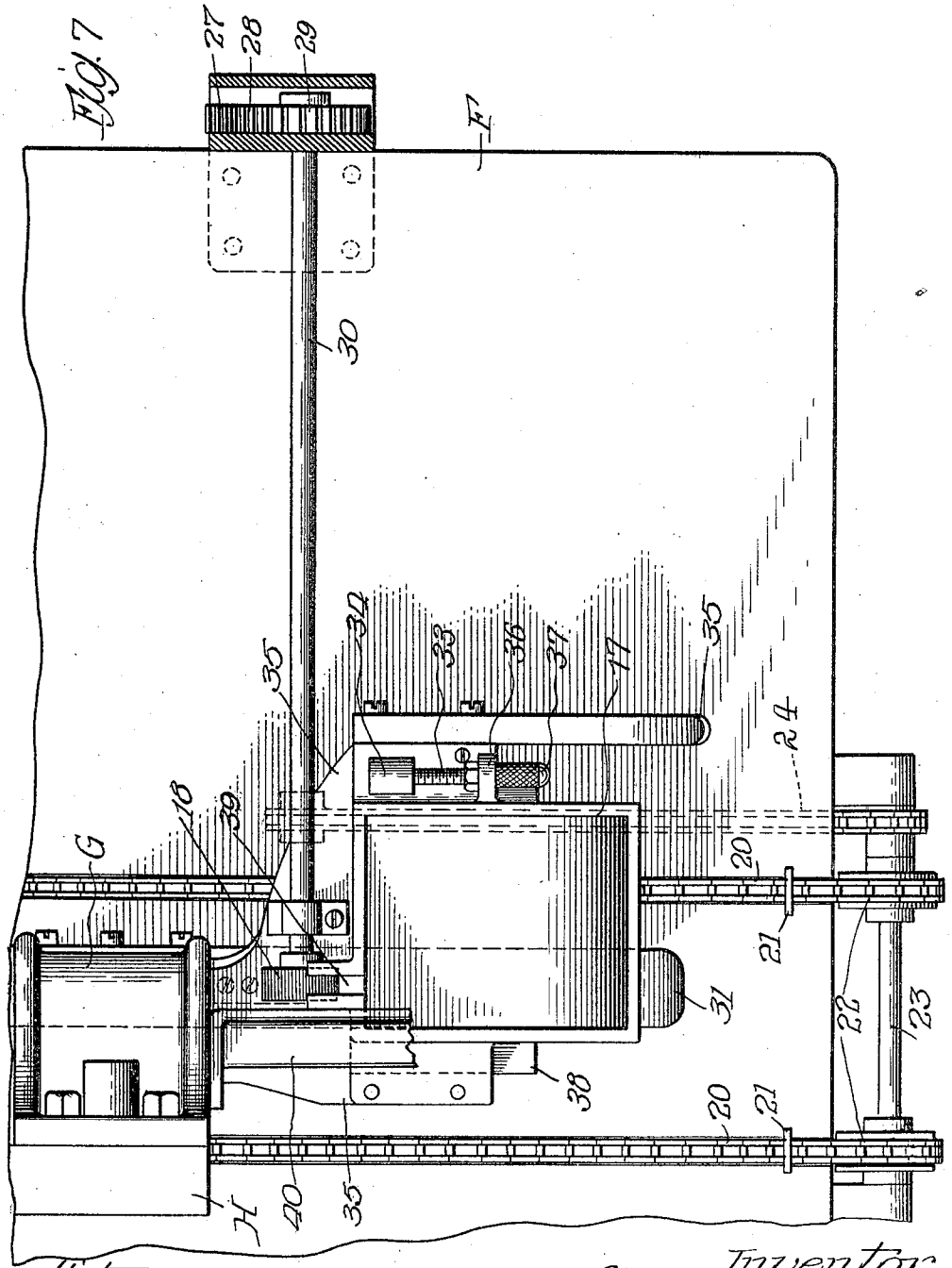
5 SHEETS—SHEET 3.

Fig. 7



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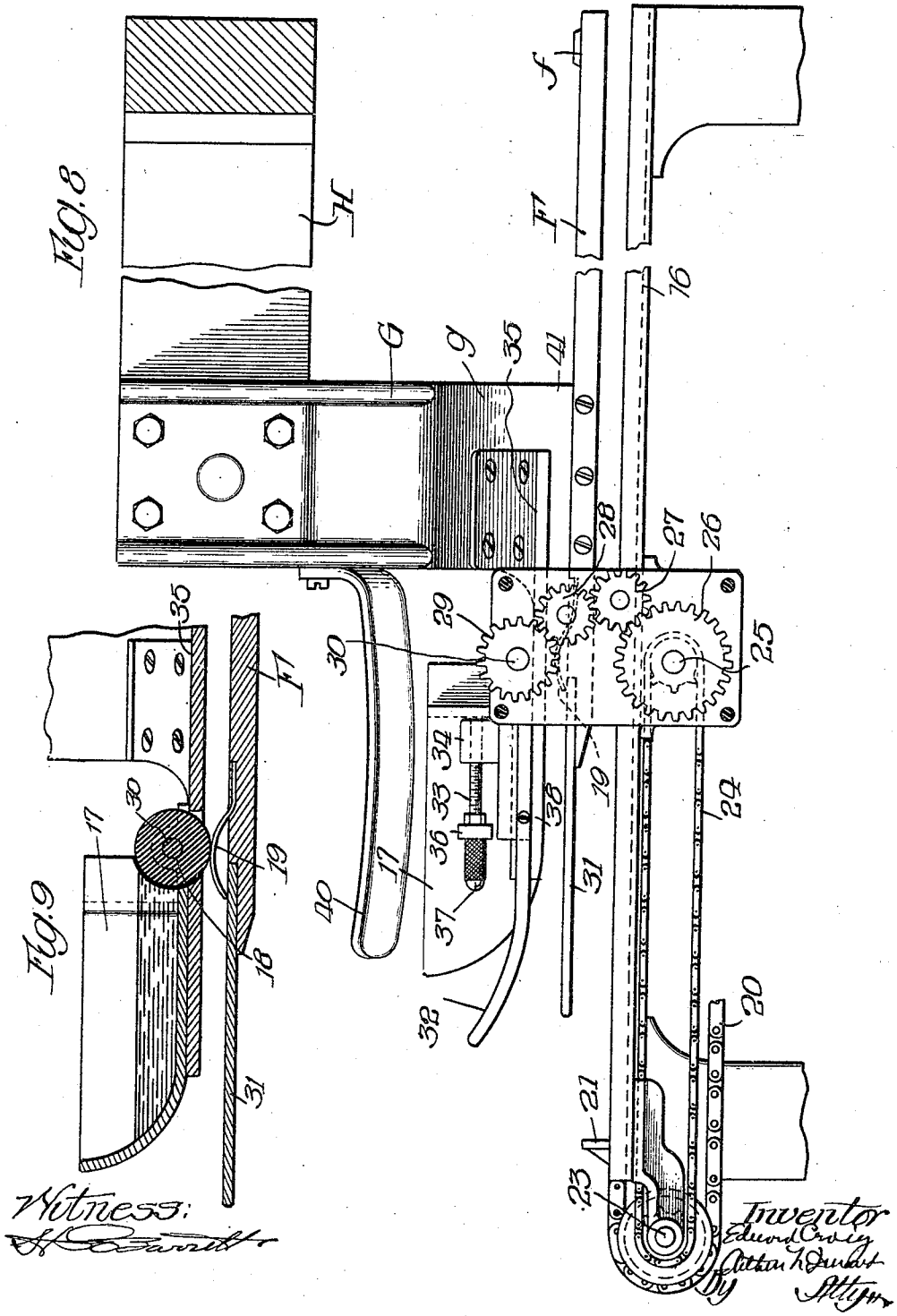
5 SHEETS—SHEET 4.



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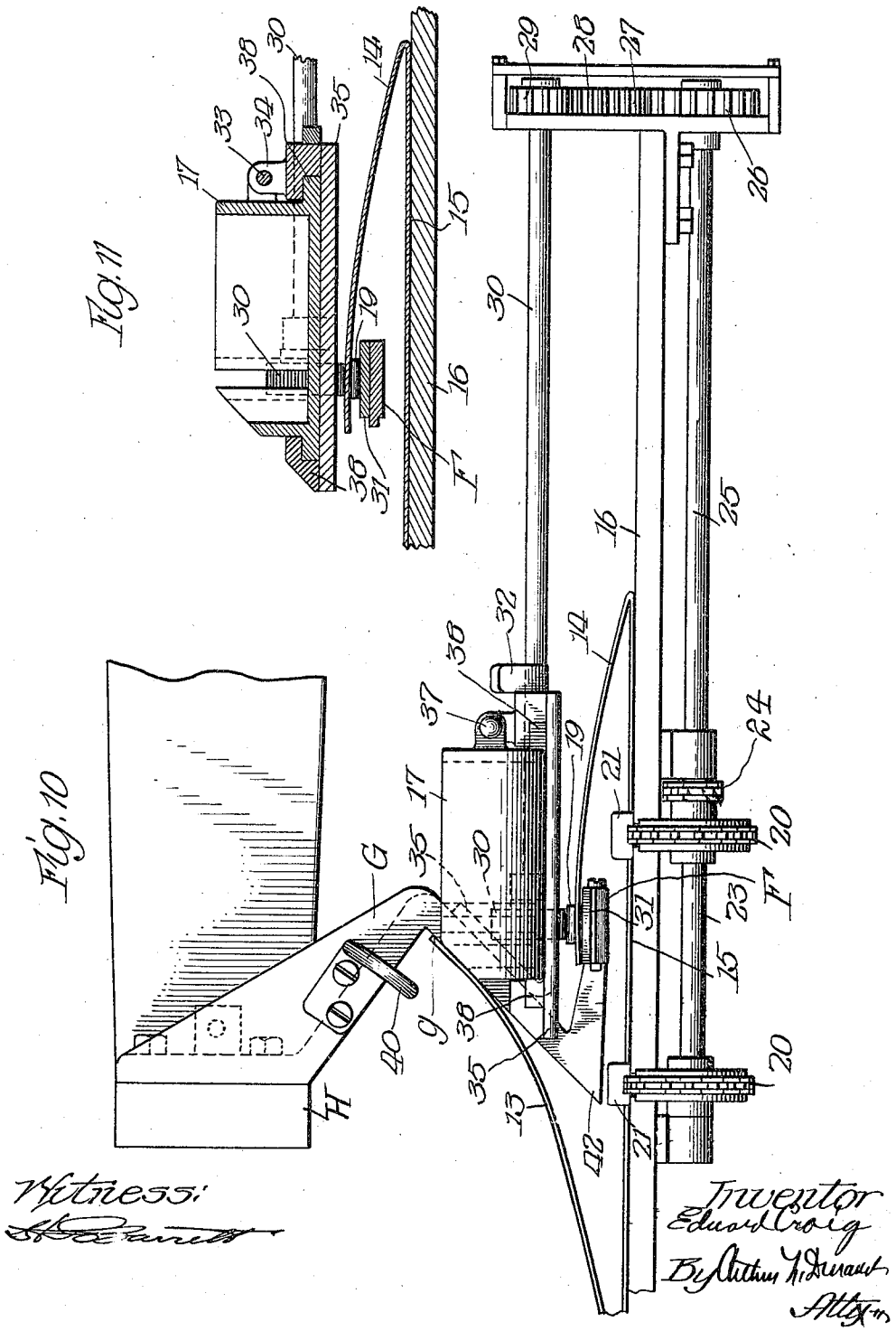
5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

EDWARD CRAIG, OF ST. JOSEPH, MICHIGAN.

CARTON-STAPLING MACHINE.

1,323,965. Specification of Letters Patent. **Patented Dec. 2, 1919.**

Application filed January 17, 1918. Serial No. 212,161.

To all whom it may concern:

Be it known that I, EDWARD CRAIG, a citizen of the United States of America, and resident of St. Joseph, county of Berrien, and State of Michigan, have invented a certain new and useful Improvement in Carton-Stapling Machines, of which the following is a specification.

This invention relates to machines for stapling cartons of that kind in which a row of staples is driven along one corner of the carton, or in which a plurality of such rows of staples are driven, before the ends of the carton are closed, so that the blank is converted into a hollow body having flaps which can be folded together to close the opposite ends of the body, the length of said row or rows of staples depending upon the length of the carton or box.

Generally stated, the object of this invention is to provide a novel and improved construction for guiding the blank into position to have the two end portions thereof stapled together, one end portion of the blank being folded upon the other, the blank thus folded being moved along in a direction parallel with the overlapping edge portion thereof.

A special object is to provide a form of guide which is adapted for use in conjunction with either large or small cartons, and of such shape that, when used in connection with a small carton, the blank can be folded and stapled without breaking or objectionably bending any of the side walls thereof.

Another object is to provide an improved construction and arrangement whereby the use of certain devices and features of construction heretofore considered necessary will be avoided.

It is also an object to provide certain details of construction tending to increase the general efficiency and desirability of a stapling machine of this particular character.

To the foregoing and other useful ends, the invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings:—

Figure 1 is a front elevation of a stapling machine embodying the principles of the invention.

Fig. 2 is a perspective of a guiding device by which the blank and sheet material is guided into position to receive the staples.

Fig. 3 is a side elevation of the machine shown in Fig. 1, showing the folded blank of sheet material in cross-section.

Fig. 4 is a perspective of one of said blanks after being stapled.

Fig. 5 is a detail sectional view of the adjustable pivotal support for said guiding device.

Fig. 6 is a cross-section of said guiding device, illustrating the use thereof in conjunction with a smaller blank.

Fig. 7 is a plan of another form of the invention.

Fig. 8 is a side elevation of the construction shown in Fig. 7.

Fig. 9 is a detail section of a portion of the construction shown in Figs. 7 and 8.

Fig. 10 is an end elevation of the construction shown in Figs. 7 and 8.

Fig. 11 is a cross-section of a portion of the structure shown in said Figs. 7, 8, 9 and 10.

As thus illustrated, the invention comprises a table or body A of any suitable character, and a stapling head B of any suitable known or approved form, supported in any suitable manner above said table. The guiding device comprises a bar C extending under the stapler head, in the direction in which the blanks are moved forward to receive the staples. This bar is supported by a portion *c* thereof, disposed at an angle of substantially forty-five degrees, and having an upper end portion 1 which is pivotally mounted on the adjusting device D, whereby the forward end portion 2 of said bar (which is disposed directly below the staple driver) is adapted to tilt up and down upon a horizontal axis. Said adjusting device comprises a bolt *d* having relatively large and small diameters 3 and 4, disposed eccentrically to each other, with the larger diameter 3 mounted in a bearing on the lower end of the bracket E, which latter is suitably secured to the stapler head. A nut 5 is screwed onto the end of the smaller diameter of said bolt, and the larger diameter is provided with a head 6, and by rotating this bolt the axis of the guiding device will be shifted or changed, whereby accurate adjustment of the guiding device for the purpose of properly positioning the clencher 2 below the stapler is obtained.

In Fig. 4 is illustrated one of the forms of cartons to be made. As will be seen, the sheet of material is scored and creased to form end flaps 7, and to form side walls 8, the side wall at one end of the blank being provided with a flap 9 to extend inside of the

other end of the blank, whereby a lap-joint is formed at one corner of the carton to receive the row of staples 10 therein. The blank is fed to the machine by resting the flap 9 on the outer end of the bar C, (see Figs. 3 and 6) with two of the side walls below this bar, and by resting the other end portion of the blank upon the inclined support *c*, the lapped portions of the blank being guided below the stapler to receive the row of staples, the end portion 2 of the bar C serving as an anvil or clench-block to clench the points of the staples. It will be seen that the inclined support *c* extends downward directly to the outer edge of the bar C, without any intermediate connection, so that in cross-section the guide is practically wedge-shaped, having a sharp edge at 11 extending under the upper layer or end portion of the blank. For large blanks, the shape of the guide is not a matter of so much importance; but when narrow blanks are employed, for the making of smaller cartons, it becomes necessary or desirable to provide a guiding device which will avoid the danger of breakage or objectionable bending of the sheet material, and for this purpose the upper support *c* is inclined downwardly, preferably at an angle of forty-five degrees, and forms with the edge of the bar *c* a wedge-shaped member to which the blank, even when small, can be made to conform (see Fig. 6) without danger of buckling or breaking the top flap of the blank. This, it will be seen, is because the sharp edge 11 of the wedge formed by the guiding device presents no thickness over which the top flap must be folded, and enables the attendant to fold the blanks snugly around the guiding device without any danger of buckling or breaking the sheet material in any way whatever. The upper flap of the blank is held down by the outwardly extending device D, and is thus guided along the top of the angle support *c*, in the manner shown. Furthermore, the space between the top of the bar C and the under-side of the angle support *c* provides a wide mouth to receive the edge of the flap 9, and which acts like a funnel to direct this portion of the blank into a position on top of the bar.

Thus the shape of the guiding device C and *c* not only renders it more satisfactory for use in conjunction with both large and small blanks, but also facilitates the insertion and forward feeding movement of blanks of any size. To provide a thin outer edge 11 which will fit snugly up into the corner of a folded blank of small size, the upper support *c* must be inclined at an angle, for if sufficient space is left between the top of the bar C and the under-side of the support *c*, to permit adjustment and feeding movement of the blank in the desired manner, and with the supports *c* in a horizontal position, the outer edge 11 will then be too thick to obtain the desired result, and will not serve the purpose of the invention; but with this support *c* disposed at an angle, substantially as shown and described, no intermediate connection is necessary between this support and the outer edge of the bar C, and consequently a thin edge 11 is obtained which will fit snugly into the corner of even a small carton, and in addition a wide and flaring mouth is obtained between the bar C and the support *c* to receive the lower or underflap of the blank, in the manner shown and described. The end edge 12 of the upper flap of the blank is always supported, regardless of the size of the blank, and with the blanks of the smallest size this upper flap will lie flat against the upper surface of the support *c*, in a manner that will be readily understood.

As shown in Figs. 7 to 11 inclusive, the construction is as follows:—The guide-bar F has its end provided with a clench-block or anvil *f* upon which the staples are clenched, and this bar is supported by a bracket G which has the forty-five degree angle portion *g* to support the upper flap 13 of the carton, while the lower flap 14 is supported upon the top of said bar. The body portion 15 of the carton slides forward upon the table 16, which latter may be of any suitable character. From the inclined support *g*, the top flap 13 of the carton will bend down and bear upon the lower flap 14, whereby the two flaps will be stapled together. In this case, however, the bracket G is provided with a receptacle 17 to hold glue or paste, or any suitable adhesive, and with a rotary glue-roll 18 which is adapted to apply the glue or paste to the upper surface of the flap 14, as the latter moves along toward the stapler, so that the two flaps will be glued together as well as stapled together. A spring 19 is suitably mounted on the bar F to hold the lower flap 14 up against the glue-roll 18 whereby the glue will be applied in the desired manner. Sprocket-chains 20, suitably arranged are provided with means to feed the blanks forward, and said means may consist of cleats or pushers 21 on said sprocket-chains to engage the rear edge of each blank, thereby to push the latter forward in a step-by-step manner. As shown, these sprocket-chains are arranged parallel and mounted on sprockets 22 on a transverse shaft 23 at the receiving end of the table, and can be similarly supported at the other end of said table, thereby to carry the blanks entirely through the machine. The shaft 23 drives a sprocket-chain 24 connected to the transverse shaft 25, which latter has its outer end provided with a gear-wheel 26 to engage the idler 27, which latter in turn engages another

idler 28 at this side of the table. Said idler 28 engages the gear-wheel 29 on the shaft 30 of the glue-roll 18, whereby the latter is driven in the desired direction to feed, or assist in feeding, the blank forward in unison with the feeding motion produced by the sprocket-chains 20, in a manner that will be readily understood. With this arrangement, therefore, the mechanism for applying adhesive is operated by power derived from the devices which feed the work forward. The bar F has a front end extension 31 to support the lower flap of the blank, and the outer side of the glue-receptacle has a guard 32 under which the top flap of the blank must be shoved forward in order to pass below the gluing device. As shown, the glue-receptacle 17 is provided with a screw 33 which is threaded in a stationary nut or bearing 34, which nut or bearing is carried by the plate 35, suitably secured to the bracket G, and the unthreaded portion of the said screw rotates in a bearing 36 on the side of said receptacle. This screw is provided with a thumb-piece 37, or other suitable means for the rotation thereof, and in this way the glue-receptacle 17 can be adjusted toward and away from the stapler, (the stapler is not shown, but is mounted directly above the clench-bar *f*) and guides 38 are provided for the glue-receptacle, whereby the latter is movable toward and away from the glue-roll 18 to regulate the feeding of the glue to the carton blanks. It will be seen that the receptacle has a slot 39 to feed the glue to the glue-roll.

Also, just above the glue-receptacle, a gage or guard 40 is mounted on the bracket G to extend over the upper flap 13 of the carton blank, so that this flap will be held down and guided into position. As shown, the bracket or guiding head G is suitably supported on an arm H that extends a suitable distance from the stapling head, the length of this arm, and the length of the bar F, depending upon the character of the work and the type or size of the box-blanks to be operated upon by the machine. The portion *g* of the guiding head, and its lower portion 41, like the guiding device previously described, form a wedge having a sharp edge, or comparatively thin edge 42, so that the guiding device is wedge-shaped and adapted to extend in the desired manner between the top flap 13 and the lower portion 15 of the folded carton blank, regardless of the width or size of the latter, without creasing or breaking the sheet material from which the blank is made.

The feed mechanism comprising the sprocket-chains 20 can be connected for operation in any suitable or desired manner, so that they will operate intermittently to feed the blanks intermittently below the stapler.

The guiding head or guiding device thus constructed and shaped (either the one shown in Figs. 1 to 6 inclusive, or the one shown in Figs. 7 to 11 inclusive) serves also to facilitate the manufacture thereof, so that one object and advantage of this form and construction, in addition to those previously stated, is that the guiding head or device may be produced at a comparatively low cost of manufacture. As previously stated, however, it is also designed to facilitate the manipulation and feeding of the blanks into position to be stapled.

It will be understood that the devices thus shown and described for guiding the folded carton blanks into position for stapling can be used on different machines, and in combination with one or more staplers, as may be required. In Figs. 7 to 11, for example, only one clench block *f* is shown on the bar F, but it will be understood that in multiple head stapling machines (machines having a plurality of stapling heads arranged in one or more rows) said bar F will have a plurality of these clench blocks, one for each stapler or stapling head. The clenching means, however, can be of any suitable or desired character and may be provided on the bar F, or on the bar C, in any suitable or desired manner.

What I claim as my invention is:—

1. In combination with a machine for stapling together the over-lapped flaps of a folded carton blank, a combined work-guiding and staple-clenching device therefor, comprising a bar to support the lower flap of the blank, one end of said bar having means for clenching the staples, and a support for the other end of said bar, said support extending downward at an angle to form with said bar a wedge that will fit into the corner between the upper flap and the lower body portion of the blank, so that the upper flap will slide from said support onto the lower flap, and means for mounting said support, the space between the top of said bar and the under-side of said support forming a flaring mouth to receive the lower flap.

2. A structure as specified in claim 1, said support having a flat upper surface, disposed substantially at an angle of forty-five degrees, and said bar having a top surface which is horizontal.

3. A structure as specified in claim 1, said means including a pivot which provides a horizontal axis about which the staple-clenching end of said bar is movable up and down.

4. A structure as specified in claim 1, said means comprising an eccentric device for raising and lowering the bar bodily and for permitting the bar to tilt up and down at its free end.

5. In combination with a machine for sta-

pling together the over-lapped flaps of a folded carton blank, a combined work-guiding and staple-clenching device therefor, comprising a bar to support the lower flap, means for supporting said bar and for guiding the upper flap forward onto the lower flap, so that the two flaps will then rest one upon the other on said bar, and a pivot for said means to permit the free end of said bar to swing up and down about a lateral transverse axis, said pivot having adjustable means to hold the bar against pivotal movement.

6. A structure as specified in claim 5, said pivot comprising an eccentric device for raising and lowering said bar bodily.

7. In combination with a machine for stapling together the over-lapped sections of a folded carton blank, a combined work-guiding and staple-clenching device therefor, comprising a bar to support the lower flap of the blank, one end of said bar having means for clenching the staples, and a support for the other end of said bar, said support having one portion to extend between the upper and lower flaps of the blank, so that the two flaps will rest one upon the other on said bar after leaving said support and while being stapled together, and mechanism to apply an adhesive between the upper and lower flaps before the two flaps engage each other.

8. A structure as specified in claim 7, said mechanism comprising a receptacle for the adhesive, a rotary member to feed the adhesive from said receptacle onto the upper surface of the lower flap, and means to rotate said member.

9. A structure as specified in claim 7, and work-feeding means to push the blank forward.

10. A structure as specified in claim 7, said mechanism comprising a rotary member to apply the adhesive, a shaft to rotate said member, and gearing to rotate said shaft, said machine having a work-feeding device connected to operate said gearing, whereby the operation of said work-feeding device causes the operation of said mechanism.

11. A structure as specified in claim 7, said bar having a spring to hold the lower flap upward against said mechanism.

12. A structure as specified in claim 7, and a bracket secured to said support to form a support for said mechanism.

13. In combination with a machine for stapling together the over-lapped flaps of a folded carton blank, a combined work-guiding and staple-clenching device therefor, comprising a bar to support the lower flap of the blank, one end of said bar having means for clenching the staples, and a support for said bar, said support extending downward at an angle to form an inclined supporting surface for the upper flap of the blank.

14. A structure as specified in claim 13, and a guard on said support to extend over the upper flap.

15. A structure as specified in claim 13, said inclined surface terminating in a thin lower edge, for the purpose set forth.

16. In combination with a machine for stapling together the over-lapped flaps of a folded carton blank, a combined work-guiding and staple-clenching device therefor, comprising a bar to support the lower flap of the blank, one end of said bar having means for clenching the staples, and a support for the other end of said bar, said support having means mounted thereon to feed the blank forward, and having a portion to support the upper flap of the blank in position to move forward onto the lower flap, so that the two flaps will then rest one upon the other on said bar while approaching the staple.

17. A structure as specified in claim 16, said feeding means comprising a rotary member to engage the top surface of the lower flap of the blank.

Signed by me at St. Joseph Michigan this 10th day of January, 1918.

EDWARD CRAIG.