

Feb. 2, 1926.

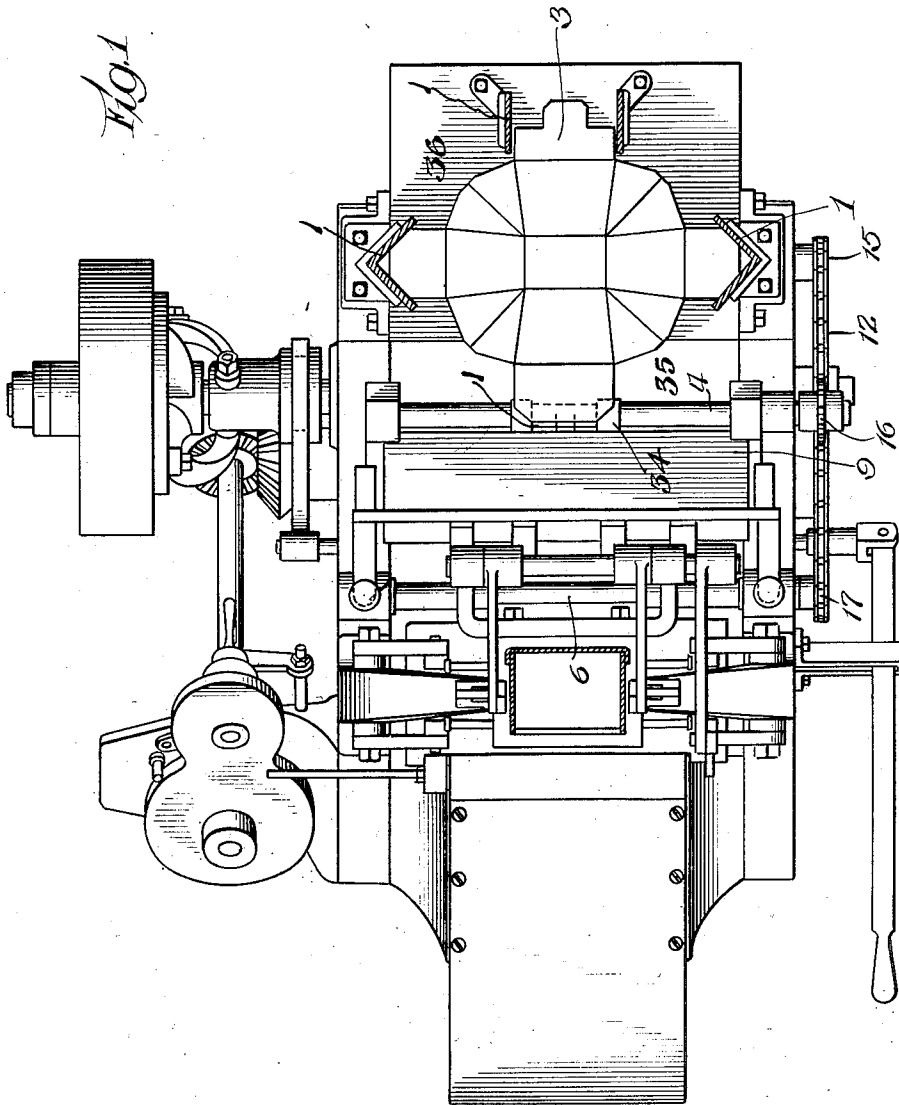
1,571,572

E. CRAIG

MACHINE FOR FEEDING SHEET MATERIAL

Original Filed April 23, 1920

5 Sheets-Sheet 1



Inventor
Edward Craig
By Arthur F. Durand
Att'y.

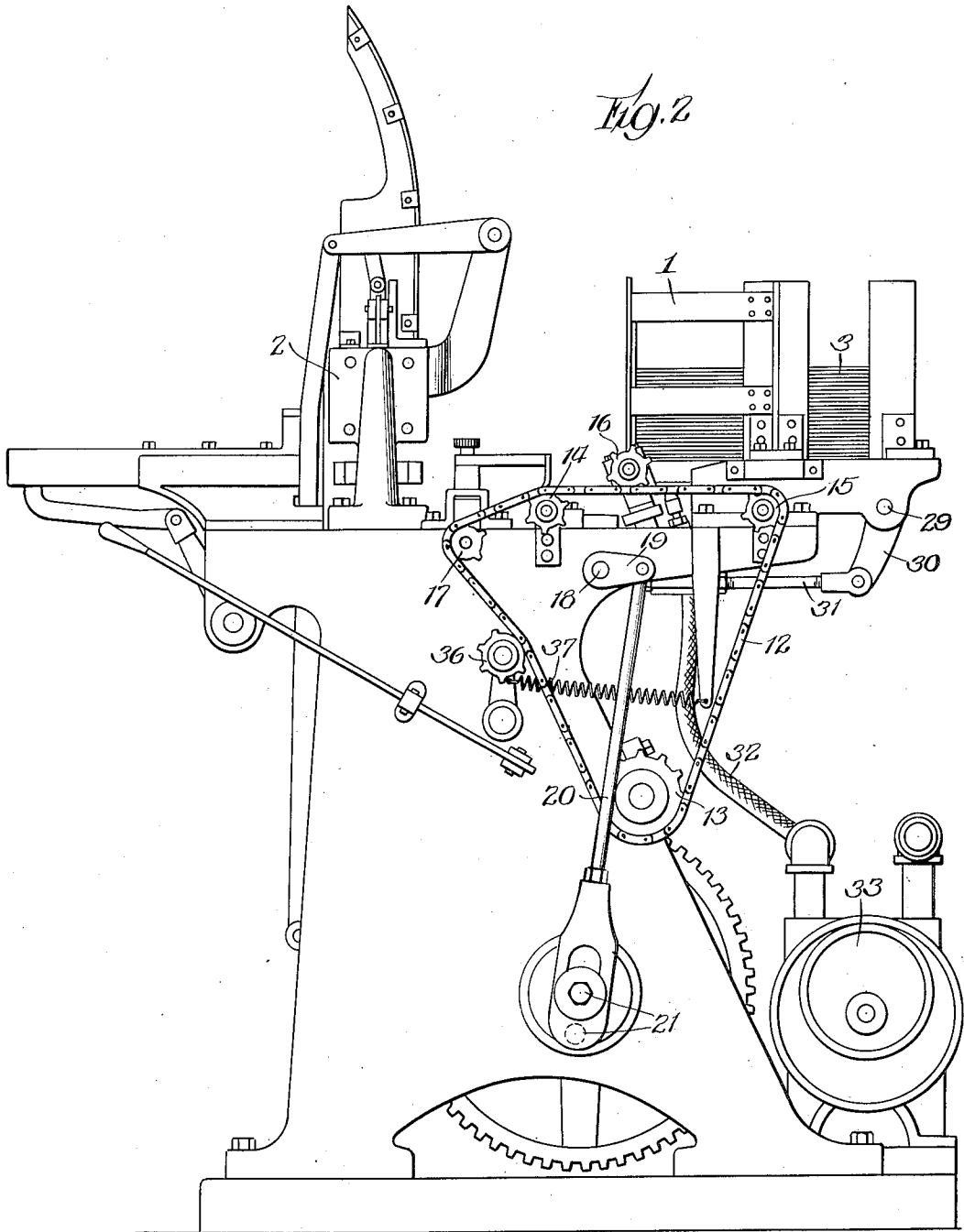
Feb. 2, 1926.

1,571,572

E. CRAIG

MACHINE FOR FEEDING SHEET MATERIAL

Original Filed April 23, 1920 5 Sheets-Sheet 2



Inventor
Edward Craig
BY Arthur F. Durant
Att'y.

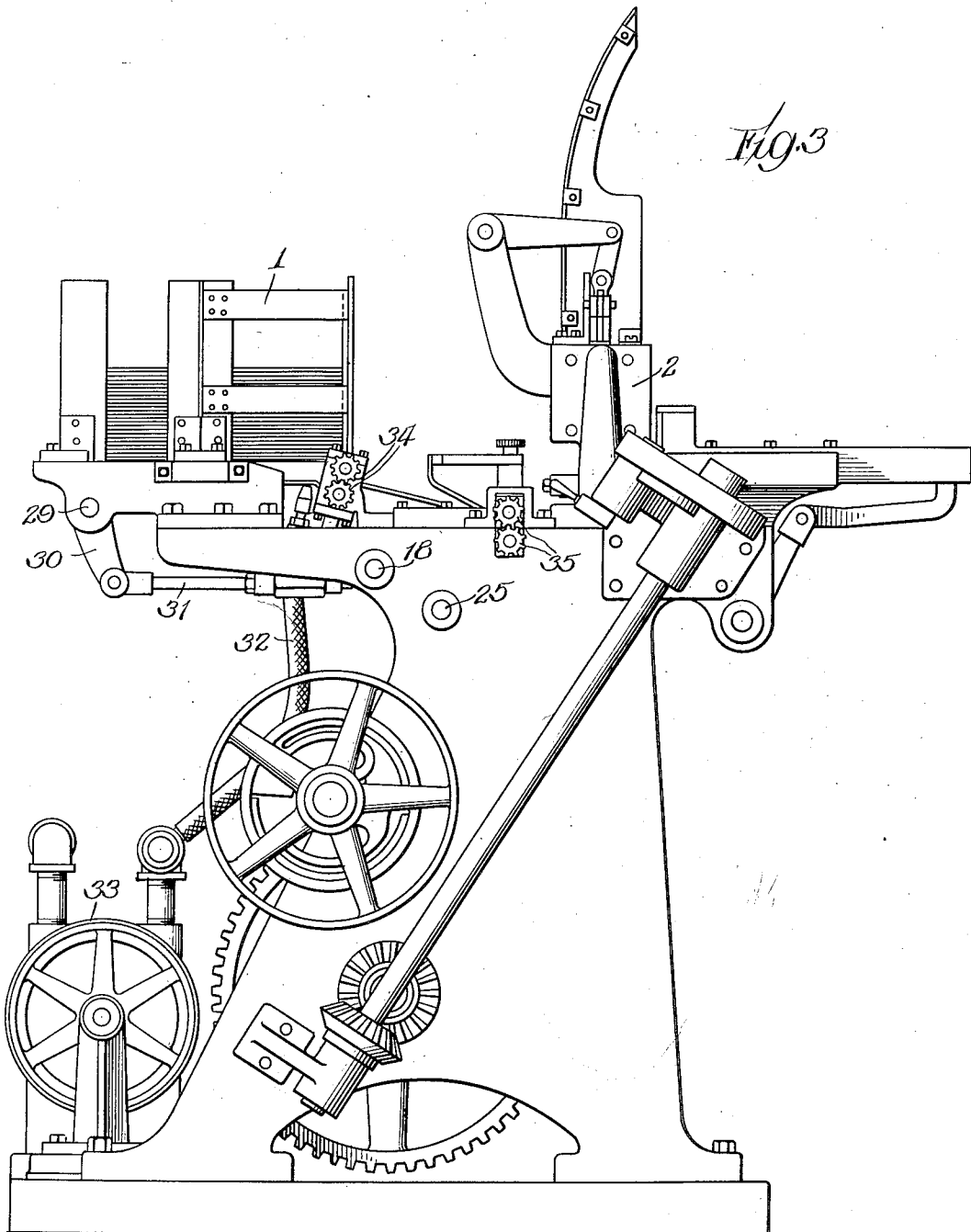
Feb. 2, 1926.

1,571,572

E. CRAIG

MACHINE FOR FEEDING SHEET MATERIAL

Original Filed April 23, 1920 5 Sheets-Sheet 3



Inventor
Edward Craig
By Arthur F. Durand
Atty.

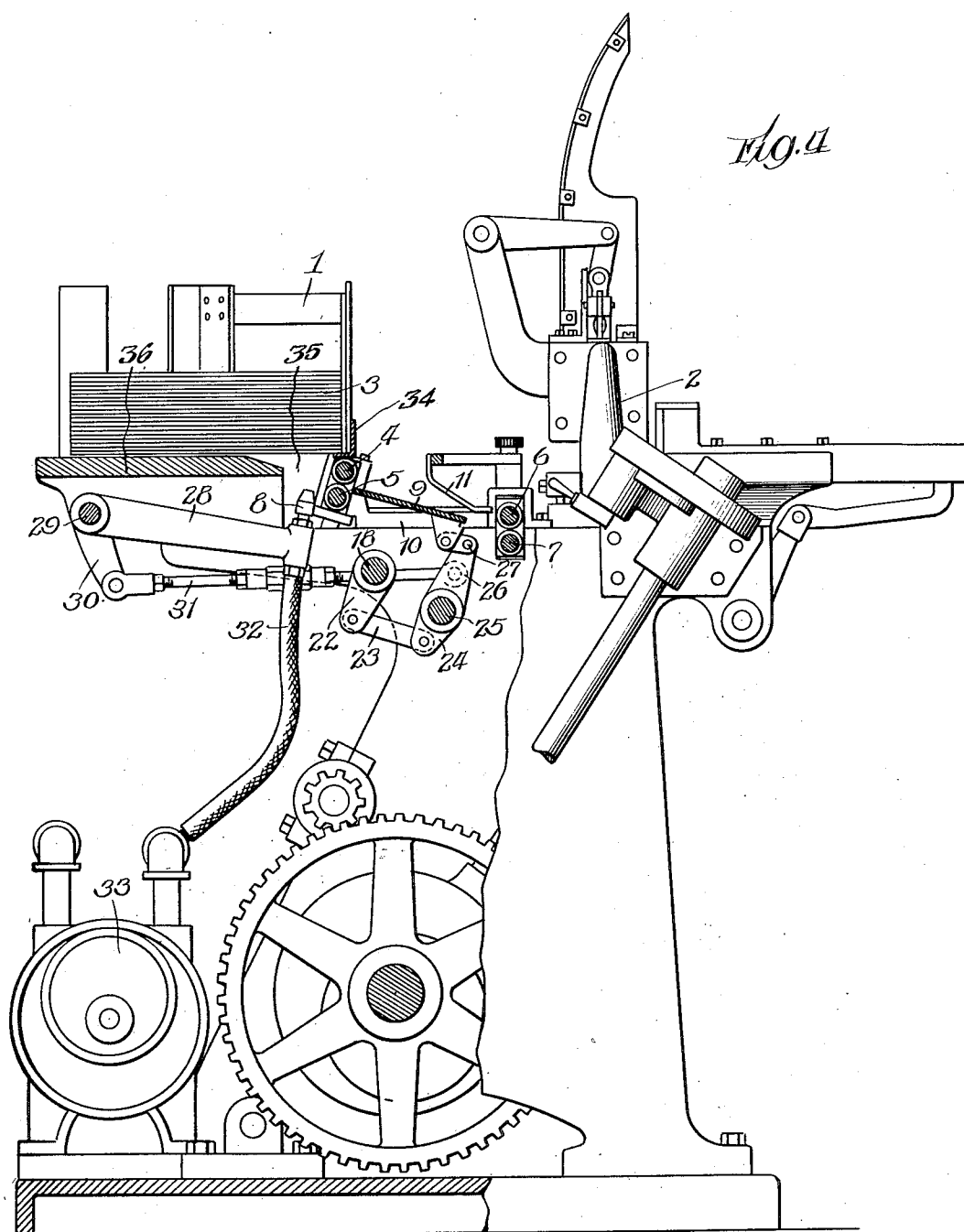
Feb. 2, 1926.

1,571,572

E. CRAIG

MACHINE FOR FEEDING SHEET MATERIAL

Original Filed April 23, 1920 5 Sheets-Sheet 4



Inventor
Edward Craig
By Arthur F. Durand
Att'y.

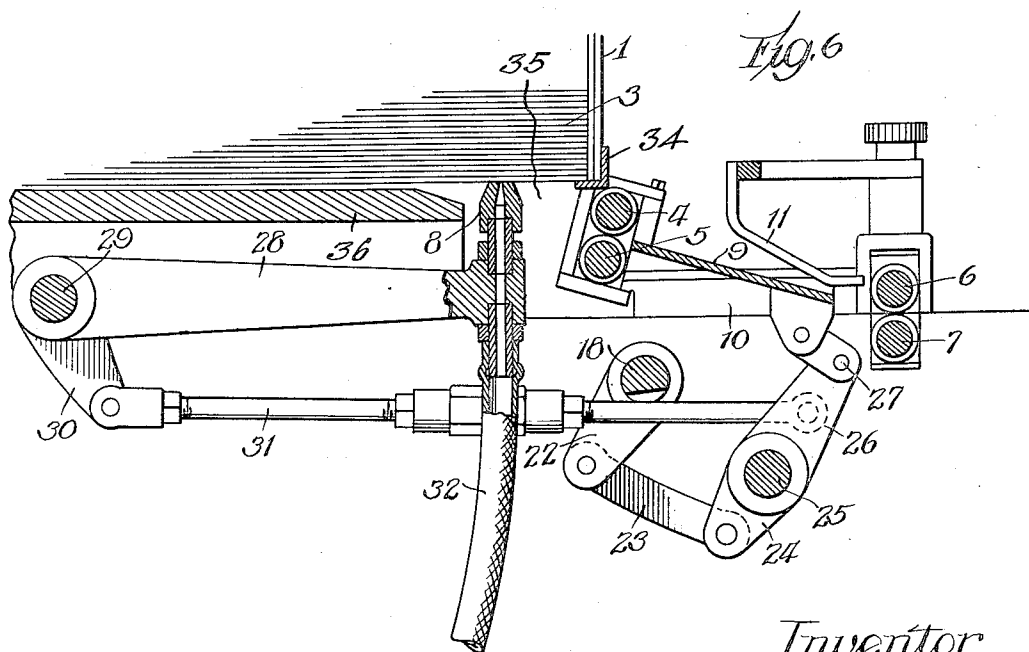
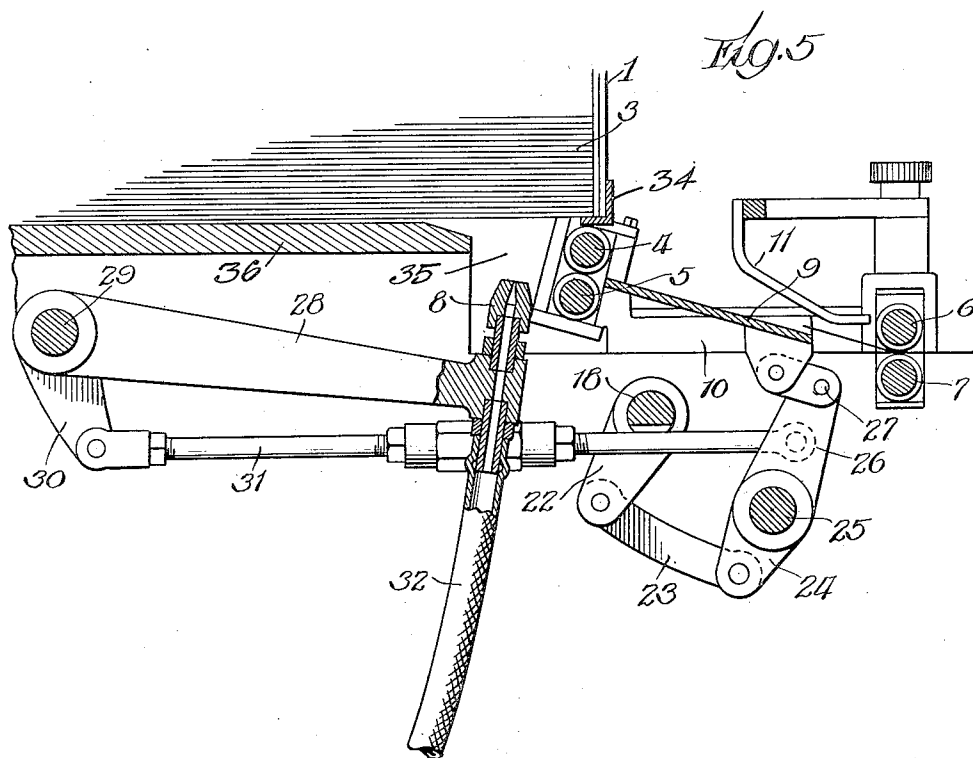
Feb. 2, 1926.

1,571,572

E. CRAIG

MACHINE FOR FEEDING SHEET MATERIAL

Original Filed April 23, 1920 5 Sheets-Sheet 5



Inventor
Edward Craig
By Arthur H. Durand
Atty.

Patented Feb. 2, 1926.

1,571,572

UNITED STATES PATENT OFFICE.

EDWARD CRAIG, OF ST. JOSEPH, MICHIGAN.

MACHINE FOR FEEDING SHEET MATERIAL.

Original application filed April 23, 1920, Serial No. 376,161. Divided and this application filed August 19, 1921. Serial No. 493,573.

To all whom it may concern:

Be it known that I, EDWARD CRAIG, a citizen of the United States, and a resident of St. Joseph, county of Berrien, State of Michigan, have invented a certain new and useful Improvement in Machines for Feeding Sheet Material (division of application No. 376,161), of which the following is a specification.

This invention relates to feeding mechanism for automatically feeding sheet material, or articles made from sheet material, from a hopper to a folding and fastening mechanism, or for any other suitable or desired purpose.

This is a division of application Serial Number 376,161 filed April 23, 1920 for machine for making ice cream pails or other receptacles, the Patent Office having requested that all claims for the feeding mechanism disclosed in said prior application be presented in a separate application.

Generally stated, the object of the invention is to provide a novel and efficient and improved feeding mechanism which will accurately feed the sheet material in the desired manner.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of a feeding mechanism of this particular character.

To these and other useful ends the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawings in which—

Figure 1 is a plan of a machine for making ice cream pails, such as the one shown in said prior application, having feeding mechanism embodying the principles of the invention.

Figure 2 is a side elevation of said machine.

Figure 3 is a similar view showing the other side of the machine.

Figure 4 is a view similar to Figure 3 showing certain portions broken away and showing the feed mechanism in vertical section.

Figure 5 is an enlarged sectional view of the said feed mechanism as shown in Figure 4.

Figure 6 is a similar view showing said mechanism in a different position.

As thus illustrated, the machine in connection with which the invention is illustrat-

ed comprises a hopper 1 and a folding and forming and fastening machine 2, the previously mentioned feed mechanism being employed for feeding the blanks 3 from said hopper to said forming machine, in which latter the blanks are folded and provided with bail shaped handles, so that each blank becomes an ice cream pail or other similar receptacle.

Said feed mechanism comprises the upper and lower feed rolls, 4 and 5 for receiving the blanks from the bottom of said hopper, and for feeding these blanks to the feed rolls 6 and 7 disposed in position to feed the blanks directly into said forming machine. The suction nozzle 8 is operative to pull down the lowermost blank at the proper time, thereby to facilitate the feeding of the blanks to the rolls 4 and 5, which latter shift horizontally toward and away from the rolls 6 and 7, as will hereinafter more fully appear. Thus, when the rolls 4 and 5 move back toward the hopper, they receive between them the edge portion of the blank which has been pulled down by the nozzle 8, and which is thus in position to be seized by the rollers. Said rollers 4 and 5 and also the rollers 6 and 7 rotate in unison, in the direction desired for the feeding of the blanks or other sheet material. When the rolls 4 and 5 seize a blank, they then not only feed the blank forward by their rotation, but also by their shifting movement toward the rolls 6 and 7, thus accelerating the feeding motion. The table 9 is carried by the reciprocating slide or frame 10 upon which the rolls 4 and 5 are mounted, and is disposed in position to deliver the blanks from the first set of feed rolls to the second set of rolls. Guards 11 are suitably mounted in position to hold the blanks down while they are traveling forward on this inclined table.

The means for operating said feed rolls, as well as for operating the nozzle, are as follows: A sprocket chain 12 is suitably operated by sprocket wheel 13 and is supported on idler sprockets 14 and 15 arranged as shown in the drawings. The upper feed roll 4 has its end provided with a sprocket wheel 16 which engages the horizontal portion of this sprocket chain and the feed roll 7 has its end provided with a sprocket 17 which also engages said sprocket chain or belt. In this way the operation of said belt serves to

rotate one roll of each pair of feed rolls. A rock shaft 18 is provided with a crank arm 19 to which is attached the upper end of the rod 20 which is reciprocated up and down by the cam device 21 at the side of the machine. This shaft 18 has an arm 22 connected by a link 23 with the arm 24 on the rock shaft 25, which latter has an arm 26 connected by a link 27 with the slide 10 previously mentioned. It will also be seen that the nozzle 8 is supported by an arm 28 mounted on a rock shaft 29, and that the latter has an arm 30 which is connected by the rod 31 with the arm 26 previously mentioned, whereby the oscillation of the rock shaft 25 by the cam device 21 not only reciprocates the slide 10, thereby to shift the rolls 4 and 5 back and forth in the desired manner, but also causes the nozzle 8 to move up and down in the required manner to pull the blanks down from the bottom of the hopper. Said nozzle is connected by a flexible tube 32 with the exhaust pump 33, which latter is constructed and operated in any suitable or desired manner.

The construction shown and described permits the sprocket wheel 16 to shift back and forth on the horizontal upper portion of the belt 12 without being disengaged therefrom. Said belt drives the feed rolls to feed the blanks or the sheet material and at the same time the rolls 4 and 5 are shifted back and forth to assist in the feeding action, in the manner explained. The various parts are so timed in their operations that the nozzle 8 rises and pulls down a blank, and while the edge portion of the blank is thus bent down the rolls 4 and 5 return and seize this edge portion of the blank, and then the rolls 4 and 5 move forward while rotating. The front edge portion of the blank is then seized by rolls 6 and 7 and the blank is forced forward into the forming machine.

For the broader purposes of the invention, it will be understood that the hopper 1 may be of any suitable form or construction and that the blanks themselves may be of any suitable or desired shape. The invention is shown as applied to a machine for making ice cream pails or other receptacles, but it is obvious that the feed mechanism may be employed in other situations and for other purposes, and may be employed for feeding sheet material of any suitable or desired character. For the blanks shown and described, the hopper preferably has a support just above the roll 4 for the front ends of the blanks. Thus when one is pulled down, the front ends of the other blanks are left fully supported. See Figures 5 and 6.

While only the upper roll of the reciprocating pair of feed rolls is positively driven, it will be seen that the two rolls are geared together at 34, so that the upper roll communicates power to the lower roll, whereby

the two rolls are driven in unison. In the same way, and while power is communicated from the endless belt 12 to the lower roll 7, it will be seen that through the gearing 35 this lower roll drives the upper roll 6, whereby the two rolls are driven in unison. With the construction shown and described, therefore, the endless belt 12 drives all of the feed rolls, those which reciprocate toward and away from the means for supplying and delivering the sheet material, as well as those which are disposed in stationary position to feed the sheet material directly into the forming machine. The belt 12 can be tightened by means of an ordinary belt tightener 36, which is controlled by a spring 37, in a manner that will be readily understood.

With further respect to the hopper, which is plainly shown in Figures 5 and 6 as having a support 34 for the front ends of the blanks, it will be seen that this results in pulling the front of each end blank downward through the gap 35 between this support and the front edge of the bottom of the hopper. Thus the lowermost blank lies flat in the horizontal plane, as shown, until the suction nozzle 8 pulls its front end downward from under the other blanks resting on the support 34 and into position to be grasped by the rolls 4 and 5 in the manner previously explained. There is no sagging, therefore, of the front ends of the blanks while they are in the hopper, and the nozzle 8 always comes back to find the next blank lying flat in a horizontal plane in the manner shown, and the pulling down of the front end of this lowermost blank does not disturb the others, and thus the feed mechanism tends to operate with precision and certainty in the successive feeding of the blanks from the hopper to the rolls 6 and 7 which then feed the blank to the pail forming machine. As previously explained, however, the hopper may be shaped or constructed to hold blanks of any suitable or desired form, depending upon the shape or form of the product to be produced from the blanks.

It will be seen that the means for delivering the sheet material or blanks comprises a hopper having means for supporting blanks each having a flap at its forward edge, as shown more clearly in Fig. 1, and instrumentalities for pulling down the lowermost flap and means for seizing this displaced flap and thereby feeding the entire blank forward in the desired direction. The nozzle 8 comprising the means for pulling the lowermost blank downward, is unaffected by the reciprocating motion of the feed rolls 4 and 5, of course, as shown and described, so that the means for pulling down the lowermost blank and the means for then feeding the blank forward are separate

and distinct and are each unaffected by the operation of the other. There is also, of course, the stationary feed rolls 6 and 7 for then seizing the blank fed from the reciprocating feed roll mechanism, all cooperating in an advantageous manner and in the way shown and described to feed blanks of sheet material to any sort of machine for converting the sheet material into the desired product.

What I claim as my invention is:

1. In a machine for making receptacles from sheet material, the combination of means for supplying the sheet material, and for supporting the front edge thereof, feed rolls to receive the sheet material from said means, a movable suction nozzle for pulling the edge portion of the sheet material downward into position to be engaged by said feed rolls, and guiding and supporting means to receive the sheet from said rolls, together with supporting and operating means whereby said nozzle is unaffected by the operation of said rolls, in combination with instrumentalities including a sprocket chain for operating said feed rolls, a second pair of feed rolls also operated by said sprocket chain, the second pair receiving the sheet material from the first pair, and means including a reciprocating member upon which said feed rolls are carried for reciprocating said rolls horizontally, a portion of said sprocket chain being disposed horizontally to facilitate the reciprocation of the feed rolls.

2. In a machine for making receptacles from sheet material, the combination of means for supplying the sheet material, and for supporting the front edge thereof, feed rolls to receive the sheet material from said means, a movable suction nozzle for pulling the edge portion of the sheet material downward into position to be engaged by said feed rolls, and guiding and supporting means to receive the sheet from said rolls, together with supporting and operating means whereby said nozzle is unaffected by the operation of said rolls, said suction nozzle being carried on a swinging arm, below the sheet material, a flexible pipe connection extending to said nozzle, a power shaft, and operating connections extending from said power shaft to said swinging arm, so that said nozzle is moved up and down to successively pull down sections of sheet material and deliver the same to said feed rolls.

3. In a machine for making receptacles from sheet material, feeding means comprising a pair of feed rolls for feeding the sheet material, means for reciprocating said rolls horizontally, so that said rolls reciprocate bodily in a direction at right angles to the length thereof, in a plane below the sheet material, means unaffected by said reciprocating motion to assist in delivering the

sheet material to said rolls, means to drive the feeding means without interfering with the reciprocating motion thereof, and means to finally receive the sheet material.

4. A structure as specified in claim 3, in combination with a second pair of feed rolls to receive the sheet material from said reciprocating feed rolls.

5. In feeding mechanism, the combination of feed rolls, an endless sprocket belt, means for supporting said belt with a portion thereof extending horizontally, means for reciprocating said rolls horizontally, and means engaging the horizontally disposed portion of said belt to rotate one of said rolls.

6. A structure as specified in claim 5, in combination with means for delivering sheet material to said rolls.

7. A structure as specified in claim 5, in combination with a second pair of feed rolls one of which is driven by said sprocket belt, and means for delivering sheet material to the first pair of rolls, the second pair of rolls being disposed in position to receive the sheet material from said reciprocating rolls.

8. A structure as specified in claim 5, in combination with a suction nozzle for delivering sheet material to said rolls, and provisions whereby said nozzle is operated by said means for reciprocating said rolls.

9. A structure as specified in claim 5, in combination with a table to receive sheet material from said rolls, and guards for engaging the upper surface of the sheet material over said table.

10. In feeding mechanism, the combination of rotary feed rolls, means for delivering sheet material to said rolls, means for reciprocating said rolls toward and away from said means for delivering the sheet material, so that said delivering means are unaffected by said reciprocating motion, and means for positively rotating at least one of said rolls without interruption during said reciprocating motion.

11. A structure as specified in claim 10, said means for rotating the roll comprising an endless sprocket belt having a straight portion, and means engaging said straight portion and reciprocating back and forth thereon with said rolls to communicate power from said belt to rotate the roll.

12. In a machine for making receptacles from sheet material, the combination of means for supplying the sheet material, feed rolls to receive the sheet material from said means, a movable suction nozzle for pulling the edge portion of the sheet material downward into position to be engaged by said feed rolls, and guiding and supporting means to receive the sheet from said rolls, in combination with instrumentalities including a sprocket chain for operating said

feed rolls, a second pair of feed rolls also operated by said sprocket chain, the second pair receiving the sheet material from the first pair, and means including a reciprocating member upon which said feed rolls are carried for reciprocating said rolls horizontally, a portion of said sprocket chain being disposed horizontally to facilitate the reciprocation of the feed rolls.

10 13. In feed mechanism for sheet material, the combination of feed roll mechanism, means for reciprocating said mechanism, devices unaffected by the reciprocating motion for delivering the sheet material to said feed roll mechanism, means for operating 15 said devices, and instrumentalities for operating said mechanism, said instrumentalities comprising a sprocket chain having a horizontal stretch, and means engaging said horizontal stretch to operate said mechanism. 20

EDWARD CRAIG.