Dec. 19, 1933. S. J. CAMPBELL 1,940,487

FEEDER FOR BLANK SHEETS

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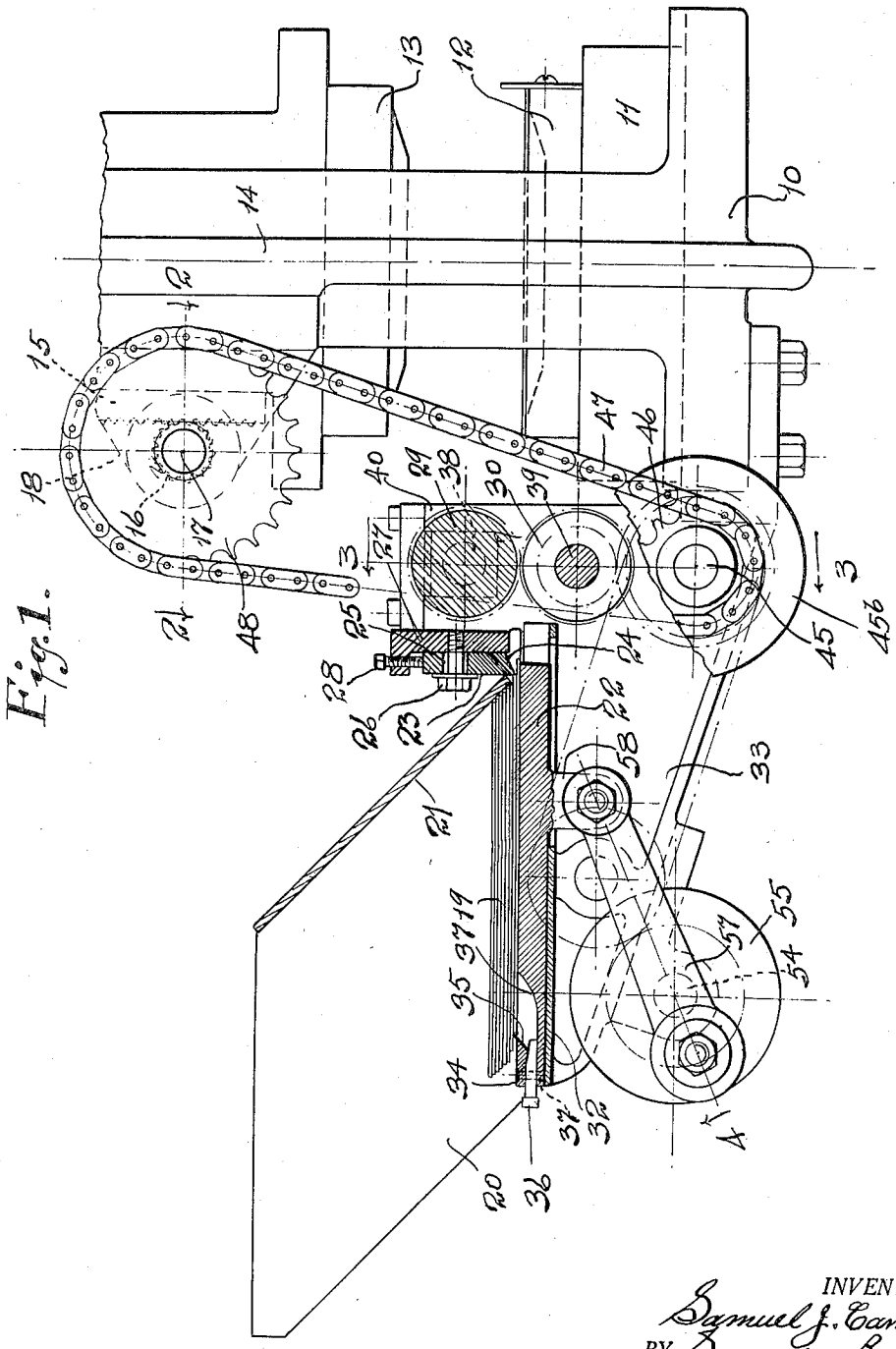

Fig. 1.

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Fig. 2.

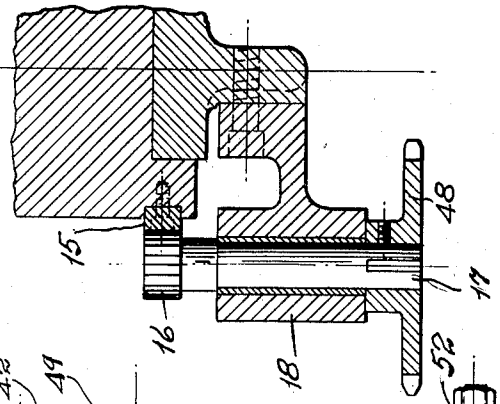



Fig. 3.

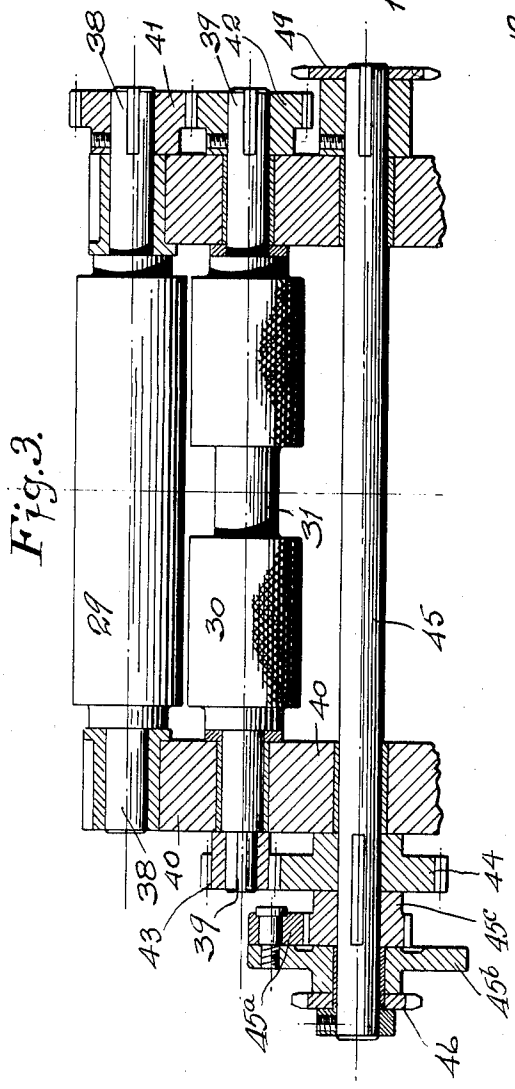



Fig. 4.

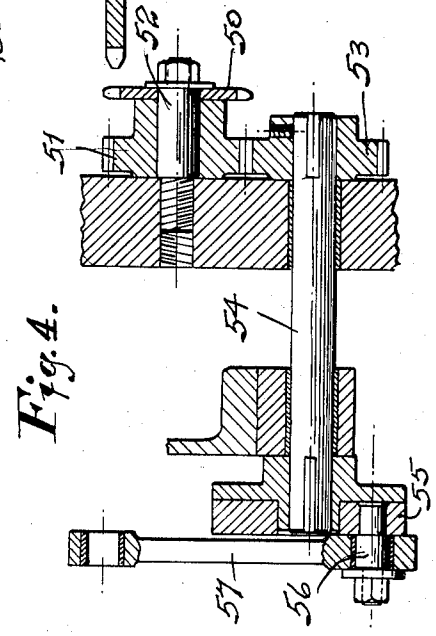
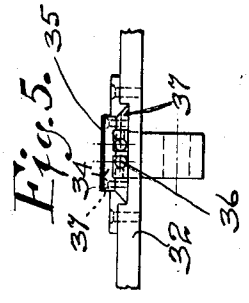



Fig. 5.

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# UNITED STATES PATENT OFFICE

1,940,487

## FEEDER FOR BLANK SHEETS

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Application April 4, 1932. Serial No. 602,901

3 Claims. (Cl. 271—44)

The feeder of the present invention is designed for use in association with any form of mechanism, such as a punch press, die or the like, to which it is necessary to feed blanks in timed order from a stack, and the present mechanism relates particularly to the means provided for maintaining the stack of blanks in proper order and to the means provided for feeding the lowermost blank from the stack while retaining the remaining blanks in superposed relation. The invention furthermore relates to the means for adjusting the blade which engages and feeds the lowermost blank forwardly; to the means for adjusting the bar which regulates the space afforded for feeding forward the lowermost blank, to the mechanism for operating the slide plate which carries forward the selected blank and presents it to the feeding rollers, and to the various mechanisms for operating the parts in properly timed relation to one another.

Further objects and details will appear from the description of the invention in conjunction with the accompanying drawings wherein

Fig. 1 is a side elevation, partly in section, of the feed mechanism of the present invention;

Fig. 2 is a sectional detail taken on line 2—2 of Fig. 1;

Fig. 3 is a view, partly in section, of the feed rollers, taken on line 3—3 of Fig. 1;

Fig. 4 is a sectional detail taken on line 4—4 of Fig. 1; and

Fig. 5 is a detail showing the tapered screw adjustment for the blade which engages the blank to be fed from the stack.

The feeding mechanism of the present invention is shown as associated with a die press for forming paper plates or the like, which comprises a main frame 10, provided with a bed 11, which carries a female die 12 which co-acts with a male die 13 operable between standards 14 and carrying a rack 15 which meshes with a spur pinion 16 carried by a shaft 17 journalled within a bracket 18 outstanding from one of the standards 14 as best shown in Fig. 2 to impart forward and reverse rotation to the shaft 17. Of course it will be understood that the machine above described served merely as an exemplification of a suitable form of mechanism with which the feeding device of the present invention may be suitably associated.

The blanks to be fed to the die press or other mechanism are stacked in the form of oblique column 19 and are maintained in position within a guide hopper comprising side plates 20 and a forward plate 21, the latter extending obliquely upward and in reverse direction to the forward movement of the lowermost blank of the column which rests upon a reciprocating slide plate 22 which occupies a position slightly below the lowermost lip or edge of the obliquely disposed plate 21 between which and the slide plate is a narrow space which, as shown, is of sufficient width to permit the projection thereunder of the two lowermost blanks of the column.

Immediately in advance of the slot thus afforded is located an adjustable gate bar 23 which presents its beveled edge 24 below the edge of the oblique plate 21 and in position to engage and prevent the advance of all but the lowermost sheet of the stack. The gate bar 23 is provided with slots 25 through which are entered locking screws 26 which are threaded into the cross bar 27 constituting a portion of the frame of the machine. An adjustment is effected by means of adjusting screws 28 which bear against the upper edge of the gate bar and afford means for vertical adjustment thereof to regulate the gap provided for the discharge of the blanks.

The upper surface of the slide plate stands in alignment with the bite of upper and lower feed rolls 29 and 30, respectively, and the lowermost feed roll of the pair is of reduced diameter in its center 31 to afford clearance for the reciprocations of the slide plate so that with each forward advance movement thereof, the blank carried thereby will be positively delivered into the bite of the rollers 29—30.

The guide 32 is suitably mounted upon brackets 33 which constitute a portion of the frame of the machine and the slide plate at its rear edge is provided with a vertically adjustable block 34 which is beveled at its forward edge to receive a sharp blade 35 which stands obliquely and projects upwardly above the forward edge of the block and to a sufficient degree to engage the rear edge of the lowermost blank of the stack carried above the slide plate. The vertical adjustment of the block 34 is effected by means of a pair of tapered wedges 36 and locking screws 37 which arrangement permits the blade 35 to be accurately adjusted with respect to the thickness of the blanks being fed so that in each case only the lowermost blank will be fed from the stack. In order to provide for the mounting of the block 34 which carries blade 35, the rear end 37 of the slide plate 22 is of reduced thickness which brings the upper surface of the block 34 into substantially flush relationship with the plane of the upper surface of the slide plate and brings the upper edge of the blade 35 slightly above the said

plane as is required to engage the lowermost blank of the stack.

The rollers 29 and 30 are carried by spindles 38 and 39 respectively, journalled within the standards 40 which constitute a portion of the frame, and the spindles 38 and 39 carry intermeshing spur gears 41 and 42, respectively, for driving the rollers in unison. The spindle 39 carries a spur gear 43 meshing with a driving spur gear 44 on a drive shaft 45 which is given intermittent forward feeding movements through the medium of a dog $45^a$ pivoted on a loosely mounted disk $45^b$ and coacting with a ratchet $45^c$ keyed to the shaft 45. The disk $45^b$ is given forward and reverse oscillations by a sprocket 46 driven by a sprocket chain 47, which latter passes over a sprocket 48 on the shaft 17, which is oscillated by the reciprocations of the die press acting through the rack 15 and spur pinion 16. The power transmission elements thus far described impart intermittent forward feeding movements to the rollers 29 and 30 in timed relation to the movements of the parts.

In order to operate the slide plate 22 in timed relation with the mechanisms last described, the shaft 45 is provided with a sprocket 49 which co-acts with a sprocket 50 through the medium of a sprocket chain to drive a pinion 51 on a stub-shaft 52, which pinion meshes with a pinion 53 on a counter-shaft 54 which carries a disc 55 upon which is mounted a crank pin 56, which pivots a link 57, having its forward end pivoted to a tongue 58, depending from the slide plate 22, the arrangement being such as to impart to the slide plate a range of feeding and return movement sufficient on each throw to carry forward the lowermost blank in position to be caught within the bite of the rollers 29 and 30.

It will be understood that the above described power transmission train serves merely by way of exemplification and that any suitable form of power transmission adapted to impart to the working elements the necessary movements in proper timed relation, can be employed and that the invention has not been limited to the particular transmission mechanism above described.

In operation, the feeding movements will, of necessity, take place in alternation to the movements of the die punch or instrumentality which acts upon the blanks when delivered and in properly timed relation thereto. With the parts in the position shown, and with the male die on its upward movement, and with the slide plate in its rearmost position, the lowermost blank of the stack will be engaged in position for forward advancement during the remainder of the upward movement of the movable die or other instrumentality and during the continuance of such upward movement, the rollers 29 and 30 will rotate in a direction to feed the blank forwardly and into a position immediately above the female die 12. During this period of the operation, the slide plate will have a forward movement imparted to it through the action of the crank 56 and the link 57 and this will cause the blade 35 to engage the rear edge of the lowermost blank which will be forced beneath the lower beveled edge of the bar 23 and into the bite of the rollers, the lowermost of which is recessed or channelled in its center to afford clearance for the forward movement of the slide plate.

The obliquely disposed plate 21 serves to hold the blanks composing the stack in stepped relation to one another so that on each forward reciprocation, as the lowermost blank is fed forward, the blank immediately above will be forced forwardly into contact with the oblique edge of the gate bar and stopped in that position in preparation for its forward advancement on the next feeding movement of the slide bar. By a proper adjustment of the gate bar, in conjunction with an equivalent adjustment of the feeding blade 35, provision can be made for permitting the escape on each reciprocation of the slide plate of the lowermost blank of the stack with a retention of the remaining blanks in the stack in position for feeding singly during succeeding operations of the slide plate.

The mechanism is one which affords positive means for feeding blanks singly and the adjustments can be accurately made to accommodate very thin blanks which, however, are of sufficient stiffness to be fed by a thrust from the rear in the manner described.

Although the invention has been described with particularity as to detail, it is not the intention to limit the invention strictly to the features described since variations can be made without departing from the spirit of the invention.

I claim:—

1. In mechanism for feeding blanks, the combination of upper and lower feed rolls, the lower roll being grooved at its center, a slide plate having its upper surface in a plane extending through the bite of the rolls and of a size to permit it to enter the grooved portion of the lower roll, means for reciprocating the slide plate and an adjustable blade carried by the slide plate and adapted to engage the rear edge of a blank lying thereon, an obliquely disposed plate having its lower edge located slightly above the slide plate and adapted to permit blanks to be fed thereunder, and an adjustable unyielding gate bar mounted on a rigid portion of the structure independently of the obliquely disposed plate and having its lower edge projected below and in advance of the lower edge of the obliquely disposed plate in position to prevent escape of blanks above the lowermost blank.

2. In mechanism for feeding blanks, the combination of upper and lower feed rolls, the lower roll being grooved at its center, a slide plate having its upper surface in a plane extending through the bite of the rolls and of a size to permit it to enter the grooved portion of the lower roll, means for reciprocating the slide plate, a member carried by the slide plate and adjustable to varying degrees of projection above the slide plate and adapted to engage the rear edge of the lowermost blank lying thereon, an obliquely disposed plate having its lower edge elevated slightly above the slide plate and adapted to hold the forward edges of a column of blanks in oblique stepped relation to one another and elevated to permit feeding thereunder of the two lowermost blanks, and an unyielding gate bar mounted upon a rigid portion of the structure independently of the obliquely disposed plate and vertically adjustable to present its lower edge below and in advance of the lower edge of the obliquely disposed plate in position to prevent escape of the blank above the lowermost blank.

3. In mechanism for feeding blanks, the combination of upper and lower feed rolls, the lower roll being grooved at its center, a slide plate having its upper surface in a plane extending through the bite of the rolls and of a size to permit it to enter the grooved portion of the lower roll, means for reciprocating the slide plate, a member car-

ried by the slide plate and adjustable to varying degrees of projection above the slide plate and adapted to engage the rear edge of the lowermost blank lying thereon, an obliquely disposed plate having its lower edge elevated slightly above the slide plate and adapted to hold the forward edges of a column of blanks in oblique stepped relation to one another and elevated to permit feeding thereunder of the two lowermost blanks, an unyielding gate bar having its lower edge in advance of and in close relation to the lower edge of the obliquely disposed plate, the lower edge of the gate bar being upwardly and forwardly beveled to present a knife edge below the obliquely disposed plate in position to prevent escape of the blank above the lowermost blank, and a frame bar rigidly carried by the frame structure of the machine independently of the obliquely disposed plate upon which frame bar the gate bar is adjustably mounted to permit vertical adjustment of its acting edge.

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