F. N. & W. C. WEIS.

PAPER BOX MAKING MACHINE.

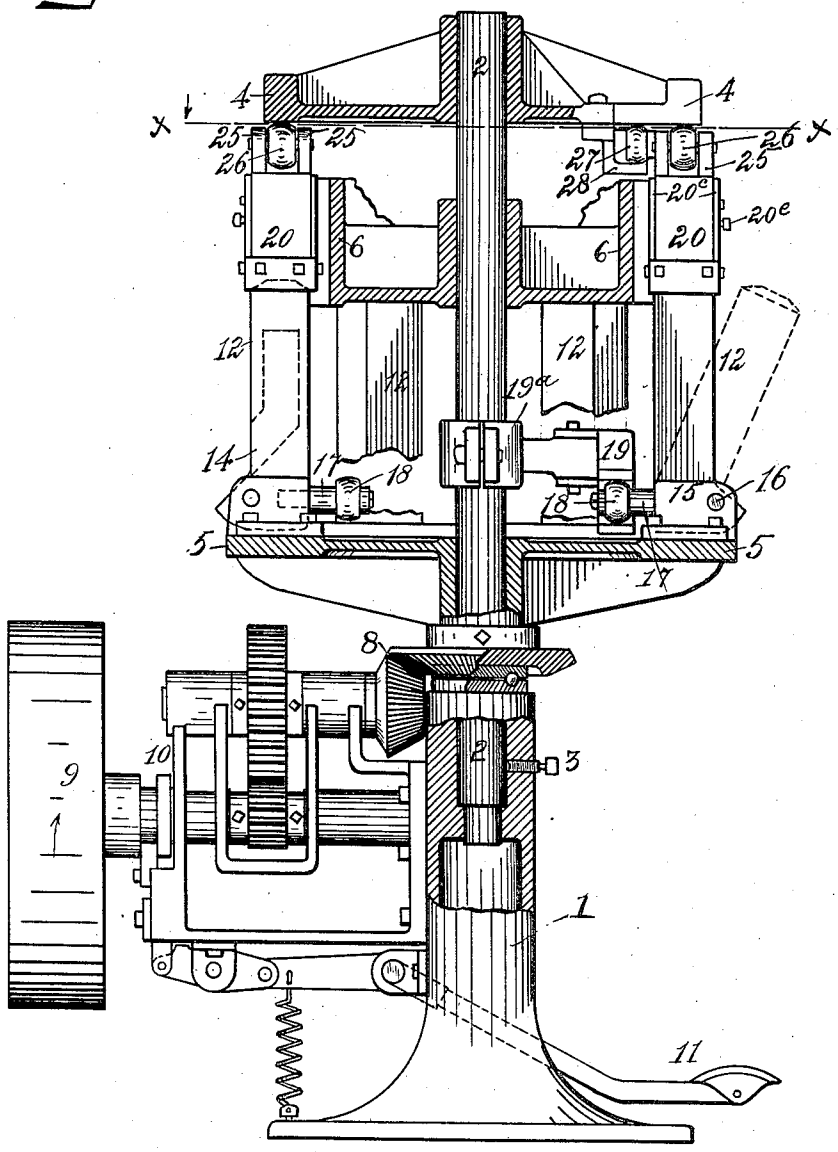
APPLICATION FILED NOV. 27, 1911.

1,095,537.

Patented May 5, 1914.

4 SHEETS—SHEET 1.

Fig. 1



WITNESSES.

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Leona Kilburtz

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4 SHEETS—SHEET 2.

Fig. 2

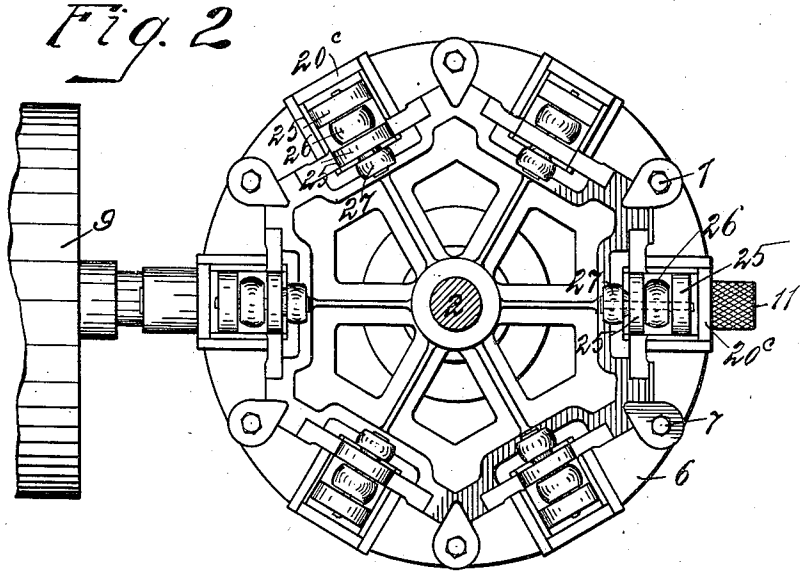
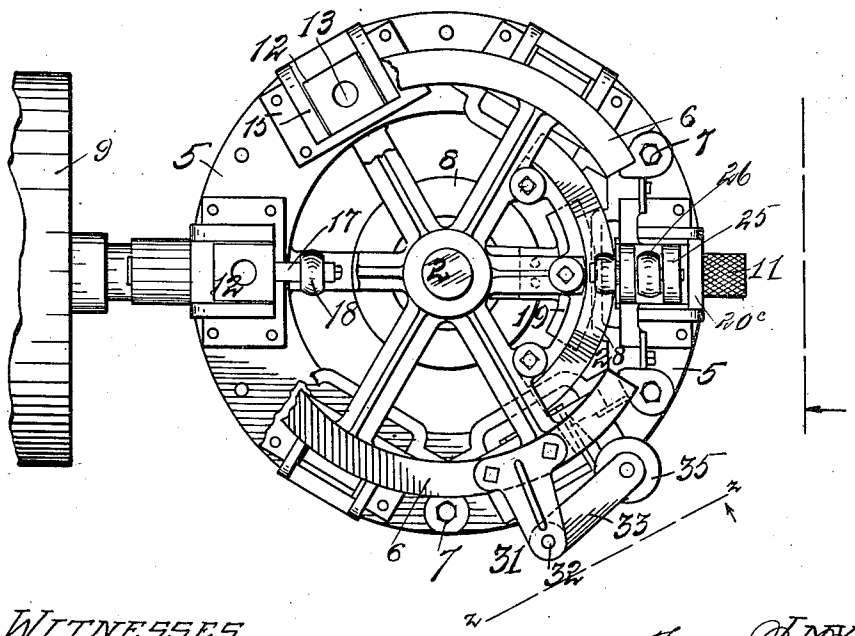


Fig. 3



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4 SHEETS—SHEET 3.

Fig. 4

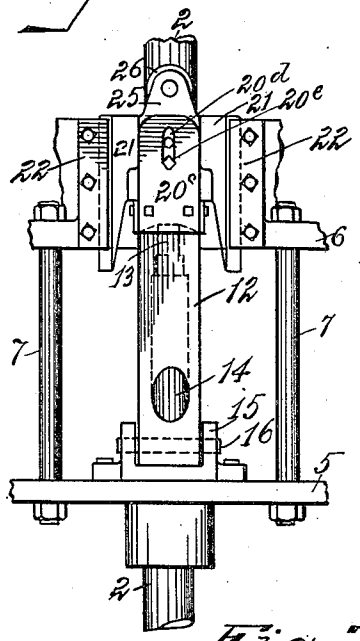


Fig. 5

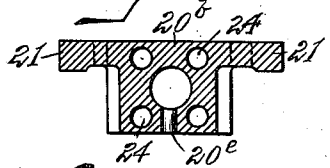


Fig. 6

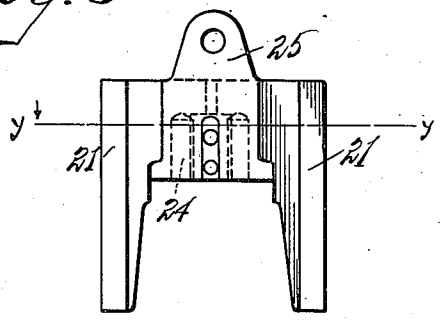
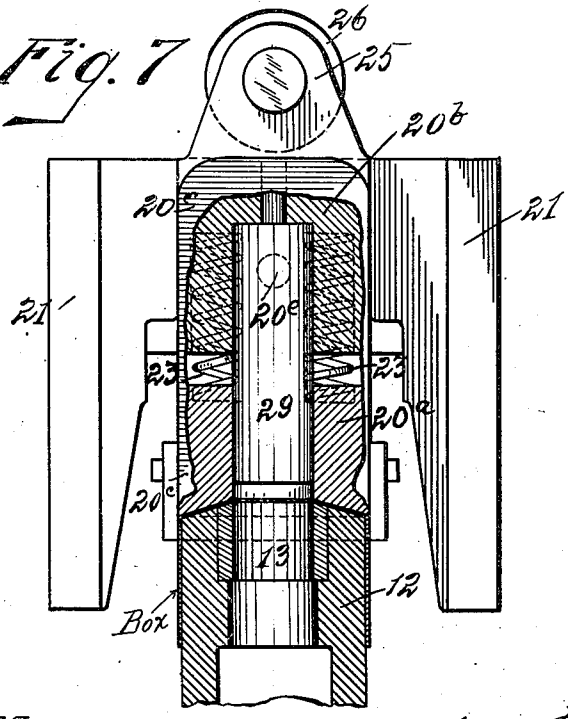


Fig. 7



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4 SHEETS—SHEET 4.

Fig. 8

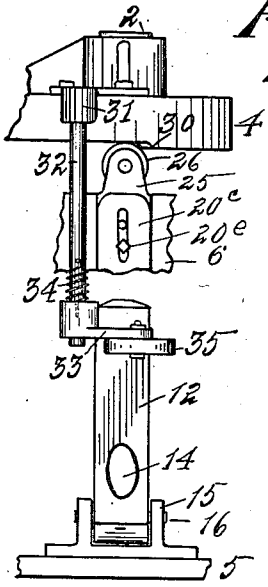
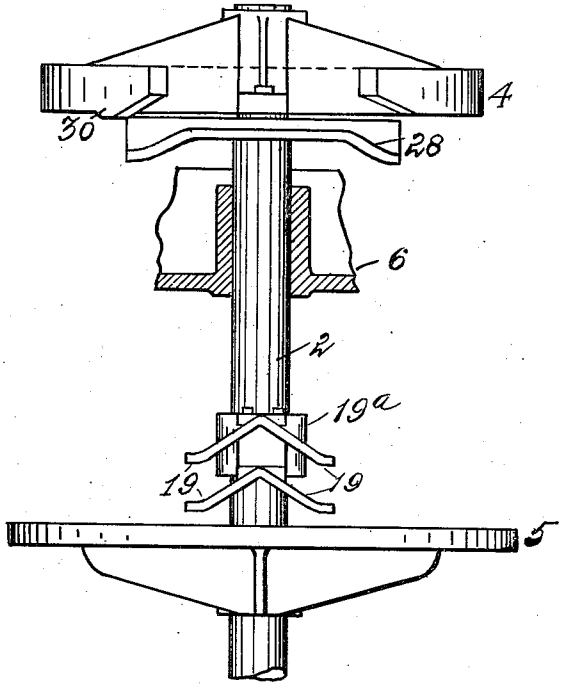


Fig. 9



WITNESSES.

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UNITED STATES PATENT OFFICE.

FRANK NICOLAUS WEIS AND WILLIAM CHRISTIAN WEIS, OF MONROE, MICHIGAN, ASSIGNORS TO THE WEIS-VAN WORMER COMPANY, A CORPORATION OF MICHIGAN.

PAPER-BOX-MAKING MACHINE.

1,095,537. Specification of Letters Patent. Patented May 5, 1914.

Application filed November 27, 1911. Serial No. 662,641.

To all whom it may concern:

Be it known that we, FRANK N. WEIS and WILLIAM C. WEIS, citizens of the United States, residing at Monroe, in the county of Monroe and State of Michigan, have invented certain new and useful Improvements in Paper-Box-Making Machines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to and its object is to provide a machine for pressing and holding together the glued meeting surfaces of the overlapping flaps of a paper-box-blank.

Our invention is also designed to provide means for cutting a hole through the flaps while thus held in place to form a mouth for the completed box.

Our invention further relates to certain details of construction hereinafter described, and which will be pointed out in the claims.

We attain the objects above indicated by means of the devices, construction and arrangement of parts hereinafter described, and shown and illustrated in the accompanying drawings, in which,—

Figure 1 is a side-view of our device, for the most part in central vertical sectional elevation; Fig. 2, a top-plan view of our machine taken on line *x*—*x* Fig. 1, the upper ring hereinafter referred to being removed; Fig. 3, a top-plan view of our machine with the upper ring in place but partly broken away to show the second ring hereinafter referred to, which ring is also partly broken away to show the top of the formers and cutting-dies hereinafter referred to; Fig. 4, a front-elevation, on an enlarged scale, of the lower and middle ring hereinafter referred to with the housing for the former, and the slide for the presser-block and cutting die, hereinafter referred to, in place thereon; Fig. 5, a top-plan view, in section on line *y*—*y* Fig. 6, showing the guide for the sliding presser-block hereinafter referred to; Fig. 6, a front-elevation of the same; Fig. 7, a front-elevation of the same on an enlarged scale with portions broken away to show the internal construction and arrangement of the cutting-die, presser-block, springs, punch and former-block, hereinafter referred to; Fig. 8, a side-elevation of a portion of our machine seen on line *z*—*z* Fig. 3, showing the device for holding the box in place on the former-block during the upward movement of the presser-block, as hereinafter explained, and Fig. 9, a side-elevation of the upper and lower rings of our machine, disclosing the devices for tilting the former-block to permit the application and removal of the blank to be operated upon, together with the device for actuating the slide which carries and actuates the presser-block and punch.

Like numerals of reference indicate like parts throughout the drawings.

In the drawings, 1 is a pedestal in the vertical bore of which is socketed a shaft 2 held rigidly against rotation by a set-screw 3. At the top of the shaft is rigidly secured a horizontal ring 4. Journaled upon the shaft 2, just above the pedestal, is a ring 5 which supports and carries a ring 6, also journaled on the shaft 2 and intermediate the top ring 4 and the ring 5. The connections between the rings 5 and 6 by which they are held rigidly in fixed relation consist of rods or bolts 7, (see Fig. 4) threaded and provided with nuts at their lower and upper ends, as shown. The rings 5 and 6 are caused to revolve upon the shaft 2 by means of the beveled gears 8 connected by suitable intermediate gearing with the driving pulley 9. A clutch 10, actuated by foot-lever 11, throws the gears into and out of operative connection with the driving pulley so that the rotation of the rings 5—6 is quickly started and stopped as may be desired.

The box, one end of which this machine is intended to close, seal and punch, is, in the present instance, for illustration, square in transverse section, the box being closed at its sides, one end being open, the sides of the box being extended and terminating at the opposite end to form flaps which, when folded inwardly, overlap each other to form a closure for that end of the box. The end thus closed and sealed is designed to be slightly conical, the cone being truncated by a round hole cut or punched therethrough.

12 is a former-block of the exact size and shape of the interior of the box, except that it is longer, the upper end of the former being slightly conical, as indicated in dotted

lines in Fig. 1 and as shown in Fig. 7. In the present machine there are, for illustration, six of these blocks and a description of one, its supports and its mode of operation will answer for all. The block is hollow and has a hole 13 in the center of its top which leads down into the hollow of the block. At the bottom of the cavity of the block is an outwardly inclined opening 14 for the discharge of punchings, as hereinafter explained. Secured to the top of the ring 5 at equi-distant intervals, between the posts 7, are blocks, each having a pair of upright lugs 15 between which the blocks 12 are, at their lower ends, pivotally supported, as at 16, the pivots permitting the blocks to swing outwardly, as indicated in the dotted lines in Fig. 1, or into upright position. The block 12 at its lower end has an arm 17 which projects inwardly toward the central upright shaft, upon which arm is journaled a roller 18. At the front of the machine,—that is, the part nearest the operator,—and supported by a collar 19^a on the shaft 2, is a pair of short segmental tracks 19 (see Fig. 9) lying in the path of the roller 18 and between which the roller must travel in its circuit. These tracks 19 are inclined upwardly from the approach-side to their middle and from thence downwardly to their opposite ends so that when the roller travels between these two tracks it moves upwardly and then downwardly, causing the former-block 12 to first tilt outwardly upon its pivot and then inwardly into upright position.

Mounted upon the ring 6, in vertical alinement with the former blocks 12, is a series of presser-blocks 20, a description of one of which will suffice for all. The presser-block is provided with wings or elongated lugs 21 which slide vertically in guides or ways 22, secured to the outer rim of the ring 6. (See Fig. 4.) The bottom of the presser-block is concaved to conform to the conical upper end of the former-block 12. The presser-block is divided horizontally into two parts 20^a—20^b, the two parts being held asunder by stiff spiral springs 23 which are held in position by sockets 24 in the opposed faces of the parts 20^a—20^b. The upper block-part 20^b is rigidly or integrally connected with the wings or slides 21. The lower block-part 20^a is slidably connected with the upper part by means of plate 20^c rigidly bolted at its lower end to the part 20^a and having a vertical slot 20^d near its upper end through which slot a set-screw 20^e enters the part 20^b, the arrangement being such that the part 20^a has a limited movement toward and away from the upper part 20^b. The two presser-block-parts are furthermore held in alinement and slidable toward and away from each other by means of a cutting punch or plunger rigidly connected at its upper end with the part 20^b and movable in the vertical axis of part 20^a, as hereinafter explained. Upon the top of the block-part 20^b are two upwardly projecting lugs 25 between which is journaled a roller 26. The shaft of this roller also carries another roller 27. The underside of the top ring 4 forms a track against and upon which the roller 26 travels. At the front part of the machine this ring is broken away, as illustrated in Fig. 3. Secured to the underside of the ring 4 at the front of the machine and coinciding with the interrupted portion of the ring is a short segmental track 28 which lies in the path of the roller 27. This track is bent upwardly at its approach end and then runs horizontally and at its opposite end is inclined downwardly, as clearly shown in Fig. 9, the arrangement being such that when the roller 26 rides against its overhanging track the presser-blocks are pushed downwardly, and when the roller 26 reaches the open space in the front of the ring 4 the roller 27 mounts and rides upon the short track 28, thus lifting the presser-blocks and holding them elevated during a short portion of their circuit.

The two blocks 20^a—20^b are bored axially and vertically for the reception of a punch 29. The upper end of the punch rests against the upper end of the socket in the part 20^b, and is there held by its engagement with the inner end of the set-screw 20^e. It will be seen that if the block-part 20^a be held stationary and if the upper block-part 20^b be depressed, the plunger will be moved downwardly with its lower end projecting beyond the bottom of the block 20^a. In the track of the roller 26, near the end of its circuit, is a downwardly projecting shoulder 30 which depresses and causes the roller 26 to travel in a lower plane until it is released by the gap in the front of the ring 4.

The operation of our device, thus far described, is as follows: Assuming that the parts are assembled in operative relation, as hereinbefore described, and that the driving pulley is in motion, the operator removes his foot from the clutch-actuating pedal. Now the machine stops with one of the former-blocks tilted outwardly, as shown in dotted lines in Fig. 1. Next the open end of the unfinished box is slipped down over the former-block and the end flaps,—which have been previously coated with glue or other suitable adhesive,—are folded inwardly to overlap each other in proper relation. A touch upon the clutch-pedal starts the machine, and the roller 18, traveling down the inclined guide 19, swings the former-block into upright position. At the same moment the roller 26 passes under the end of its overhanging track and forces the two presser-blocks 20^a—20^b downwardly so that the underside of the block 20^a rests with

a heavy pressure on top of the folded flaps. The flaps are held thus pressed together until the roller 26 reaches the shoulder 30 where the roller and the upper block are forced farther downwardly, thus,—through the springs 23,—pressing the lower block 20^a down with a strong pressure on top of the box-flaps, and at the same time forcing the punch 29 through the flaps of the box, leaving a smooth round hole. The punchings are discharged through the opening 14. The roller 26 now emerges from beneath its track and at the same time the roller 27 mounts its upwardly inclined track 28 and lifts the presser-blocks away from the top of the former-block. The next instant the roller 18 strikes the upwardly inclined track 19, tilting the former-block forwardly to permit the removal of the box and the substitution of another. As the former-blocks successively tilt toward the operator he removes his foot from the clutch-pedal, causing a pause in the procession of boxes under pressure, thus prolonging the operation and giving time for the adhesive to set, and giving time to remove and supply boxes. The lifting of the presser-blocks tends to slip the box upwardly upon the former block. The tilting of the former-block forwardly with the top of the box held fast would now break and ruin the box. To overcome this difficulty we provide the device, illustrated in Figs. 3 and 8, which show a top-plan view and a front elevation of the device. 31 is a bracket secured to and projecting horizontally from the ring 4 and carrying a downwardly extending rod 32 upon the lower end of which is journaled a horizontal arm 33 which is held normally pressed inwardly by a coiled spring 34 engaged with the rod and arm respectively. At the outer end of the arm 33 is journaled a roller 35 shod,—preferably,—with india rubber. The spring 34 causes the roller to press against and ride upon the front sides of the boxes in succession at the instant the presser-blocks are lifted, thus holding the boxes in place upon their blocks so that they cannot be lifted away by the upward movement of the presser-blocks.

Having described our invention, what we claim and desire to secure by Letters Patent, is,—

1. In a device of the described character, a rotary frame; a series of hollow forms mounted upon said frame, each having—leading into the cavity of the form—an aperture the margin of which forms one of the members of a cutting die, and having a mouth for the discharge of cuttings; a corresponding series of presser-blocks co-acting with said forms; a corresponding series of punches carried by the presser-blocks and in coöperative relation to said apertures in the forms; means for holding the blocks pressed toward the forms during a part of their rotation, means for moving the presser-blocks away from the forms during the remainder of their rotation; means for actuating the punches, and means for imparting an intermittent rotary movement to the frame.

2. In a device of the described character, a rotary frame; a series of forms mounted upon said frame, each having—leading into the cavity of the form—an aperture the margin of which forms one of the members of a cutting die, and having a mouth for the discharge of cuttings; a corresponding series of presser-blocks co-acting with said forms; a corresponding series of punches carried by the presser-blocks and in coöperative relation to said apertures in the forms; means for holding the blocks pressed toward the forms during a part of their rotation; means for moving the presser-blocks away from the forms during the remainder of their rotation; means for projecting the punches during the former part of the rotation of the presser-blocks; means for retracting the punches during the latter part of the rotation of the presser-blocks, and means for imparting an intermittent rotary movement to the frame.

3. In a device of the described character, a rotary frame, a form carried by the frame, a presser-block co-acting with said form and comprising two parts held normally in separated relation by suitable springs, a punch carried by one of said block-parts and adapted to project through the other of said block-parts, combined with means for moving the presser-block into pressing relation with the form during part of the rotation of the frame, means for increasing the pressure of the presser-block during such part of its rotation, the arrangement being such that such increased pressure projects the punch into the form.

4. In a device of the described character, a rotary frame, a form mounted thereon, a presser-block arranged to co-act with said form, means for pressing the block toward the form during part of the rotation of the frame, means for retracting the presser-block during the remainder of the rotation of the frame, combined with a spring controlled roller 35 disposed in the path of the side of the form and in advance of the point of retraction of the block.

5. In a device of the described character, a pedestal, an upright shaft rigid upon said pedestal, a horizontal ring rigidly secured to the shaft at its top, journaled upon the shaft a frame consisting of two suitably connected horizontal rings, a former pivotably mounted upon the lower ring and having an arm, a roller upon said arm, inclined guides in the path of said roller and adapted to tilt the former upon its pivot, a presser-

block slidably mounted upon the intermediate ring, a roller mounted upon the presser-block and adapted to engage and traverse the underside of the upper ring to depress the presser-block toward the form, and means for lifting the presser-block in harmony with the tilting of the form.

In testimony whereof we affix our signatures in presence of two witnesses.

FRANK NICOLAUS WEIS.
WILLIAM CHRISTIAN WEIS.

Witnesses:
ALBERT G. WUEST,
GEORGE K. DENTEL.