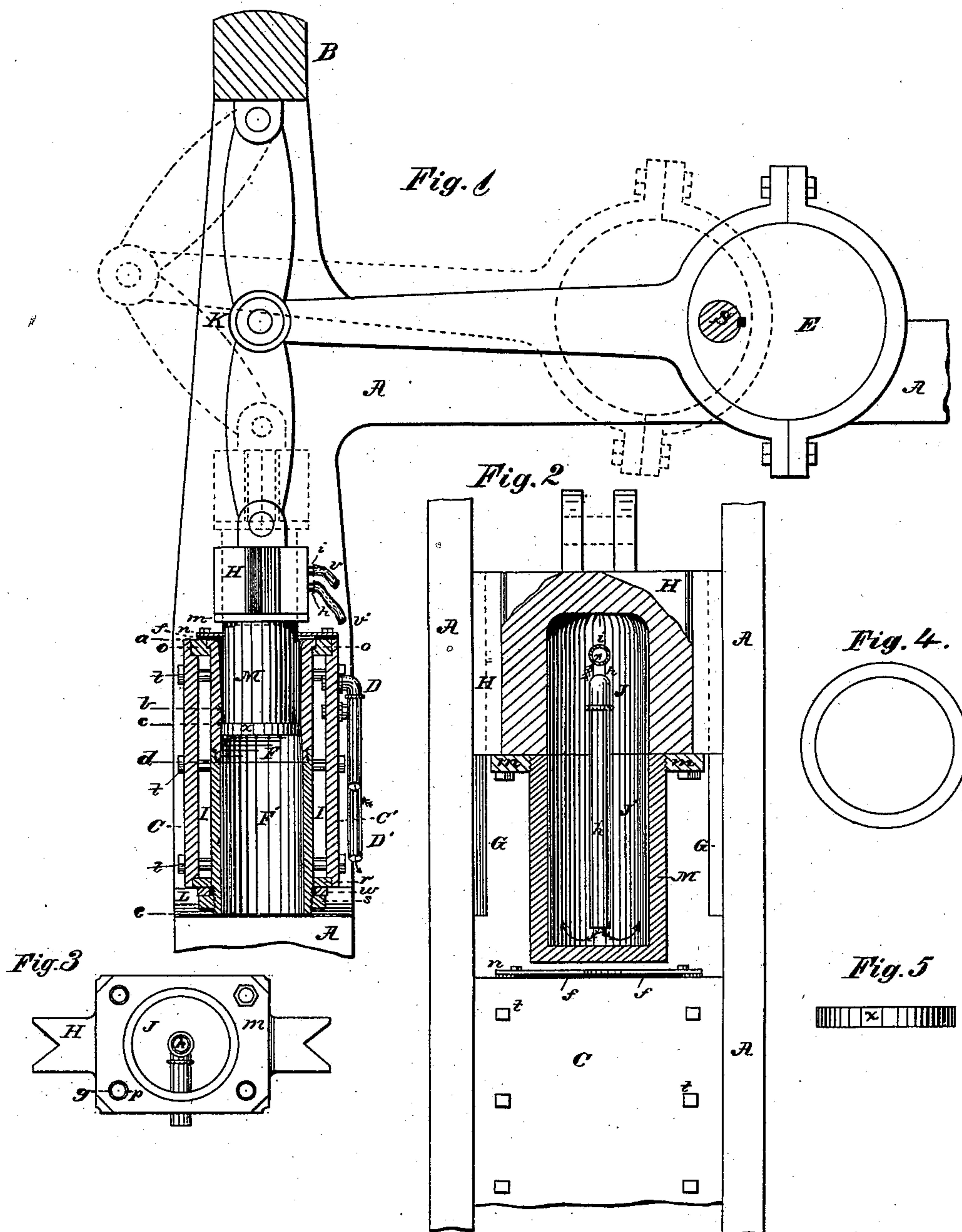


M. F. WILSON.
Paper-Box Cover Machine.

No. 216,009.

Patented May 27, 1879.



WITNESSES.

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UNITED STATES PATENT OFFICE.

MERRICK F. WILSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM C. RITCHIE, OF SAME PLACE.

IMPROVEMENT IN PAPER-BOX-COVER MACHINES.

Specification forming part of Letters Patent No. **216,009**, dated May 27, 1879; application filed June 10, 1878.

To all whom it may concern:

Be it known that I, MERRICK F. WILSON, of the city of Chicago and State of Illinois, have invented certain new and useful Improvements in Paper-Box-Cover Machines, of which the following, taken together with the accompanying drawings, is a full and accurate specification.

My invention relates in general to machinery for forming covers or shallow boxes from finished paper by turning a flange upon a circular blank of finished paper to stand at right angles with the top of the cover. It has especial reference to the heating of the formers, to the varying diameters of the matrix, to the extension thereof, to devices for procuring coincidence of slowest motion of the male former with the reduced diameter of the matrix, all hereinafter more fully set forth and described.

Figure 1 is a side view of the working parts of my improved machine, showing the matrix and surrounding steam-chest in vertical median section from front to back. Fig. 2 is a front view of a portion of the frame and the steam-chest, and a transverse sectional view of the male former and head, revealing the arrangements for supplying steam to the interior thereof. Fig. 3 is a bottom view of the cross-head to which the male former is secured. Fig. 4 shows the blank from which the cover is made; and Fig. 5 is an exterior side view of the completed cover.

The working parts of my machine are supported by a frame, consisting of strong uprights A, suitably braced and connected. B is a heavy cross-beam, secured to the uprights at the top. S is a transverse shaft, mounted on the horizontal portion of the uprights and bearing the eccentric E. K is a knee-joint, worked by a shaft from the eccentric, having its fixed articulation beneath the beam B, and working the head H on the vertical guides G. To the head H is secured the former *m*.

F is the matrix, and F' an extension thereof, both sustained by the several plates forming the inclosing steam-chamber, which, in turn, is secured to the frame. Both male and female formers are heated, preferably by steam, and in the following manner: The head H is chambered, as shown in Fig. 2, having its open end

at the bottom. The former M is similarly chambered, and its open end is secured to the head to give the continuous chamber J J'. Through the head enter the pipes *h* and *i*, exteriorly connected by the flexible tubes *v* and *v'* to give inlet and outlet to the steam, and at the same time to allow free vertical movement to the head. The inlet *h* is interiorly extended to near the bottom of the chamber, as shown, so that the live steam employed is made to impinge upon the bottom of the former. The latter is thereby more highly heated, and accumulation of water within the chamber is prevented.

The female former or matrix is in two parts—the matrix proper, F, and the extension thereof, F', beyond the stroke of M. F is of steel, hardened, and well finished. F' may be of iron, and less carefully polished. The two are joined as shown at *d*, to constitute a continuous tube from *a* to *e*. This tube is suspended by an exterior flange at the top resting upon an annular ledge in the plate *o*, and is laterally inclosed within a tight chamber made up of the plates *o* C C' *r*, and end plates, (not shown,) all securely held together by suitable bolts. The lower protruding end of the tube is exteriorly threaded and receives the washer and packing *w* and nut *s*.

Inlet and outlet steam-pipes D and D' communicate with the interior of this chamber. Above the top-plate, *o*, of the steam-chest is supported a plate, *n*, parallel with *o*, giving a suitable space, *f*, between the two for the admission of the blank from which the cover is to be formed. The two supports that sustain the plate *n* serve also as guides to direct the blank into proper position between the formers.

An important feature of my invention relates to the varying diameter of the tube F F' at different points of its interior. The upper inner edge thereof is rounded somewhat, as shown, to prevent cutting or tearing of the blank in the first stage of forming. Immediately beyond the rounding the diameter is such as to only slightly compress the upturned margin of the paper. It gradually diminishes, however, to, say, the point *b*, when the compression becomes great, and thence continues uniform for a short distance to *c*. At this

point it increases to d , in the present instance the junction of the two parts F and F' . Therefrom to the bottom e the diameter is again uniform.

Another feature of my invention has reference to the motion of the male former M in relation to the varying dimensions of the tube, just explained. By means of the knee-joint K and eccentric E , arranged, as shown, to find their dead-centers synchronously, the movement of the former M becomes very slow as it approaches the lower extremity of its stroke. It is so arranged that the cover shall be carried by the former so far that the edge of the upturned flange now formed thereon shall be at or near the point c —the lowest point of smallest diameter of the tube. The cover is thus advanced in the matrix more and more slowly as it is more and more compressed to the point b , and has very slow motion as it is carried through the neck of the tube from b to c . The effect is to subject the cover to the action of heat for the greatest period while it is being most compressed, thereby more firmly and permanently establishing the form given it.

Being carried at least partly into the enlarged portion of the passage below c , the cover-flange expands slightly to fill the tube, and is therefore held in the tube, while the former M leaves it and returns on its upward stroke. A second cover is brought down in like manner with the first and forces it forward in the tube. Others follow, and when the tube is full the covers drop one by one from the bottom. The diameter of the extension F' is such as to hold the covers by their friction with the tube till thus forced out, whereby they are still further exposed to the action of heat while retained in shape, for the purpose of fully confirming the form given them.

The differences in diameter of the tube are very slight, and their indications in the drawings are of necessity exaggerated. The blank is preferably slightly moist when it enters the machine, but not necessarily so. In any case the cover formed in the machine described is found to permanently hold the shape given it, and is adapted to many uses in which metallic covers have hitherto been thought indispensable.

Obviously, the retarded movement of the former M on its downstroke may be otherwise accomplished than by the devices shown. By

the use of a cam directly connected with M , or in place of the eccentric, any variation of movement desired may be obtained; and, if thought best, the cover may be wholly arrested for a time in the neck of the passage before the completion of the full stroke.

Other modes of heating the formers may also be employed, as by heated air. In order to bring the edge of the cover about opposite the point c in all cases whatever the depth of the flange, the relative positions of the two formers should have adjustment toward or from each other, which will be preferably attained at the points of attachment of the steam-chest C to the bed in which it rests, or of the latter to the former.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for forming box-covers from finished paper, the hollow male former provided with the steam-inlet pipe extending downward within the same to near the bottom thereof, and also provided with an outlet above the mouth of the inlet, substantially as and for the purposes set forth.

2. In a mechanism for the purpose specified, the matrix having the extension F' , adapted to be heated, following and slightly larger than the forming portion thereof, for the purpose of retaining the covers in form, and subject to the action of heat after the male former has been withdrawn from them, substantially as described.

3. The tubular matrix, having a reducing diameter from a to b , cylindrical from b to c , and enlarged below c , and adapted to be heated, combined with a reciprocating former, M , adjusted so that at the dead-point the paper cover will have been pushed partly past the line c , and be left there by the former exposed to the heat of the matrix until discharged by the succeeding cover, as set forth.

4. The combination of the chambered head H , having the former secured thereto, and downward-extending inlet h and outlet i , for the admission and escape of steam, substantially as and for the purposes set forth.

MERRICK F. WILSON.

Witnesses:

JESSE COX, Jr.,
M. E. DAYTON.