

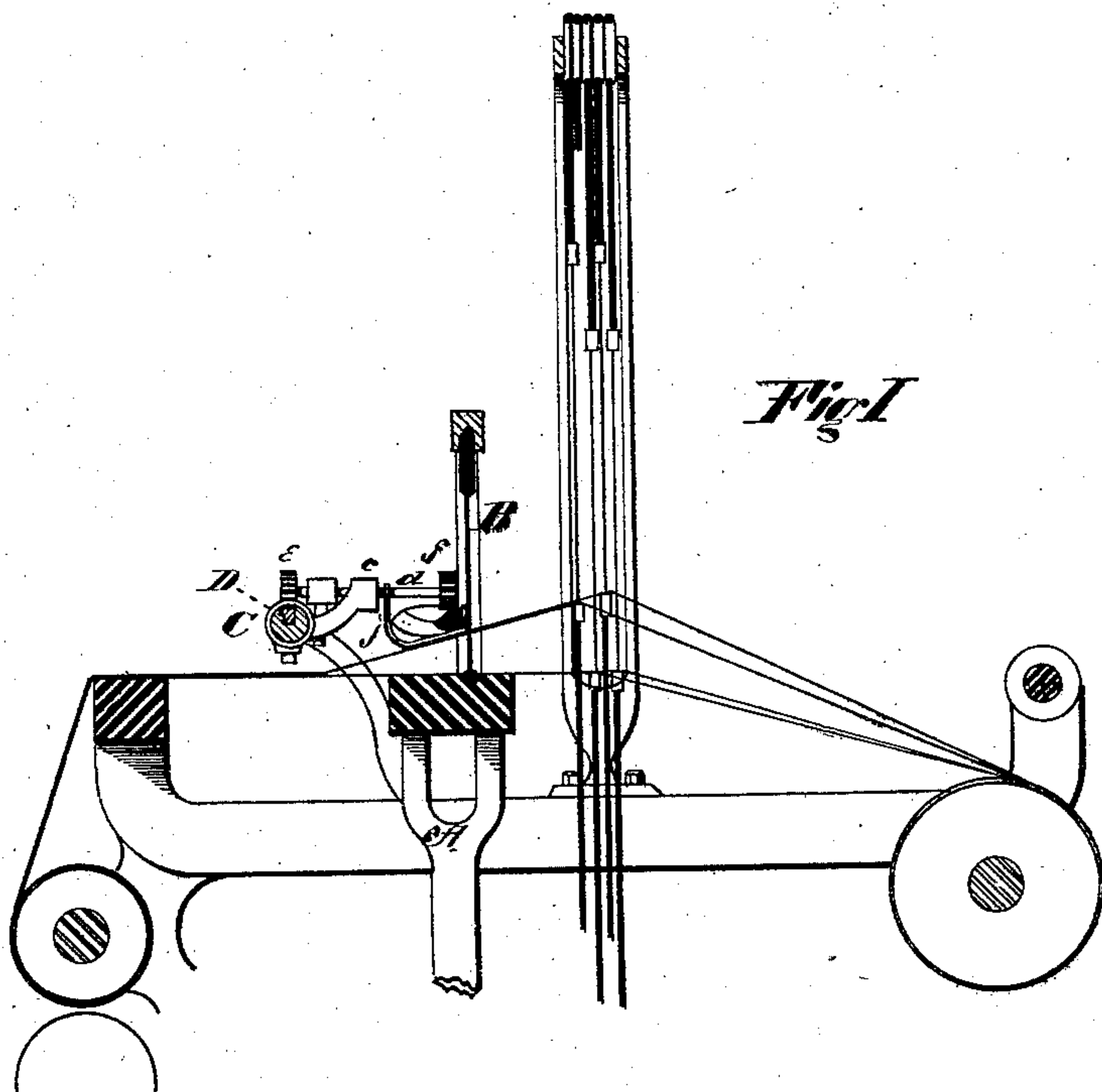
2 Sheets--Sheet 1.

R. W. & G. P. ANDREWS

Looms.

No. 154,436.

Patented Aug. 25, 1874.



Witnesses

H. G. King  
E. L. Beach

Inventors

Robert W. Andrews  
George P. Andrews  
by their Attorney  
Gardiner Hyde

R. W. & G. P. ANDREWS

Looms.

No. 154,436.

Patented Aug. 25, 1874.

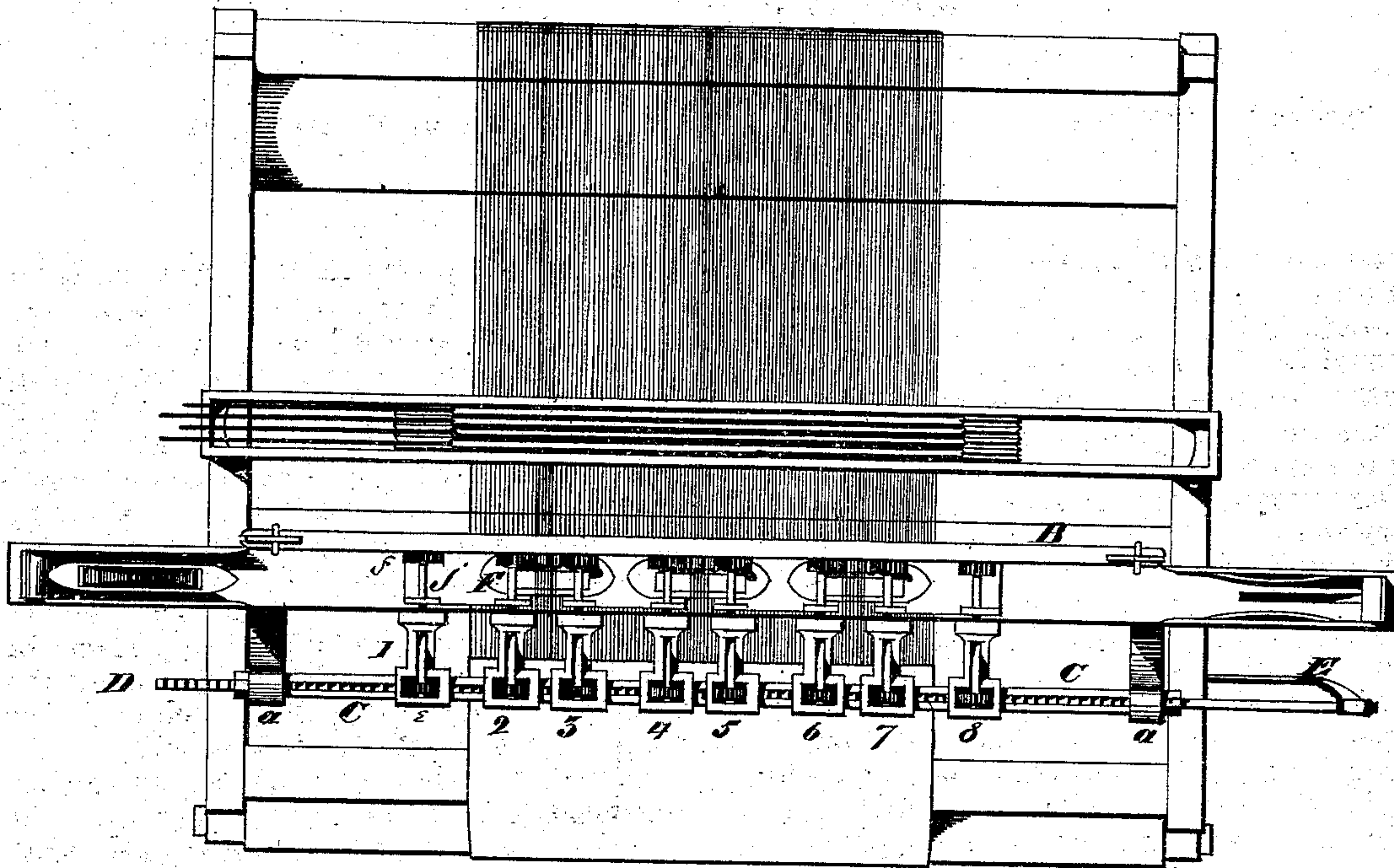


Fig II



Fig IV.

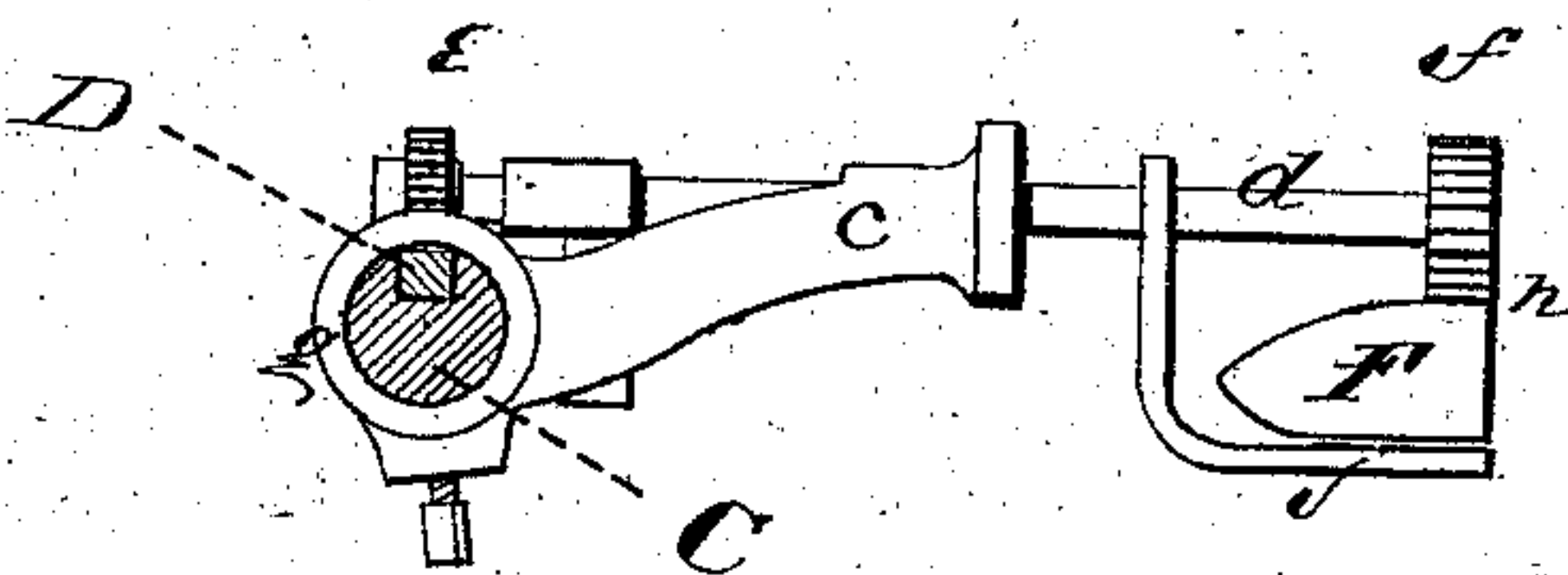


Fig III.

WITNESSES

A. G. King  
C. L. Beach

INVENTORS

Robert W. Andrews  
George P. Andrews  
by their attorneys  
Fardner & Hyde



# UNITED STATES PATENT OFFICE.

ROBERT W. ANDREWS, OF STAFFORDVILLE, CONNECTICUT, AND GEORGE P. ANDREWS, OF SOUTH CHICAGO, ILLINOIS.

## IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. 154,436, dated August 25, 1874; application filed September 15, 1873.

*To all whom it may concern:*

Be it known that we, ROBERT W. ANDREWS, of Staffordville, Connecticut, and GEORGE P. ANDREWS, of South Chicago, Illinois, have jointly invented certain Improvements in Looms and in Weaving, of which the following is a specification:

Our invention relates to looms in which auxiliary shuttles are used in connection with the main shuttle for the purpose of increasing the filling at one or more places.

In the drawings, Figure I is a cross-sectional view; Fig. II, a rear view. Figs. III and IV are detail views.

Instead of forming the tubes in cloth or strengthening it by increasing the warp, while causing the filling to be divided between such additional warp and the main warp, we use one or more auxiliary shuttles arranged above the warp and web, so that we are able to double the filling at one or more places, either in the form of tubes or in the form of double thickness of cloth having double filling, and this we have accomplished as follows:

Hinged in bearings, at *a a*, from the lathe A, and extending across it parallel to the reed B, is the slotted rod C, in the longitudinal slot of which plays or reciprocates the rack-bar D, which receives its limited motion in the rod C through a lever or picker-stick, E, which moves with the lathe, while being, at the same time, swung by convenient mechanism to reciprocate the rack-bar D at the proper time. Clamped upon the rod C are two or more sets (considering two as a set) of fingers, 1 2 3, &c., each finger being constructed, as shown in Fig. III, to carry in bearings in its shank *c* a rod, *d*, having pinions *e f* upon its ends, the pinion *e* having access, through the sleeve *g*, to the rack-bar D, with which it engages, while the pinion *f* engages with a rack, *h*, upon the shuttle F. These fingers are arranged upon the rod C relatively to each other and to the shuttle-boxes and shuttles F, so that the shuttle is always held or carried by one or more of them by means of the rack *h* and pinions *e f*, their number being determined by the number of auxiliary shuttles, if more than one is used, or by the distance it is desired to move one or

more. The reciprocating motion of bar D imparts a positive motion to the shuttles F when the auxiliary warp has been raised by its harness from the rest of the warp, thereby supplying the additional filling. The object of having the rod C hinged in bearings *a a* is to permit the auxiliary shuttles, with their operating mechanism and boxes *j*, to be raised up by or with the main warp to permit the throw of the main shuttle beneath, and to sink with the main warp to pass in their turn beneath the auxiliary warp, provision being made for this rotary motion of rod C by attaching the end of bar D, by a sleeve and collar, to the lever E in a line with the axis of rod C. The boxes with the shuttles can also, by this arrangement, be swung entirely over upon the web when not wanted, and their operating-lever E detached.

In Fig. I the shuttle-box *j*, with its shuttle, is shown resting upon the upper shed of the main warp at the time when the main shuttle would be thrown below. In Fig. II the shuttle is shown as moving upon the main warp beneath the auxiliary warp.

The auxiliary shuttles and the main one may be made to alternately put in two strands of filling each, or may be compelled to move in the order known as "pick and pick," and, by a simple variation in the arrangement of the harness, the additional filling may be introduced to form a tube or a double thickness of cloth.

The shuttle-boxes *j* rest immediately upon the main warp, and are hung upon the rod *d* by means of the supporting-fingers 1 2 3, and they correspond in number to the sets of fingers.

We do not wish to confine ourselves to the use of a lever to reciprocate the bar D, as a pinion having its teeth upon a concave cylindrical surface to admit of the partial revolution of the bar D, and geared to the rack prolonged or formed on the end of bar D, would impart the desired motion.

In putting in the filling from the auxiliary shuttles when forming tubes, we found that the tension upon the filling from the bobbin crowded the warp of the tube more or less toward the center of the tube and away from the



main warp, leaving the tube unequally thick by drawing away from the main warp next to the selvage of the tube or double thickness of web, and we have discovered that by taking the outside strands of warp upon the auxiliary warp and moving them severally to pass through the reed one space away with the main warp, to distend them that far from the rest of the auxiliary, the crowding of the filling will just compensate for this distention, and that the tube will be evenly woven throughout.

In order that the filling when weaving tubes may be uniformly beaten up by the reeds, we provide the reed-dents coming opposite the tubes with the inclined faces *k*, so that the filling upon the upper shed of the auxiliary warp is beaten up with the same force as the main filling.

What we claim is—

1. In combination, with the lathe of a loom, the hinged rod C and fingers carrying the auxiliary shuttle-boxes arranged to rest upon and to be raised and lowered by the main warp, in the manner and for the purpose set forth.

2. In combination with the lathe H of a loom and with the auxiliary shuttle-boxes *j*, the hinged rod C, containing the reciprocating bar D, operating to impart a positive motion to the shuttles by mechanism, substantially as shown and described.

3. The combination of one or more sets of fingers, 1, 2, 3, &c., having pinions *e f*, with rod C, containing the bar D, boxes *j*, and shuttles F, provided with racks thereon, substantially as set forth.

ROBERT W. ANDREWS.  
GEORGE P. ANDREWS.

Witnesses to the signature of ROBERT W. ANDREWS:

EDWARD F. WHITON,  
GEORGE H. RICH.

Witnesses to the name of GEORGE P. ANDREWS:

A. S. DOWNS,  
JAMES H. ROWELL.