No. 784,370. PATENTED MAR. 7, 1905.

F. E. ZENGERL.

LOOM.

APPLICATION FILED JULY 17, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

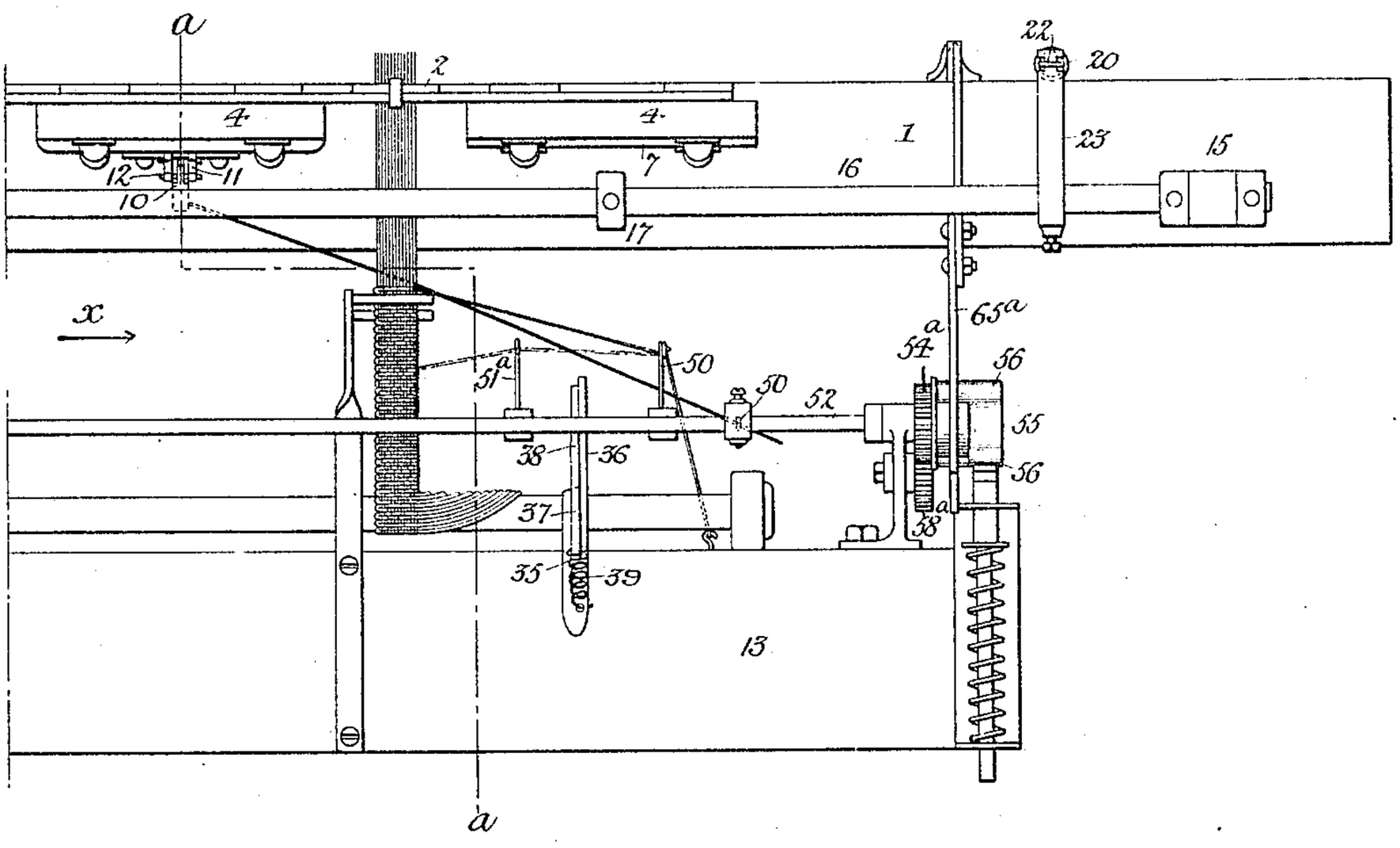
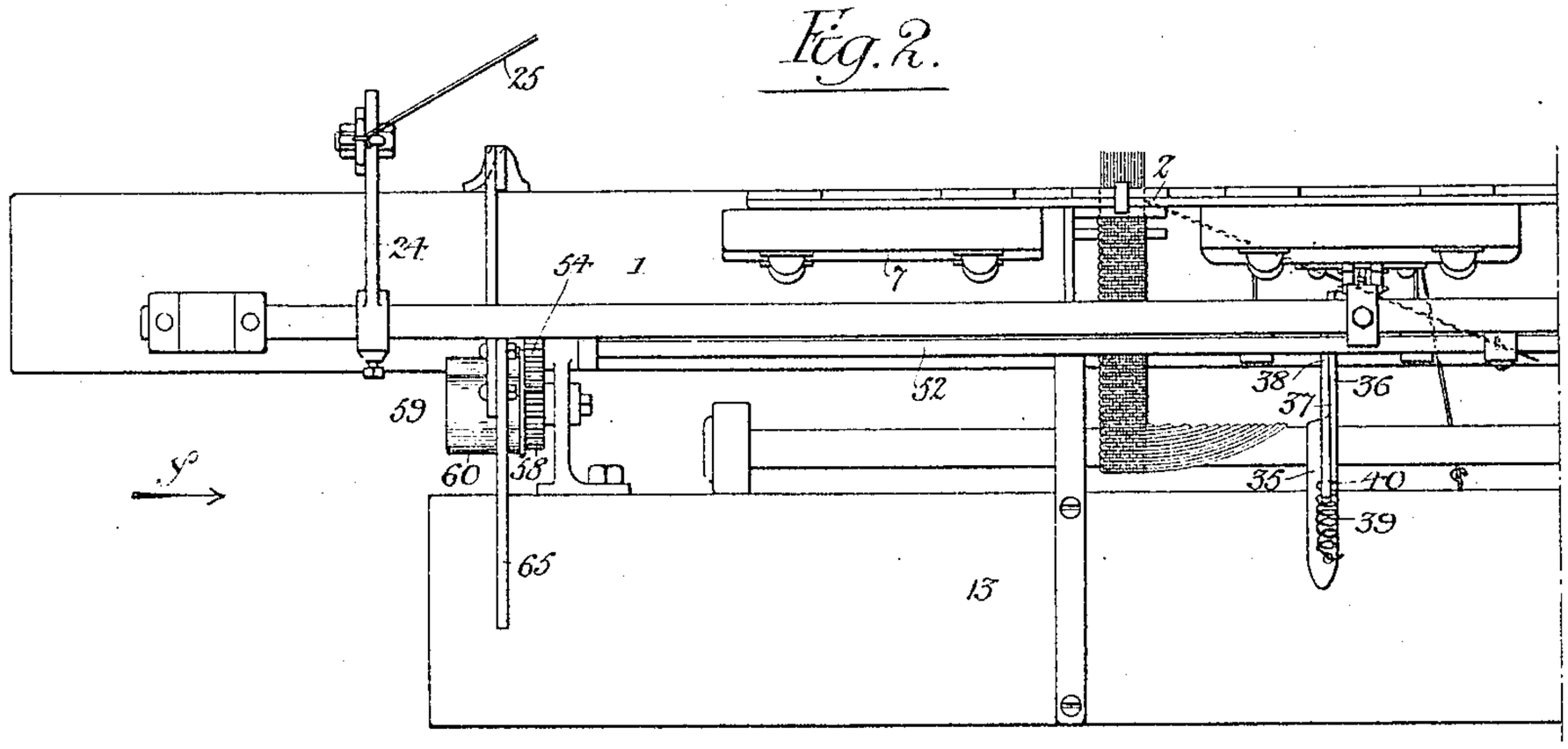


Fig. 2.



Witnesses:

Frank L. A. Graham.

Herman E. Metius

Inventor:

Friedrich Ewald Zengerl,

by his Attorneys;

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3 SHEETS—SHEET 2.

Fig. 3.

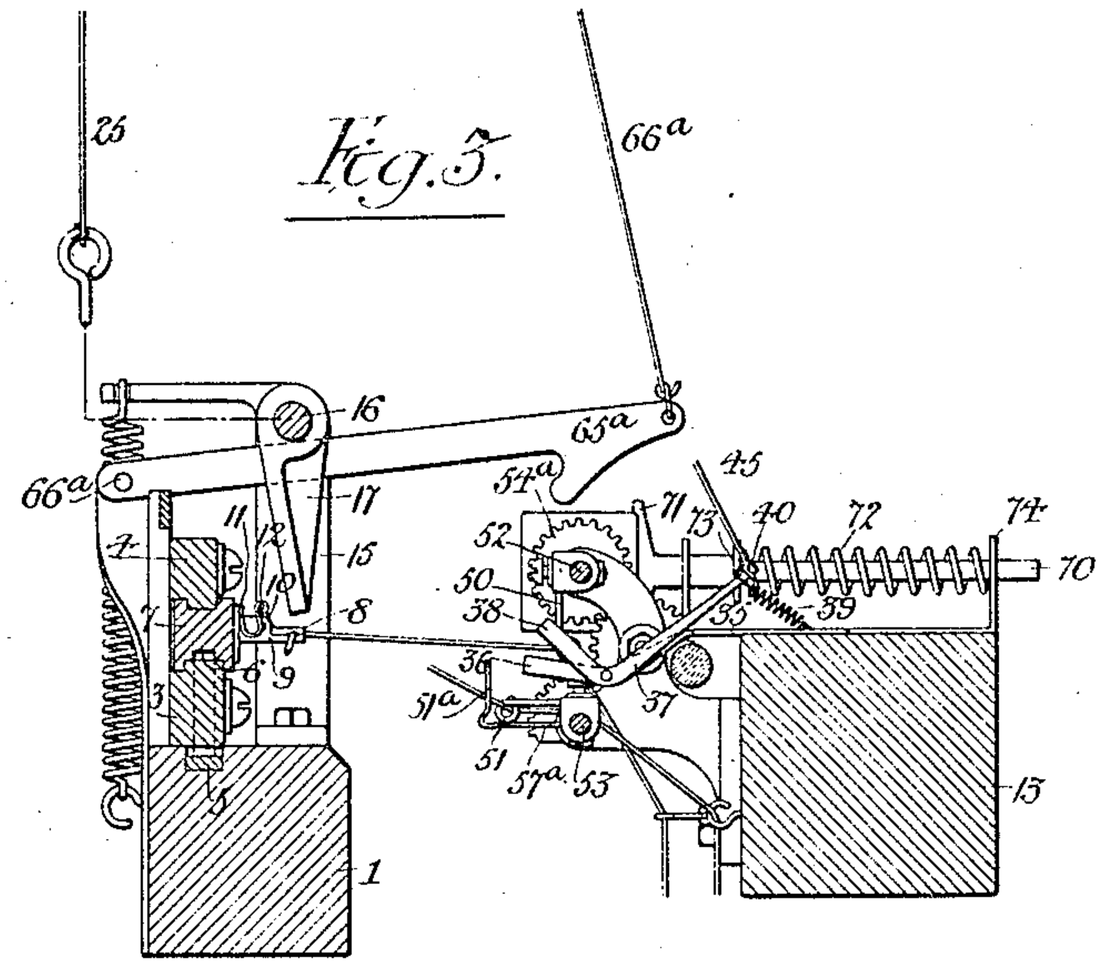


Fig. 7.

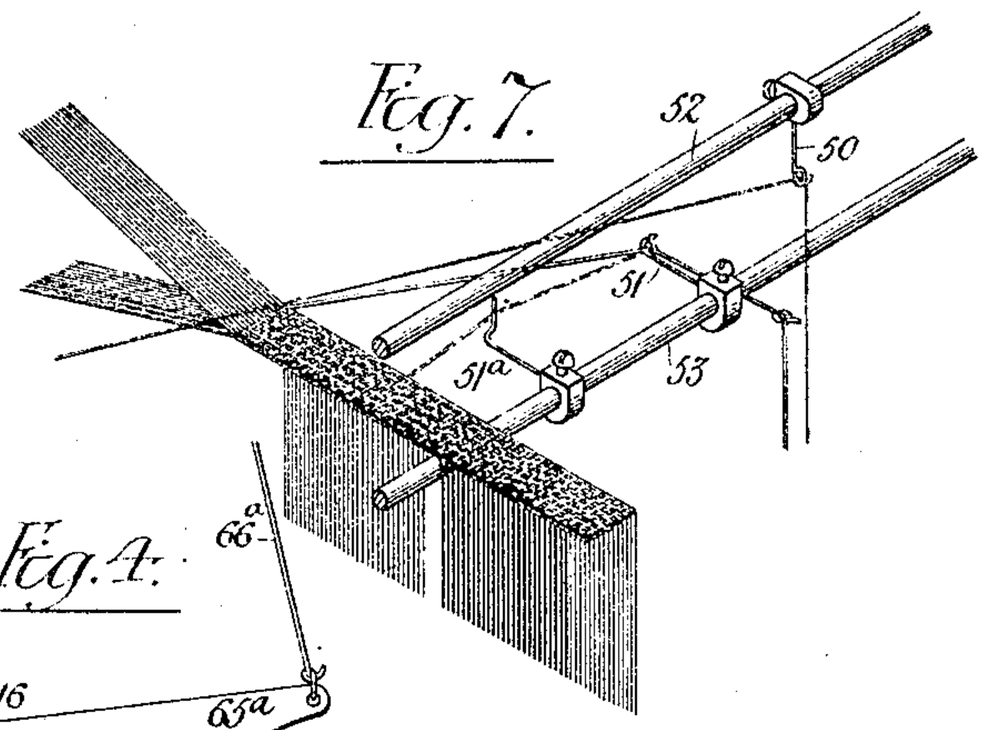
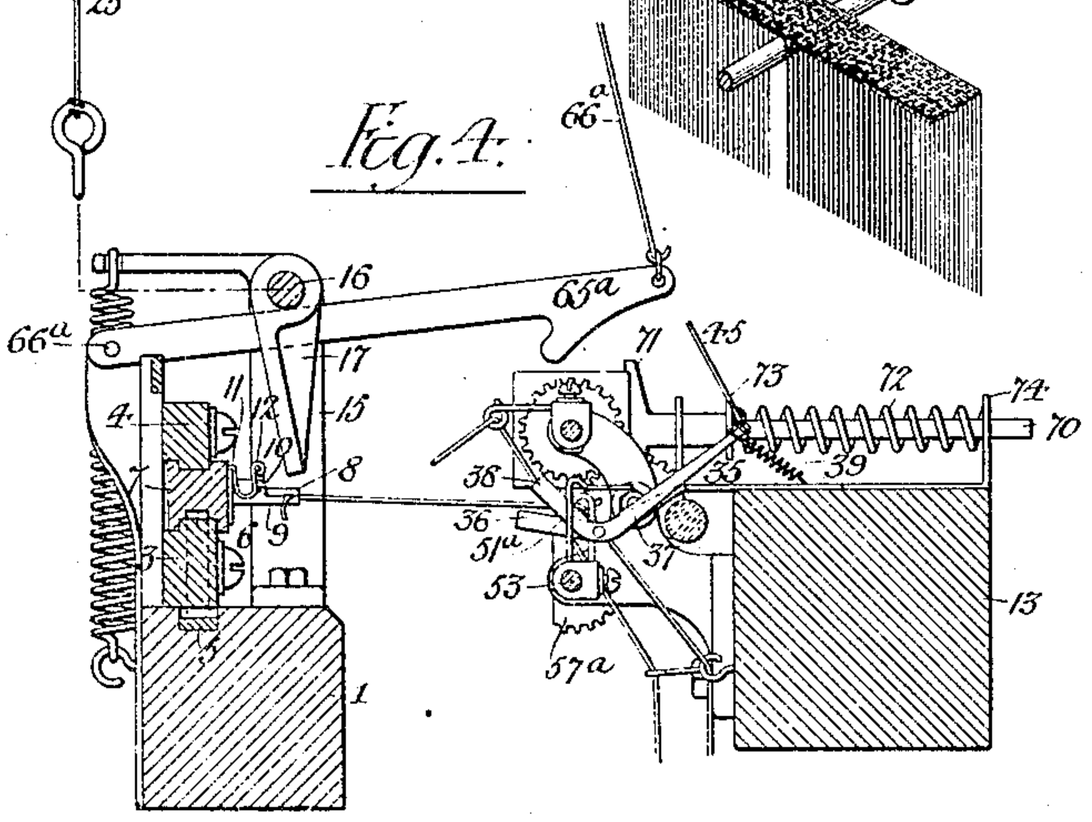


Fig. 4.



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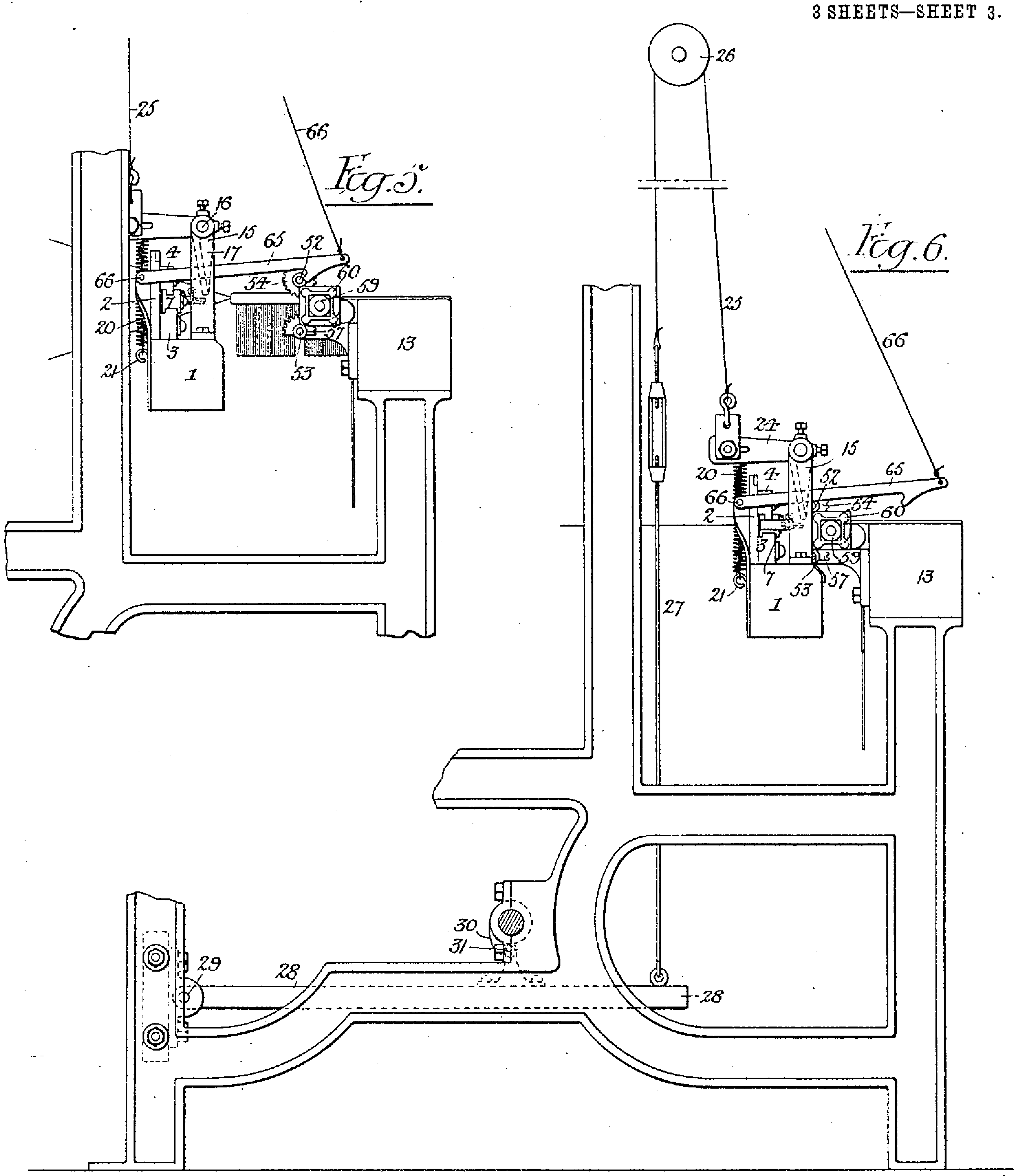

Fig. 5. Fig. 6.

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UNITED STATES PATENT OFFICE.

FREDERICK EWALD ZENGERL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO E. L. MANSURE COMPANY, A CORPORATION OF ILLINOIS.

LOOM.

SPECIFICATION forming part of Letters Patent No. 784,370, dated March 7, 1905.

Application filed July 17, 1903. Serial No. 166,020.

To all whom it may concern:

Be it known that I, FREDERICK EWALD ZENGERL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Looms, of which the following is a specification.

My invention relates to looms for weaving fringes for use with carpets and other woven fabrics, familiarly known as "narrow-ware" looms, in which bobbin-holding shuttles carried by a race-bar in the swinging lay are shot through the warp-threads to lay fringe ends therein and form the heading.

In my Patent No. 734,390, dated July 21, 1903, I have shown and described an apparatus for making fringe in which the usual bobbins carried by the shuttle are dispensed with and in their place shuttle-bodies are provided carrying nippers or clamping-jaws adapted to carry the yarn from a stationary cop or bobbin to the warp-threads, so as to be woven therewith to form the fringe, such invention also including means for severing the weft-thread at regular intervals in order to form fringe ends of uniform length.

My present invention relates to means for opening the clamping jaws or nippers described and claimed in my former application, to means for introducing threads of different color into the fringe-heading, and to other details, which will be fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of one end of a loom to which the improvements forming the subject of my invention have been applied. Fig. 2 is a similar plan view of the opposite end of the loom, showing the operating parts in another position. Fig. 3 is a sectional view on the line *a a*, Fig. 1, looking in the direction of the arrow *x*. Fig. 4 is a similar sectional view showing a part of the mechanism in a different position. Fig. 5 is an end view on a slightly-smaller scale looking in the direction of the arrow *y*, Fig. 2. Fig. 6 is a similar view showing the parts of the mechanism in a slightly-different position, and Fig. 7 is a detached perspective view illustrating a detail of my invention.

The general construction and operation of the loom made in accordance with my present invention is substantially similar to my prior application before noted and to which reference may be made.

In the accompanying drawings, 1 represents the movable lay carrying the reed 2 and the bars 3 and 4, between which the shuttle-race is formed. The race-bar is shown at 5, operating the pinions 6, mounted in the bar 3, which pinions in turn drive the carrier 7 in the race. The carrier is provided with a pair of nippers, comprising upper and lower jaws 8 and 9, respectively, the lower jaw being fixed to the carrier, while the upper jaw is pivoted to the lower jaw at 10 and is maintained in the lowered or closed position by means of springs 11, such springs engaging pins 12, carried by said upper jaw and having their opposite ends secured to the carrier. The springs are arranged on both sides of the nippers so that they will not interfere with the means serving to open the jaws of the same.

In my former application I have shown and described an arm carried by the breast-beam 13 and having a finger arranged to engage the nippers as the lay moves to beat up whereby said nippers were opened to receive a weft-thread. As will be readily understood, I employ a series of weft-carriers, so that, as in all narrow-ware looms, similar operations of weaving are going on at several points. Each weft-carrier is operated in the same manner, and in lieu of the mechanism described and claimed in my former application I provide a single member, which serves to operate all of the nippers simultaneously. For this purpose I secure to the movable lay brackets 15, in which is mounted a rocking bar or shaft 16, having a series of arms 17 disposed at proper points to engage the pins 12 of the nippers and open the jaws of the same at proper intervals. The rock-shaft or bar is held normally in the inactive position by means of a spring 20, secured at one end, 21, to the lay of the loom and at the opposite end, 22, to an arm 23, carried a one end of the rock-shaft or bar 16. To cause the rock-shaft to turn, whereby the arms 17 may engage the

nippers and open the jaws of the same, the following mechanism is employed: Connected to said rock-shaft at the end opposite the arm 23 is another arm, 24, to which is secured a cord 25, which extends upward and passes over a suitable pulley 26 above the loom, the opposite end of said cord being connected to an adjustable link 27, extending from a lever 28, pivoted at 29 to the frame of the loom. The position of this lever is controlled by means of a cam 30, and the lever carries an antifriction-roller 31, contacting with the cam. The cam is mounted on a shaft 32, forming part of the usual driving mechanism of the loom, the movement of the same being controlled by suitable means so as to operate the rock-shaft at the proper intervals and cause the arms of the latter to open the nippers. If desired, the shaft or bar 16 need not rock and the arms 17 may be held in a fixed position, such position being previously determined as one that will effect the opening of the nippers when the lay is moved forward in beating up. With such an arrangement it may be preferable to employ a spring-finger of the character shown and described in my former application to engage the nippers.

The scissors are mounted on the breast-beam of the loom in the same relative position to the means for operating the nippers as in my patent before cited. They consist of the member 35, secured to the breast-beam in any suitable manner and carrying the lower fixed blade 36 of the scissors, and the member 37, pivoted to the member 35 and carrying the upper movable blade 38. The upper blade is maintained in an open position by means of a spring 39, secured at 40 to one end of said member 37 and at the opposite end to the breast-beam. At the moment the lay begins its rearward movement the scissors are operated, and this action is effected by a pull of the cord 45, such pull being accomplished by the aid of a cam controlling a suitable spring or weight to which the cord is connected, the cam being carried by a moving part of the mechanism for operating the loom.

Another feature of my present invention is the mechanism designed to guide independent strands or threads, usually of different color, to be woven into the heading. As ordinarily constructed and as shown in my former application only one strand or thread could be woven into the heading to form the fringe. In my present invention, however, I can introduce one or more additional colored strands or threads as desired. The mechanism for effecting this is clearly shown in the drawings. When two ends or strands of different color are being woven into the heading, for instance, guides 50 and 51 will be employed, the strands coming from suitable cops or bobbins mounted at any suitable point on the machine. These guides are carried by rock-shafts 52 and 53 and are so disposed that when one is in proper position to direct a thread to be woven into the heading the other will be in the inactive position, and vice versa. In addition to the guide 51, carried by the shaft 53, a guard 51[a] is employed, which serves to keep the thread passing through the guide 51 clear of the scissors when the other thread is being woven and before the thread from the guide 51 is thrown into action. This is clearly illustrated in the detached perspective view Fig. 7. The shaft 52 carries at one end a pinion 54 and at the opposite end a pinion 54[a], which has a hub 55, having a series of projections 56. The shaft 53 carries at each end toothed segments 57 and 57[a], meshing with the pinions 54 and 54[a]. The shaft 53 is driven from the shaft 52 by means of the intermediate pinions 58 and 58[a], the pinion 58 meshing with the pinion 54 and toothed segment 57, while the pinion 58[a] meshes with the pinion 54[a] and toothed segment 57[a]. The pinion 58 is provided with a hub 59 exactly similar to the hub 55, such hub 59 having a series of projections 60. By engaging the projections of these hubs alternately and giving them a quarter-turn the shafts 52 and 53 will be rocked back and forth and with them the guides 50 and 51. In Fig. 3 the guide 50 is shown in the active position, and in Fig. 4 the guide 51 is shown in the active position. To engage the hubs 55 and 59, and thereby effect the turning of the shafts 52 and 53 and the consequent positioning of the guides, hooks 65 and 65[a] are provided, pivoted at 66 and 66[a] to opposite ends of the lay of the loom and held normally in the raised or inactive position by means of cords 67 and 67[a], respectively. These cords are connected to harness mechanism controlled by jacquard cards, which are so arranged that at regular intervals said hooks 65 and 65[a] will be allowed to drop and engage the hubs 55 and 59 alternately. When so engaged, they will effect the quarter-turn of the shafts 52 and 53 upon the backward movement of the lay. In order to hold the shafts in position when moved by either hook, an arm 70 is employed, carried at one end of the breast-beam and arranged to engage the hub 55. This arm is preferably provided with a face 71 to seat between the projections 56 and is held in place by means of a spring 72 engaging a collar 73, carried by the arm, the opposite end of which engages the bracket 74, in which the arm is mounted.

By multiplying the mechanism just described and the means for operating it any number of colors may be woven into the heading.

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

1. In a narrow-ware loom, the combination of the movable lay, a thread-carrier reciprocable in said lay, nippers mounted on said carrier at right angles thereto and arranged to engage a thread, a movable member, and an

arm carried by said movable member and arranged to engage the nippers at regular intervals.

2. In a narrow-ware loom, the combination of the movable lay, a series of thread-carriers reciprocable therein, nippers mounted on each of said carriers at right angles thereto, a rock-shaft, and a series of arms carried by said rock-shaft and arranged to engage said nippers at regular intervals.

3. In a narrow-ware loom, the combination of the movable lay, a series of thread-carriers reciprocable therein, nippers mounted on each of said carriers at right angles thereto, a rock-shaft, a series of arms carried by said shaft and arranged to engage said nippers, and means for moving the rock-shaft at regular intervals.

4. In a narrow-ware loom, the combination of the movable lay, a series of thread-carrying members reciprocable therein, nippers carried by each of said members, a rock-shaft, a series of arms carried by said shaft and arranged to engage the nippers, means for holding said rock-shaft in the inactive position, and means for moving said rock-shaft at regular intervals.

5. In a narrow-ware loom, the combination of the movable lay, a series of thread-carrying members reciprocable therein, nippers carried by each of said members, a rock-shaft, a series of arms carried by said shaft and arranged to engage the nippers, a spring for holding said rock-shaft in the inactive position, a lever connected to said rock-shaft, and a cam for engaging said lever whereby the rock-shaft may be moved at regular intervals.

6. In a narrow-ware loom, the combination of the movable lay, a series of thread-carrying members reciprocable therein, nippers carried by each of said members, a rock-shaft, a series of arms carried by said shaft and arranged to engage the nippers, a spring for holding said rock-shaft in the inactive position, a lever, a cord passing over a pulley and connected at one end to said rock-shaft and at the opposite end to the lever, and a cam for engaging said lever whereby the rock-shaft may be moved at regular intervals.

7. In a narrow-ware loom, the combination of the movable lay, a thread-carrier reciprocable therein, means for alternately supplying said carrier with independently-disposed thread ends, guides for said thread ends, and means for moving said guides into and out of a position to direct the thread ends to the carrier, such means being coupled together so as to move one guide into the operative position as the other guide is moved out.

8. In a narrow-ware loom, the combination of the movable lay, a thread-carrier reciprocable therein, means for alternately supplying said carrier with independently-disposed thread ends, guides for said thread ends, paralleling rock-shafts carrying said guides, and means for operating said shafts so as to move said guides into and out of a position to direct the thread ends to a carrier, said shafts being coupled together so as to move one guide into the operative position as the other guide is moved out.

9. In a narrow-ware loom, the combination of the movable lay, a thread-carrying member reciprocable therein, means for supplying said carrier with thread, a pair of guides for said thread, rock-shafts carrying said guides, and means for moving said shafts alternately whereby the guides may be brought into the active and inactive positions with respect to the nippers, alternately.

10. In a narrow-ware loom, the combination of the movable lay, a thread-carrying member reciprocable therein, means for supplying said carrier with thread, a pair of guides for said thread, rock-shafts carrying said guides, hubs operatively connected to said shafts, and hooks carried by the lay and arranged to engage said hubs.

11. In a narrow-ware loom, the combination of the movable lay, a thread-carrying member reciprocable therein, means for supplying said carrier with thread, a pair of guides for said thread, rock-shafts carrying said guides, hubs operatively connected to said shafts, hooks carried by the lay and arranged to engage said hubs, and means for permitting the action of said hooks alternately at regular intervals.

12. In a narrow-ware loom, the combination of the movable lay, a thread-carrying member reciprocable therein, means for supplying said carrier with thread, guides for said thread, paralleling rock-shafts carrying said guides, gearing at each end of said shafts connecting the same together, said gearing including an intermediate gear, means for engaging one of said shafts to shift the respective guides simultaneously to the active and inactive positions, and means for engaging one of the intermediate gears to simultaneously reverse the positions of the respective guides.

13. In a narrow-ware loom, the combination of the movable lay, a thread-carrying member reciprocable therein, means for supplying said carrier with thread, guides for said thread, paralleling rock-shafts carrying said guides, gearing at each end of said shafts connecting the same together, said gearing including an intermediate gear, a toothed hub at one end of one of said shafts, a similar hub carried by the intermediate gear at the opposite end of the shafts and means for engaging and turning said hubs, such movement serving to throw the respective guides alternately and simultaneously into the active and inactive positions.

14. In a narrow-ware loom, the combination of the movable lay, a thread-carrying member reciprocable therein, means for supplying said carrier with thread, guides for said thread, a

pair of paralleling rock-shafts carrying said guides, gearing at each end of said shafts connecting the same together, said gearing including an intermediate gear, a toothed hub carried by one of said shafts at one end, a similar hub carried by the intermediate gear at the opposite end, and hooks arranged to engage said hubs alternately whereby the shafts may be moved to shift the respective guides alternately and simultaneously to the active and inactive positions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK EWALD ZENGERL.

Witnesses:

FRANKLIN B. BROWN,

FRANCIS P. TIMMIONS.