

424 N. George Mason Drive
Arlington, Virginia
15 August 1949

Mr. Alfred Percy
Elon Road
Madison Heights, Virginia

Dear Mr. Percy:

I must hasten to acknowledge receipt of your most interesting letter of 5 August and to indicate my sincere appreciation of your taking the trouble to write me in such detail.

At the moment I am much engrossed with other matters and have found it necessary to put off dealing with The Beale Papers. However, I do not intend by any means to drop the study which I initiated on them sometime ago. Should I have soon an opportunity to make a visit in your neighborhood, I hope that it will include the making of your personal acquaintance and discussing the matter over a dinner table at which I trust that you would be sufficiently gracious to be my guest.

Thanking you again for your courtesy, I am

Sincerely yours,

WILLIAM F. FRIEDMAN

424 N. George Mason Drive
Arlington, Virginia
16 June 1949

Mrs. Martha Rivers Adams
c/o The News
Lynchburg, Virginia

Dear Mrs. Adams:

I sent a letter addressed to Mr. Alfred Percy, Jr., at Elon, N.C., and then on its return by the post office I sent it to Elon, Va. The letter has also been returned and I, therefore, am writing to ask you if you cannot give me a more complete address so that I might reach Mr. Percy and ask him a few questions.

I am enclosing a self-addressed stamped envelope for your convenience in replying.

With cordial greetings, I am

Sincerely yours,

WILLIAM F. FRIEDMAN

Incl

Percy

March 23, 1943

Mr. Walter B. Payne
The Todd Company
Rochester, New York

Dear Mr. Payne:

I hope you will forgive my tardiness in replying to your letter of March 11. I know that you will understand how pressed we are.

I recall quite well that you had proposed a simple cryptographic device at the time of my contact with the Todd Company in 1937.

My first impression with regard to the possible utility of a device such as you describe is that it would probably not be useful because of its comparative slowness of operation. Moreover, I very much doubt that it presents elements of novelty in the field. However in order to insure that we do not overlook anything that might be useful, I suggest that you send the model for examination and we will be glad to make a recommendation. I believe it would be best if you would address the letter and package officially to the Commanding Officer, Signal Security Service, Arlington Hall Station, Arlington, Virginia. Upon its receipt and thorough examination you will be promptly informed of our conclusions.

With cordial greetings to you and your associates, I am

Sincerely yours,

William F. Friedman
Director of Communications
Research

THE TODD COMPANY

ROCHESTER ▽ NEW YORK

March 11, 1943

Col. William F. Friedman
3932 Military Road
Washington, D. C.

Dear Col. Friedman:

Perhaps you will recall that during your visit to Rochester in October 1937, when you presented your plans for a check sorting machine, you met the writer of this letter, and showed a cryptographic device on which you had applied for patent. On October 13, 1938 this patent was issued, bearing No. 2,144,204.

This cryptographic device showed two gears of unequal diameters, having arranged around their circumferences letters and corresponding symbols.

Shortly after you were here, I conceived the idea of running two photographic film tapes over sprockets arranged side by side on the same shaft so that in coding a message, letters were selected on one tape and corresponding symbols on the adjacent tape were selected to make the code. It is obvious in this arrangement that the letters on the second tape could be scrambled in an endless sequence by making the tapes of a sufficient length.

During the early part of last year, a War Research Committee was formed in the Rochester Chamber of Commerce, of which committee I became a member.

It has occurred to me that a simple cryptographic device might be of use in the communication organizations of the Army and Navy. I have made a model, elaborating somewhat on my original plan, which I should be pleased to forward to you in order to get your opinion on its practicability.

This model embodies four 16 mm. film sprockets fixed side by side on a shaft and adapted to carry four film strips. Each film strip carries a group of letters of the alphabet as shown in the accompanying sketch. In this particular instance, each group consists of five letters. Consequently, the number of permutations of each letter group could be 120; and with the four tapes the possible permutations would be 120^4 or 2.07×10^8 .



Col. William F. Friedman

-2-2

March 11, 1943

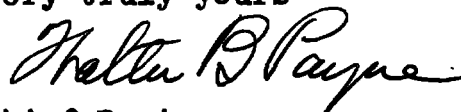
The rows running across the four films can be brought into registration with two stationary series of letters comprising the alphabet, figures from 0 to 9, and a few punctuation marks. The stationary letters, forty in all, may be divided into groups of five each and the eight groups can be arranged in factorial 8 different ways amounting to 40,320. With the film tapes set in proper registration according to a known code number, and the stationary alphabet groups also arranged according to a known code number, it would be possible to obtain a very large number of settings which would be almost impossible to find by trial unless one could guess correctly certain words in the message. This would be quite a remote contingency.

Inasmuch as the device which prompted this investigation was shown me by you, I think it proper to take the matter up with you before submitting it to the War Research Committee for their consideration.

I should consider it a favor if you would give me your frank judgment on the merits of this device, and if you think that it is a waste of time to put further effort on it, please do not hesitate to so advise me. The model I have made, while it is quite crude, operates well and you could tell by an inspection of same whether there are any possibilities for a device of this nature.

I have shown this model to Mr. Walter Todd and he advised me to take the matter up with you, which I am pleased to do as I rely implicitly on your judgment.

Very truly yours



Chief Designer

Walter B. Payne
MB

THE TODD COMPANY

INTER-OFFICE CORRESPONDENCE

Mar 11 1943

TO
AT

DATE

FROM

OFFICE

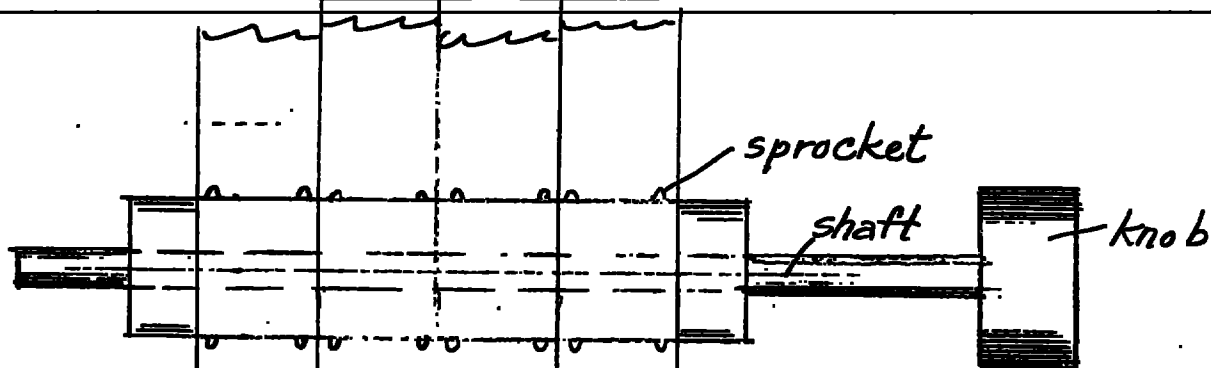
ATTENTION OF

SUBJECT

ANSWERING YOURS OF

DICTATED BY

EVERY INTER-OFFICE LETTER MUST HAVE A SUBJECT. WRITE OF ONLY ONE SUBJECT IN THIS LETTER.
NO BALLINATION OR SIGNATURE IS NECESSARY OR DESIRED.



BAC	E	D	V	R	L	M	X	Y	U	V	W	6	5	7	8			
7		9		11										18				
F	G	H	I	R	S	T	P	Q	Z	1	2	3	4	5	9			
6		8		10										17				
A	D	E	B	M	N	O	K	L	W	X	Y	U	V	6	7	8	4	5
5		7		9										16				
J	T	H	G	F	Q	R	S	T	P	Z	1	2	3	4	5	9	7	8
4		6		8										15				
A	C	D	E	F	Z	M	N	K	V	W	X	Y	U	5	6	7	8	4
3		5		7										14				

stationary
or index
letter
groups

1	3	5	7																															
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	1	2	3	4	5	6	7	8	
B	A	D	C	K	L	M	O	V	U	X	Y	W	5	4	7	6	8																	
1	3	5	12																															
G	H	I	J	F	Q	R	S	T	P	Z	1	2	3	4	5	9	7	8																
2	4	6	8																															

The film is advanced
for each word.

No spacing between words

Rym

Different arrangement of
index letter groups

3	7	1	6																				
K	L	M	N	O	4	5	6	7	8	A	B	C	D	E	Z	1	2	3					
F	Q	R	S	T	U	V	W	X	Y	9	1	2	3	4	5	9	7	8	F	G	H	I	J
4	5	8	2																				

SAMPLE MESSAGE OBSVDIJDIAOOTJNCMD CODED WITH MACHINE

17 14 9 10

COMBINATIONS IN MACHINE NOT SAME AS IN SKETCH